THE CURRENT STATUS OF INFORMATION AND COMMUNICATION TECHNOLOGIES INTEGRATION INTO SCHOOLS OF TEACHER EDUCATION AND K-12 IN TURKEY

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Approval of the Graduate School of Natural and Applied Sciences

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ABSTRACT

THE CURRENT STATUS OF INFORMATION AND COMMUNICATION TECHNOLOGIES INTEGRATION INTO SCHOOLS OF TEACHER EDUCATION AND K-12 IN TURKEY

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The purpose of this study was to investigate the current status of schools of teacher education (STE) in Turkey in terms of how they prepare future teachers to use information and communication technologies (ICT) in their professions, and the current situation of K-12 schools in terms of how teachers employ ICT in their professions. The primary focus was to develop a deeper understanding of ICT perceptions, competencies, classroom use, related courses effectiveness, main barriers, and possible enablers to integrating ICT.

This study may contribute to the existing literature by revealing and establishing baseline data on the current status of ICT integration into schools of teacher education and K-12 in Turkey. The results of this study can be used by policy makers, Ministry of National Education, Higher Education Council, universities, and K-12 schools to reexamine the current status of ICT and revise related policies, strategies, and courses. A mixed method approach was used by utilizing questionnaires from 51 deans, 111 faculty members, 1330 prospective teachers,

and 1429 K-12 teachers; and interviews with 6 faculty members, 6 prospective teachers, and 6 K-12 teachers.

It could be interpreted from the results that most of the participants expressed positive perceptions about the integration of ICT into teacher education and K-12 schools. Generally, faculty members perceived themselves as competent overall, while prospective and K-12 teachers did not. Faculty members and prospective teachers perceived ICT related courses beneficial and effective in ICT integration into education. On the other hand, K-12 teachers showed a degree of overall unsure (neutral) perception towards their ICT related courses and considered themselves well prepared for professional life. There were strong agreements between the participants as to the main barriers and possible enablers.

Keywords: information and communication technology (ICT), ICT perception, ICT competencies, effectiveness of ICT related courses, ICT barriers and enablers

ÖZ

BİLİŞİM TEKNOLOJİLERİNİN TÜRKİYE'DEKİ EĞİTİM FAKÜLTELERİ İLE İLK VE ORTA ÖĞRETİM OKULLARINA BÜTÜNLEŞTİRİLMESİNİN BUGÜNKÜ DURUMU

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Bu çalışmanın amacı; bilişim teknolojilerinin (BT) Türkiye'deki eğitim fakülteleri ile ilk ve orta öğretim okullarındaki durumunu, eğitim fakültelerinin geleceğin öğretmenlerini BT'yi mesleki hayatlarında kullanabilmeleri için nasıl hazırladıklarını, ilk ve orta öğretim okullarındaki öğretmenlerin bu teknolojilerden nasıl yararlandıklarını incelemektir. Öncelikli amaç, BT ile ilgili algı ve yeterlilikleri, BT'nin sınıf içinde kullanımını, konuyla ilgili derslerin etkinliğini, bu konudaki önemli zorlukları ve muhtemel çözümleri anlamaktır.

Bu çalışma, Türkiye'deki eğitim fakülteleri ile ilk ve orta öğretim okullarına BT'nin bütünleştirilmesi konusundaki mevcut çalışmalara konuyla ilgili temel verileri ortaya koyarak katkıda bulunabilir. Bu çalışmanın sonuçları politikacılar, Milli Eğitim Bakanlığı, Yüksek Öğretim Kurulu, üniversiteler ile ilk ve orta öğretim okulları tarafından BT'nin mevcut durumunu yeniden değerlendirmek, ilgili politikaları, stratejileri ve dersleri tekrar gözden geçirmek için kullanılabilir. Bu çalışmada, anketler yoluyla 51 dekandan, 111 öğretim

elemanından, 1330 aday öğretmenden ve 1429 öğretmenden; görüşmeler yoluyla da 6 öğretim elemanından, 6 aday öğretmenden ve 6 öğretmenden veriler toplanmış; bu süreçte karma araştırma yöntemi kullanılmıştır.

