ICT USAGE IN HIGHER EDUCATION:
A CASE STUDY ON PRESERVICE TEACHERS AND INSTRUCTORS

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ABSTRACT

This study explored the level of usage of preservice teachers' and instructors' utilization of information and communication technologies (ICT). Thus, the main purpose of this study was to examine factors that contribute to preservice teachers' utilization of technology and suggest recommendations regarding to the effective utilization of technology. This case study used data from a school of education in a private university. Results of this study indicated that teacher education programs fail to provide appropriate instructional technologies and computer facilities for both in and out of class activities. Furthermore, three factors that appear to have a significant influence on the effective use of technology were found to be: (1) the quantity and quality of the lessons addressing technology in the curriculum, (2) incompetent teachers/lack of in-service training, and (3) insufficient technological infrastructure.
Keywords: ICT use, teacher education, technology integration

INTRODUCTION

The rapid developments in technology have made tremendous changes in the way we live, as well as the demands of the society. Recognizing the impact of new technologies on the workplace and everyday life, today's teacher education institutions try to restructure their education programs and classroom facilities, in order to minimize the teaching and learning technology gap between today and the future. This restructuring process requires effective integration of technologies into existing context in order to provide learners with knowledge of specific subject areas, to promote meaningful learning and to enhance professional productivity (Tomei, 2005, p. 195).

However, many recent research studies on this theme shows that many institutions are failing to integrate technology into existing context. Bauer & Kenton (2005) stated in their study that although teachers were having sufficient skills, were innovative and easily overcome obstacles, they did not integrate technology consistently both as a teaching and learning tool. Reynolds, Treharne & Tripp (2003) also underlined continuing problems in the adoption of ICT by teachers and stated the need for further research on how ICT can improve education.

Turkey also made innovative attempts to increase ICT use of teachers. Building 2802 ICT classrooms in 1999 and 3000 ICT classrooms in 2005, providing laptops for teachers' project and building large "National Education Portal" project (2005) is just some of these attempts carried out by Ministry of Education in order to increase ICT use in Turkey. On the other hand, although the potential of technology has been valued early on and ICT use is increasing, the extent and nature of ICT usage in Turkish educational institutions is still very varied and in many instances limited.

Regardless of the quantity of technology placed in classrooms, the key to how those tools are used is the instructor. The majority of instructors believe technology usage is important for teaching, however, lack confidence and understanding during integration process. Furthermore, instructors should possess the skills and competencies essential for designing, delivering and evaluating instruction, since "Successful integration of technology requires not only the knowledge of the technology and its potential use but also the skill to plan and execute a good lesson (of which the technology is only a part)" (Painter, 2001, p. 23). When technology usage is aligned with the instructional goal, where technology is integral to teaching, successful integration might be succeeded. . Otherwise, the use of technology alone is not a sufficient indicator of integration. Therefore, "teacher educators need to place instructional technology education within the context of teachers' work in the classroom" (Mayo, Kajs & Tanguma, 2005, p.12). Wang, Ertmer & Newby (2004) concluded about this topic "…as our future teachers achieve high confidence levels for technology implementation, meaningful technology use can come closer to being the norm, rather than the exception, in our K-12 classrooms" (p. 242). Deaney, Ruthven & Hennessy (2003) also considered three major points for using ICT: the need for wider skills for effective use of tools, the need to focus on the power of technology and the need to shift familiar patterns of classroom interaction by introducing technology (p. 161).

Given the importance of access to technology, technology-competency and effective integration of technology, an understanding of how instructors and pre-service teachers in a faculty of education perceive technology can help institutions of higher education to successfully integrate, in relation with the current ICT usage. Desiring

technology-competent teachers for 21st century classrooms, we have to inquire the utilization of technology in teacher education institutions (Yildirim, 2000, p. 481). Understanding the factors contributing to the utilization of technology and the possible relations of these factors will lead us to educate technology-competent teachers. Under the light of these facts, the main purpose of this study was to examine factors that contribute to preservice teachers' utilization of technology and suggest recommendations regarding to the effective utilization of technology.