Sonuçlar, katılımcıların çoğunun BT'nin eğitim fakülteleri ile ilk ve orta öğretim okullarına bütünleştirilmesi konusunda olumlu algıya sahip oldukları biçiminde yorumlanabilir. Öğretim elemanları genel olarak kendilerini tamamen yeterli görürken, aday öğretmenler ile ilk ve orta öğretim okullarında görev yapan öğretmenler kendilerini yeterli bulmamaktadır. Öğretim elemanları ve aday öğretmenler BT ile ilgili dersleri, bu teknolojilerin eğitimle bütünleştirilmesi konusunda faydalı ve etkili görmektedirler. Öte yandan, ilk ve orta öğretim öğretmenleri kendilerini mesleki yaşamlarına hazırlaması konusunda bu derslerin faydalı ve etkili olup olmadığı konusunda tereddütte kalmışlardır. Çalışmaya katılanlar arasında temel zorluklar ve olası çözümler konularında kuvvetli bir fikir birliği bulunmaktadır.

Anahtar Kelimeler: Bilişim Teknolojileri, BT algısı, BT yeterlilikleri, BT ile ilgili derslerin etkinliği, BT zorlukları ve çözümleri

To my first teachers,

one is Ayten Göktaş, my mother, who is my first teacher in my small world;

the other one is Dursun Göktaş, my father, who is my first teacher in the school.

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#: Number

%: The percent sign

‰: The per thousand sign

ANOVA: Analysis of variance

AÜ: Ankara University

BECTA: British Educational Communications and Technology Agency

CEIT: Computer Education and Instructional Technology

CMC: Computer-mediated communication

CO: Computer ownership

DV: Dependents variable

EA: Educational administration

ELT: English language teaching

ETS: Educational testing service

EU: European Union

EUROSTAT: The statistical office of the European communities

f: Frequency

G: Gender

HEC: Higher Education Council (YÖK)

HTML: Hyper text markup language

I2: Interview guides for faculty members

I3: Interview guides for prospective teachers

I4: Interview guides for K-12 teachers

ICT: Information and communication technologies

ICTRC: Information and communication technology related courses

ISTE: International Society for Technology in Education

IT: Instructional technology

ITMD: Instructional technology and material development

ITS: Instructional technology center

ITSC: Instructional technology sources center

IV: Independent variable

K-12: Kindergarten through the twelfth grade

LCD: Liquid crystal display

LMS: Learning management systems

METU: Middle East Technical University

MoNE: Ministry of National Education of Turkey

MS: Microsoft

NCATE: National Council for Accreditation of Teacher Education of USA

NETS: National educational technology standards for USA

NUTS: Nomenclature of units for territorial statistics

NVIGM: Office of Population and Citizenship of Turkey

OECD: Organization for Economic Co-operation and Development

OTA: Office of Technology Assessment of USA

PC: Personal computer

Q1: Questionnaire 1 for deans of schools of teacher education

Q2: Questionnaire 2 for the faculty members

Q3: Questionnaire 3 for prospective teachers

Q4: Questionnaire 4 for K-12 teachers

SCRTEC: South Central Regional Technology in Education Consortium

SD: Standard Deviation

SEIRTEC: South East and Islands Regional Technology in Education Consortium

SITE: Society for Information Technology and Teacher Education

SPSS: Statistical Package for the Social Sciences

STE: Schools of teacher education

TIT: Taken inservice training

TPS: Technology perception scale

TUSS: Technology use self-competency scale

UNESCO: United Nations Educational, Scientific and Cultural Organization

UNRISD: United Nations Research Institute for Social Development

USA: United States of America

VCR: Video cassette recorder

WWW: World Wide Web

CHAPTER 1

INTRODUCTION

1.1. BACKGROUND OF THE PROBLEM

Since the beginning of this century, education has faced important challenges. For example, there are a large number of people to educate, insufficient economic conditions, and low quality of education. In the information age, how to provide high quality education and training has become a critical question to be answered for all who need education and can benefit from it in the most cost-effective way. Educational systems have attempted to overcome the challenges by developing new approaches. Information and communication technologies (ICT) represents a new approach for enhancing the dissemination of information and helping to meet these challenges (Lever-Duffy, McDonald, & Mizell, 2003; USDE, 2000).

From the beginning of the information age, ICT has maintained a critical role in enhancing the quality of education. Therefore, many countries wish to enhance the quality and effectiveness of the learning process in schools, and perceive ICT as one means whereby this may be achieved. This role in education includes helping students to learn and teachers to perform their teaching profession more effectively. As a consequence of rapid developments in a short time, ICT has become the focus of interest for educational environments.

Rapid developments in ICT have also led to drastic changes in education. This leads to the need for preparing students for these changes in the information society. In all levels of education, technology becomes a key to functioning effectively in the environment generated by the information age. With the continuing advances in educational technology and the increasing availability of technology to both universities and K-12 schools, it is incumbent upon schools of teacher education (STE) to look critically at how technology is integrated into their programs (Parker, 1997).

A predetermined process has a considerable importance for integration of ICT in classroom, curriculum, school management, library and any educational settings. Integration of ICT is important to enhance the quality of education and how ICT might enable educators to create alternative pathways. Therefore, educational policymakers have associated reform with the infusion of ICT into schools particularly since the publication of "Nation at Risk" in 1983. For that reason, billions of dollars have been spent on actualizing this policy by the whole countries in the world. Huge investments are now being made to equip schools with ICT. Governments aim to know the conditions to be satisfied for this to lead to improvements in student achievement. In a fast-changing environment, they are often searching for the best way to move forward (ISTE, 1999; Koc, 2005).

In these contexts, teachers' shifting role in the 21st century involves an essential mission, which is to be the frontier for applying technological innovations to teaching/learning process. At this point, necessary skills and the level of readiness are key factors in the implementation process of new ICT (Özoğul, 2002). Consequently, STE play a crucial role in preparing future teachers to become proficient in the integration of ICT into the curriculum. They need to help prospective teachers understand how ICT can be used to teach content in rich and meaningful ways (Keating & Evans, 2001).

On the other hand, integration of ICT into preservice teacher education is a critical issue to be able to integrate ICT in K-12 schools. According to Duran (2000) and Moursund and Bielefeldt (1999), STE do not currently provide prospective teachers with the necessary skills, competencies, and experiences to prepare them to use ICT effectively in their future profession.

With the aim of using ICT effectively, teachers should be equipped with the adequate skills and knowledge. Every semester, new teachers start their careers and are required to obtain the skills to merge today's ICT into learning activities that will stimulate and maintain students interest, while at the same time prepare the students for the future. Teachers are expected to be ICT leaders, models for appropriate use of emerging types of ICT, and effectively integrate a wide variety of ICT into the curriculum (Özoğul, 2002).

Unfortunately, many practitioners and graduates of higher education institutions are still lacking the ICT preparedness for their job demands. The ongoing empirical studies in those institutions, in particular, should involve actual classrooms, using ordinary teachers in order to be better generalized to other educational settings. The idea that is always supported is that teachers are the keys of student learning and achievement, so that teachers became the central point of the efforts.

New attributions to teachers' roles and rapid changes in ICT also affect the mission and vision of STE. Those schools have been redesigning preservice teacher education curricula in order for prospective teachers to become competent users of new technologies when they become teachers (Özoğul, 2002). Since teachers are the key to effective and efficient ICT integration into the curriculum. When technology is available, however, it is frequently used with styles of teaching that fail to maximize its full potential. This could be the result of inability, improper training, technophobia, or a lack of practice using alternative teaching strategies. Therefore, adequate professional development is needed if ICT is to help schools improve learning. In these contexts, schools of teacher education play key roles to effective and efficient ICT integration into the K-12 schools (Fullerton, 1998).

1.2. PURPOSE OF THE STUDY

The purpose of this study is to investigate the current status of schools of teacher education in Turkey in terms of how they prepare future teachers to use ICT in their professions, and the current situation of K-12 schools in terms of how teachers employ ICT in their work. The primary focus is to develop a deeper

understanding about the integration of ICT into STE and K-12 schools by presenting the current status in terms of ICT perceptions, ICT competencies, ICT usage in classrooms, effectiveness of the ICT related courses, main barriers, and possible enablers to integrating ICT.