METHOD
Educational institutions should train teachers who are technology-competent and who effectively use and integrate technology into their teaching activities. This study aims at drawing an understanding of how instructors and pre-service teachers in a faculty of education perceive technology can help institutions of higher education to successfully integrate, in relation with the current ICT usage. Thus, the following research questions were proposed:

1. What is the current provision of technology utilized by both instructors and pre-service teachers?
2. What are the anticipated technologies and activities that preservice teachers require?
3. What are the preservice teachers' perceptions pertaining to computer and technology facilities provided to them?
4. What are the instructors' perceptions pertaining to technology usage in teaching activities?
5. What are the obstacles that instructors faced during technology integration process?

Subjects
All the accessible members of Faculty of Education, who were voluntarily participated, form the participants of this study. Accessible number of participants with their percentages was given in Table-1.

Table-1 Accessed participants of Faculty of Education

	Total Number of Participants	Accessed Number of Participants	%
Administrators	6	6	100
Instructors	25	24	96
Students	558	304	55

Instruments
Researcher developed two questionnaire forms; one for academic staff and the other for preservice teachers have been used in order to obtain data. The questionnaire form for academic staff contained 71 items, in which 26 questions addressing ICT usage, 8 questions addressing factors encourages technology usage, 21 questions about obstacles and 18 questions about self-perceived competencies. The student's form consisted of total 46 items, where 22 of them were about what sort technologies preservice teachers prefer to use and how often they use ICT and 19 of them were about the views of preservice teachers on ICT based on rated and 5 rated likert type scale. Descriptive statistical techniques such as frequency (f), percent (%) and mean (X) were used for analyzing data.

FINDINGS
Demographics
The demographic data about accessed academic staff and preservice students is below.
▪ According to departments, the percentages of preservice teachers were as follows: Computer and Instructional Technology Department 18,1 %, Elementary School Mathematic Teaching Department 15,5%, Turkish Language Teaching Department 8,6%, Foreign Language 24%, Elementary Education Department 17,8% and Preschool Education Department 13,5%.
▪ The distribution of student according to grades were; Elementary education 1st grades 39,5%, 2nd grades 35,5%, 3rd grades 16, 4% and the 4th grades 7,6%.
▪ The percent of female students were 80,3 while the male students' percent were 15,5. 81,6% of students from Faculty of Education have own home computers with 54,9% Internet connection.
▪ The 35,5% of subjects pointed out that they used computer less than one hour daily, and 15,5% of them used 1-3 hours and only 4,6% of them used longer than 5 hours in a day.
▪ 17, 4% of participants mentioned that they have been computer less than one year, and 25% of them have been used it for 1-3 years, 18,8% of them have been used it for 3-5 years and 33,6% of them have been used computer for over 5 years.

Perceptions of Preservice Teachers
It is necessary to provide one computer for every 6 students in a classroom setting for effective and efficient usage of technology. However, the existing settings are far from this reality and there is only one computer available for 12 students. The board, printed materials and overhead projection are widely used technological tools in classroom settings. The educational software is used very rarely in- and out of classroom. These results imply that the conventional instructional methods and technologies have been used and confessed in classroom settings unlike new approaches.

The 25% of preservice teachers stated that the instructional media have been used efficiently in the courses of educational faculty they study. They maintained that academic staff use mostly board (99%), and overhead projectors (93%) printed materials (93%) during the courses. They pointed out that computers (85%), TV and video (70%) and overhead projectors (60%) should be used definitely and extensively during the courses.

The 87% of preservice teachers maintained that they would like to use electronic media for communicating with classmates and academic staff, however only 48% of them could use electronic media for these purposes. When preservice teachers were asked to rank the technologies they favored to use in class according to the importance, 27,3% choose "Computer Assisted Education", 16,1% preferred Internet/Web, 14,8% stated "Computer and Projector System" and 13,5% selected "Multimedia Computer" as their favored technologies to be used in classrooms. Preservice teachers were also asked to rank their preferences in terms of software. The results showed that the most favored software they want to use in their classrooms were presentations software (25,3%), Internet Browsers (13,2%), educational software (12,5%) and animations software (8,6%). Preservice teachers' thoughts on various topics can also be seen in Table-2.