1.3. THE NEED FOR RESEARCH

ICT has introduced sometimes radical changes in certain sectors. It is expected that changes on the same scale will occur in education systems. This has led to reconsideration of priorities in education. The new technologies are potential vehicles for change and innovation. They may encourage pupils to abandon passive listening in favor of more responsive engagement, help to bring the outside world into the school, and more generally, change the way education is dealt with. ICT is neither a substitute for “traditional” learning and teaching, nor a substitute for students using their minds and imaginations. The role of ICT is to serve education, in particular, by helping students to learn more effectively and by helping teachers to do their job more efficiently. ICT should be used in all sectors of the curriculum, and it should be made available to help teachers manage the learning process (EURYDICE, 2001).

Recently, increased focus on ICT in schools of teacher education emphasizes the need for ICT to move from the periphery of teacher preparation to the center of teacher preparation. Recognizing that "some schools of education are in the vanguard of introducing technology into teacher preparation," NCATE (1997) reports that "…most schools of education have not yet fully integrated technology into their teacher preparation programs” (p. v). To address such concerns, many action plans have been adopted at national and world levels, as well as stronger investments for ICT in teacher education. While the pace of such developments varies greatly, there is no doubt that all developed countries are now attaching very high priority to ICT in their teacher education policies, and seeking to adjust the way their education systems are organized and function as a result.

In Turkey, parallel to the international practices in reforming preservice teacher education for the new millennium, the Higher Education Council (HEC) developed new teacher education curricula for schools of education, and ICT has

been included in the new teacher education curricula. According to the new curricula, the "Computer" and "Instructional Technology and Material Development (ITMD)" courses became compulsory in both primary and secondary preservice teacher education programs. The main purpose of the "Computer" course is to help prospective teachers process basic computer skills on commonly used computer applications, such as word processing, spreadsheet, database, telecommunication, and presentation programs. In the "ITMD" course, prospective teachers gain knowledge and skills in a variety of instructional technologies, and develop and evaluate technology-based instructional materials (HEC, 1998).

The new technology integrated preservice teacher education curriculum has been implemented since 1998. However, there is no evidence on the effectiveness of the new curriculum, and it is not clear if the new curriculum meets the required needs in the ICT training of prospective teachers. Even though there have been recent efforts related to the integration of ICT, the field lacks extensive research studies to determine the existing situation of ICT integration into STE and K-12 schools in Turkey in terms of ICT perceptions, ICT competencies, ICT usage in classrooms, effectiveness of the ICT related courses, main barriers, and possible enablers to integrating ICT.

1.4. RESEARCH QUESTIONS

The focus of this study is to reveal the current situation of STE in Turkey in terms of how they prepare future teachers to use ICT in their professions and the current situation of K-12 schools in terms of how teachers employ ICT in their work. Consequently, the overarching question this study sought to answer was how schools of teacher education in Turkey prepare future teachers to use ICT in their professions, and how K-12 teachers employ ICT in their work. This study addressed the following research questions:

(1) What are the deans', faculty members', prospective teachers', and K-12 teachers' perceptions about ICT integration into teacher education programs?

   (1.1) What are the deans' perceptions about ICT integration into teacher education programs?

(1.2) What are the faculty members' perceptions about ICT integration into teacher education programs?

(1.3) What are the prospective teachers' perceptions about ICT integration into teacher education programs?

(1.4) What are the K-12 teachers' perceptions about ICT integration into teacher education programs?

(2) What are the prospective teachers' and K-12 teachers' perceptions about ICT integration into K-12 schools?

(2.1) What are the prospective teachers' perceptions about ICT integration into K-12 schools?

(2.2) What are the K-12 teachers' perceptions about ICT integration into K-12 schools?

(3) What are the faculty members', prospective teachers', and K-12 teachers' perceived ICT competencies?

(3.1) What are the faculty members' perceived ICT competencies?

(3.2) What are the prospective teachers' perceived ICT competencies?

(3.3) What are the K-12 teachers' perceived ICT competencies?

(4) How do faculty members, prospective teachers and K-12 teachers perceive the effectiveness of ICT related courses in teacher education programs?

(4.1) How do faculty members, prospective teachers and K-12 teachers perceive the effectiveness of the course titled "Computer" in terms of ICT integration into teacher education programs?

(4.1.1) How do faculty members perceive the effectiveness of the course titled "Computer" in terms of ICT integration into teacher education programs?

(4.1.2) How do prospective teachers perceive the effectiveness of the course titled "Computer" in terms of ICT integration in their future profession?

(4.1.3) How do K-12 teachers perceive the effectiveness of the course titled “Computer” in terms of ICT integration into teacher education programs?

(4.2) How do faculty members, prospective teachers and K-12 teachers perceive the effectiveness of the course titled “Instructional Technologies and Material Development” in terms of ICT integration into teacher education programs?

(4.2.1) How do faculty members perceive the effectiveness of the course titled “Instructional Technologies and Material Development” in terms of ICT integration into teacher education programs?

(4.2.2) How do prospective teachers perceive the effectiveness of the course titled “Instructional Technologies and Material Development” in terms of ICT integration in their future profession?

(4.2.3) How do K-12 teachers perceive the effectiveness of the course titled “Instructional Technologies and Material Development” in terms of ICT integration into teacher education programs?

(5) To what extent do faculty members and K-12 teachers use ICT in their courses?

(5.1) To what extent do faculty members use ICT in their courses?

(5.2) To what extent do K-12 teachers use ICT in their courses?

(6) What are the barriers and enablers for integrating ICT into teacher education programs?

(6.1) What are the barriers faced in integrating ICT into preservice teacher education programs according to deans, faculty members, and prospective teachers?

(6.1.1) What are the barriers faced in integrating ICT into preservice teacher education programs according to deans?

(6.1.2) What are the barriers faced in integrating ICT into teacher education programs according to faculty members?

(6.1.3) What are the barriers faced in integrating ICT into teacher education programs according to prospective teachers?

(6.2) What are the deans', faculty members', and prospective teachers' perceptions for the enablers of integrating ICT into teacher education programs?

(6.2.1) What are the deans' perceptions for the enablers of integrating ICT into teacher education programs?

(6.2.2) What are the faculty members' perceptions for the enablers of integrating ICT into teacher education programs?

(6.2.3) What are the prospective teachers' perceptions for the enablers of integrating ICT into teacher education programs?

(7) What are the barriers and enablers for integrating ICT into K-12 schools?

(7.1) What are the barriers faced in integrating ICT into K-12 schools according to their teachers?

(7.2) What are the perceptions of K-12 teachers as enablers for integrating ICT into their schools?

(8) Is there a significant difference between K-12 teachers' perceived ICT competencies in regard to gender, computer ownership, ICT related courses taken, and in-service training taken about ICT?

(8.1) Is there a significant mean difference between male and female K-12 teachers' perceived ICT competencies?

(8.2) Is there a significant mean difference between K-12 teachers who had taken and who had not taken ICT related courses during their preservice teacher education study?

(8.3) Is there a significant mean difference between K-12 teachers who had participated and who had not participated in ICT in-service training?

(8.4) Is there a significant mean difference between K-12 teachers who own computer and who do not?

1.5. SIGNIFICANCE OF THE STUDY

Turkey has faced important educational challenges, with great number of students and teachers, great land area, a very large educational system, and poor economic conditions at the beginning of this century (Göktaş, 2003; TurkStat, 2005; MoNE, 2005). Students and teachers constitute around 30% of the Turkish population. Under these conditions, providing high quality and cost-effective education and training has become critical, Turkey's educators and policy makers have tried to overcome these challenges by developing new approaches in education. In these contexts, ICT is such a new approach as enhancing the dissemination of information and meeting these challenges. ICT integration into education might be crucial important alternatives to help solve Turkey's educational and instructional challenges. By using those technologies, despite the budgetary restrictions in developing countries, Turkey can decrease the educational and instructional challenges (Usun, 2004). It is also important to integrate ICT into the all education levels via appropriate policies and strategies in order to keep pace with the information age and continue to assist in the modernization of Turkey.