Table-2 The Percentages of Responses of Preservice Teachers for Technology Usage

Technology Usage Levels	Always %	Rarely %	Never %
Technology is used adequately during the courses in the faculty	11,5	70,4	17,1
Students could be facilitated with necessary skills for using ever technology until they graduate	11,2	61,5	26,0
The courses in the faculty provide us with basic skills and knowledge for usage of computer applications	36,5	48,7	13,5
The academic staff support and direct us to use additional materials for courses	34,2	48,0	16,4

The 44% of preservice teachers stated that they have been facilitated with basic knowledge and skills for effective usage of computer applications while 26% of them believe that the courses relating to computer could response the needs of students' computer usage. Only 30% of students stated that they have adequate skills for usage of instructional technologies in the future profession.

25% of students underlined that the instructional technologies have been used effectively in the courses of faculty of Education. The majority of students (92%) pointed out they wish to attend the courses of academic staff who use instructional technologies in extensively. Unlike the courses, they prefer to use supportive materials such as Web pages, computer assisted applications, Internet and online tutors.

Students stated that they have chosen to use word-processing (72%) and Internet Browsers (62%) for computer and educational software. However, 86% of the students maintained that they have never used any database and 68% of them have never used any educational software until now. The most favorite software of students were; word-processors (70%), Internet Browsers (69%), electronic presentations (68%), animation software (66%), Web pages developing software (54%) and educational software (51%).

Perceptions of Instructors
Majority of academic staff pointed out that they needed for a classroom setting which is facilitated with ICT tools such as computer, projector, TV and video, overhead projector, Internet and other instructional technology. They mentioned that the standardization of technology in every classroom and some special classrooms with facilitated high technology might response their expectations about effective teaching.

Some of the academic staff maintained special expectations relating to their special fields. They stated that some particular laboratories such as language, mathematics education, multimedia, research and motor skills instruction, have to be established and organized for effective and freely usage of both academic staff and students. They added that increasing the numbers of tools per a student in field special laboratories would lead to

more effective teaching as well. They also pointed out that they used frequently overhead projectors, printed materials, Internet and computer for preparing and conducting a course.

The academic staff stated that they use computers firstly for communication (95%), secondly preparing examination and course material (92%), thirdly research in Internet (90%) and finally for making presentations (58%). The 45% of academic staff have participated into courses our activities relating to usage of technology previously. Almost all of the academic staff (99%) was willing and ready to participate in any course, seminar, and workshop about technology usage. 85% of these academic staff mentioned the importance of learning by doing and active learning methods in these courses. In addition, academic staff pointed out a need to be supported and informed professionally on usage of technology for the research activities.

The 87% of academic staff recognized computer as a supportive tool for instruction and other activities. 49% of them pointed out that they could use computer as an instructional medium and integrate it into curriculum easily. When instructors are asked to ranked the factors which encourages technology usage of instructors, they rated "Existence of plans and strategies of the faculty in order to diffuse the instructional technologies" as the first item, "The faculty should make investments for in-service training" rated as the second item, and "The faculty should make investments to technical infrastructure" rated as the third item.

When obstacles faced during the use of technology in the teaching-learning process were investigated, the results showed that the academic staff had not enough time for participating to professional development projects or activities due to hard schedule and scarcity of staff. Everybody agreed on the need for continuous development schemes for effective and efficient usage of technology. They pointed out necessity of informing academic staff permanently in the faculty for they could integrate technology into curriculum and use technology efficiently. It means that they pointed out in-service education activities such as seminar, workshops and so forth. Supplement of informative materials about technology usage and innovation were other important points made by academic staff.

Almost all of the academic staff were willing to use technology in their courses effectively. They expected to have more support in terms of infrastructure and in-service training. Having so many academicians in a positive attitude towards technology is a good thing for any institution. It is almost half of the way towards effective integration.