Parallel to the international trend of the importance of ICT in education was increasing worldwide, Turkey started ICT-related initiatives as early as 1984. Even though there have been some works going on related with integration of ICT in Turkey's educational system, the field lacks of extensive research studies to determine the existing situation of prospective and K-12 teachers in ICT integration. The current study has three main significances. Therefore, this study may contribute to the related stakeholders base on three aspects.

Firstly, this study may contribute by revealing and establishing baseline data regarding the ICT perceptions, ICT competencies, ICT usage in classrooms, effectiveness of ICT related courses, main barriers, and possible enablers on the current status of ICT integration into STE and K-12 schools in Turkey.

Secondly, the results of this study can be used by the legislators, politicians, policy makers, Ministry of National Education (MoNE), HEC, universities, STE, and K-12 schools for reexamine the current status of ICT and revise related policies, strategies, courses for the successful ICT integration into teacher education and K-12 schools.

Finally, the study may also contribute by developing three questionnaires and three interview guides that could be used to rate schools of teacher education, faculty members, and K-12 teachers in terms of ICT readiness for both research and practice purposes.

1.6. ASSUMPTIONS OF THE STUDY

In this study, the following assumptions are adopted:

(1) The researcher has assumed that all the primary stakeholders have some exposure and beliefs about the role of ICT specific to its use in education.

(2) The participants responded accurately to all measures used in this study.

(3) The data were accurately recorded and analyzed.

(4) Reliability and validity of all measures used in this study are accurate enough to allow accurate assumptions.

(5) 33.035 is the student quota of schools of teacher education for 2001 except in departments of computer education and instructional technology (CEIT). This number is an assumption that it is the number of prospective teachers (senior students) in 4th year in 2004-2005 (see Appendix H).

1.7. ROLE OF THE RESEARCHER

The role of the researcher is to be as objective as possible in order to make ultimate decisions. Major roles of the researcher are described in the below section:

(1) Three out of four questionnaires and all interview guides were developed by the researcher based on related literature.

(2) The questionnaires were distributed and collected with assistance of around 90 volunteer people.

(3) Interviews were conducted with 18 participants by the researcher.

(4) The collected quantitative data were entered into SPSS, analyzed, interpreted, and discussed by the researcher.
(5) The collected qualitative data were transcribed, coded, categorized, analyzed, interpreted, and discussed by the researcher.

1.8. LIMITATIONS OF THE STUDY

The following limitations are relevant to the study:

(1) This study is limited to STE and K-12 schools in Turkey.

(2) This study is limited to the sample of 51 STE for deans, 18 STE for faculty members, 19 STE for prospective teachers, and 35 provinces and 92 schools for K-12 teachers.

(3) In this study, convenience sampling with representative methodologies was used for prospective teachers, faculty members, and K-12 teachers. Thus, it can be stated that the results of the study are limited with the participants and cannot be generalized beyond this study.

(4) The prospective teachers of departments of CEIT have significant differences than the prospective teachers in other departments in terms of ICT perceptions, competencies, and usage. Therefore, the data were not collected from the prospective teachers of CEIT departments.

(5) Validity of this study is limited to the reliability of the instruments used, and to the honesty of the participants' responses to them.

1.9. DEFINITIONS OF THE CONCEPTS AND TERMS USED IN THE STUDY

Dean of STE: A person who is the head of a school of education including several departments. The dean has the role of representing the particular school's policies and points of view.

Effectiveness: A measurement of how well something meets its intended purpose.

Faculty Member: A person who is a teacher educator and instructs ICT related courses in a preservice teacher education program.

ICT: ICT stands for "Information and Communications Technology" which is currently defined as the set of activities that facilitate by electronic means the processing, transmission, and display of information (OECD, 1997). It can be broadly defined as the set of technologies that enable the collection and processing of the collected information, storage, and the automatic transfer of this information to somewhere else or access them remotely when needed by means of electronics and/or optics, etc. technologies (Ceyhun & Çağlayan, 1997).