DISCUSSION AND CONCLUSION
The results showed that in general, both the preservice teachers and instructors are in favor of using technology in and out-of-class activities. This positive attitude is an important indicator of willingness and first step in effective integration. Almost all of the academic staff were willing and ready to participate in any course, seminar, and workshop about technology usage, which reveals the need for professional development. They also pointed out the lack of electronic classrooms. These are very common results of technology integration studies. As the technology changes rapidly and contribute all segments of society and science, both preservice teachers and instructors wish to use technology in every phases of their life besides their tenure expectations.

Preservice teachers stated their most favored technology as "Computer Aided Instruction" and most favored software as electronic presentation. Due to the fact that "…the incorporation of technology in the classroom does enhance actual student learning and that this relationship is moderated by student characteristics" (Krentler & Willis-Flurry, 2005, p. 316) the expectations of preservice teachers are so important. Although preservice teachers are willing to use technology, they think that technology is rarely used in classrooms and their expectations were not meet. Thus, they also underlined the inadequacy of lessons to facilitate them with necessary skills for being technology-competent teachers. The instructors also paid special attention to the inadequacy of the quantity and low quality of computer literacy courses provided with students in faculty.

Higher Education Council, which is a central administrative body for higher education in Turkey, has revised the curriculum of all departments of faculties of education, in order to meet the expectations of both students and instructors. This new curriculum, which will be implemented in term of 2005-2006, is an attempt to train technology-competent teachers besides many other expectations of effective teachers. Further research studies regarding the effects of the enhancements in new program should be conducted. On the other hand, constituting learning environments with technology is another important factor which affects the use of technology. Placing at least an overhead projector and a computer-projector system in each classroom will be an important attempt to ensure the diffusion and effective use of technology. The lack of modeling by professors, due to poor technology competencies of professors is the one which plays an important role in the effectiveness of the teacher education process (Odabasi, 2000). Thus, another important attempt will be to provide teachers with in-service training

opportunities about technology so that they may feel themselves technology-competent, develop confidence and become role-models. As a consequence;

o The quantity and quality of the lessons addressing technology usage should be increased,
o Teachers should be sufficiently educated by providing qualified in-service training opportunities, and
o Learning environments should be donated with the minimum necessary technological tools

are the most important attempts to diffuse the use of technology for teaching-learning purposes. Gibson and Oberg (2004) also reported that the potential usage of Internet as a learning tool has not been realized by both teachers and students and they added that "This outcome appeared to be the result of limited infrastructure support, difficulties in infusing Internet use into curriculum, and lack of appropriate teacher professional development" (p. 569). The research study conducted by Staples, Pugach and Himes (2005) also identified three scaffolds that appear to have a significant influence on technology integration: "alignment with the curriculum/mission, teacher leadership, and public/private roles for technology recognition" (p. 285). Yet another researcher Venezky (2004) concluded that "… both infrastructure and teacher competencies were critical for successful implementation of ICT in a school" (p. 15) after bringing together different cases in various schools. Furthermore, Rosenfeld and Martinez-Pons (2005) found in their study that "… competence in the use of technology in the classroom proved to be a direct function of the degree of technology utilization" (p. 145).

Of course these investments cannot guarantee the effective use and integration of technology. However, these efforts will decrease the number of obstacles faced. In their study about the envisioning the use of technology within their future classrooms done with a group of preservice teachers, Doering, Hughes and Huffman (2003) offered several suggestions like; "… offering opportunities to virtually observe technology-using teachers, placing students in decision-making scenarios, providing more access to technological tools in media laboratories …" (p. 358).

As a consequence, cooperation with technology experts as advisors and role models should be the first step to be taken. Without technology-competent role-model instructors, it is difficult to integrate the technology into curriculum and graduate technology-competent teachers. Besides, careful investments on both hardware and software should be planned in the long range. Thus, as a second step, all classrooms should be equipped with the necessary infrastructure and all students should be provided with access to media laboratories whenever they want. For the quality and quantity of courses, instructors should revise their lesson plans or prepare technology-rich lesson plans and try to integrate technology into curriculum.

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