ICT Competencies: It can be defined for the scope of the study as to have and to understand adequate knowledge, skills, and abilities about ICT in order to use it effectively and efficiently for their own purposes

ICT Integration: ICT integration into education is defined for the current study as using ICT effectively and efficiently by whole stakeholders in all fields of education. The meaningful ICT integration knows when, why, and how specific tools should be used to facilitate learning. It needs together ability to plan and select the optimal application tools, as well as the knowledge and skill to implement and evaluate their effectiveness (Newby, Stepich, Lehman, & Russell, 2006).

ICT Perceptions: The term is defined for this study as the process of interpreting and understanding information gathered by the senses about ICT. It is not an immediate reaction to ICT; rather it is a process extended in time. ICT perception also is interlinked to previous experiences and memories (Ashcraft, 2006; Hentschel, Smith & Draguns, 1986).

ICT Related Courses (ICTRC): The courses which are designed to provide necessary knowledge and skills in using ICT, especially computers, effectively in a teaching/learning process. The goals of the courses are to graduate teachers with an adequate level of technology competency. The current ICT related courses in Turkey's schools of teacher education are titled "Computer" and "ITMD". Some STE use same content but different names for the

"Computer" course as like "Computer in Education", "Computer Application in Education" etc.

K-12: Kindergarten through the twelfth grade (secondary education).

NUTS (Nomenclature of Territorial Units for Statistics): NUTS is a system based on the statistical classification of the regions in the EU (European Union). It was created by the European Office for Statistics (EUROSTAT) as a single hierarchical classification of spatial units used for statistical production across the European Union (EUROSTAT, 2005). Since it is a hierarchical classification, the NUTS subdivides each Member State into a whole number of NUTS 1 regions, each of which is in turn subdivided into a whole number of NUTS 2 regions and so on.

Two criteria are used in subdividing national territory into regions: normative and analytic criteria. For the normative criteria, the regions are defined according to normative requirements; their limits are fixed according to the tasks allocated to the territorial communities, according to the sizes of population necessary to carry out these tasks efficiently and economically, and according to historical, cultural, and other factors. For the analytical criteria, the regions are defined according to analytical requirements; they group together zones using geographical criteria or using socio-economic criteria (EUROSTAT, 2005).

The NUTS classification has been used since 1988 in the EU. Turkey's application was accepted by the EU in 2002 and consequently, a consensus on defining the 12 regional breakdowns was provided. In this study, these regional breakdowns are used for the selection of representative samples (see Table 1.1).

Table 1.1: The NUTS Level 1 for Turkey

Code	Region Name	Cities
TR1	İstanbul	İstanbul
TR2	West Marmara	Tekirdağ, Edirne, Kırklareli, Balikesir, Canakkale
TR3	Aegean	İzmir, Aydın, Denizli, Muğla, Manisa, Afyon, Kütahya, Uşak

Table 1.1 (continued)

Code	Region Name	Cities
TR4	East Marmara	Bursa, Eskişehir, Bilecik, Kocaeli, Sakarya, Düzce, Bolu, Yalova
TR5	West Anatolia	Ankara, Konya, Karaman
TR6	Mediterranean	Hatay, Kahraman Maraş, Osmaniye, Adana, Mersin, Antalya, Burdur, Isparta
TR7	Middle Anatolia	Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir, Kayseri, Sivas, Yozgat
TR8	West Black Sea	Zonguldak, Karabük, Bartın, Kastamonu, Çankırı, Sinop, Samsun, Tokat, Corum, Amasya
TR9	East Black Sea	Trabzon, Ordu, Giresun, Rize, Artvin, Gümüshane
TRA	North East Anatolia	Erzurum, Erzincan, Bayburt, Ağri, Kars, Iğdır, Ardahan
TRB	Middle East Anatolia	Malatya, Elazığ, Bingöl, Tunceli, Van, Muş, Bitlis, Hakkari
TRC	South East Anatolia	Gaziantep, Adıyaman, Kilis, Şanlıurfa, Diyarbakır, Mardin, Batman, Şırnak, Siirt

Schools of Teacher Education (STE): A school of teacher education is one which provides necessary conditions to prepare prospective teachers for pre-primary, primary, and secondary school teaching. Schools of teacher education at universities are responsible for those conditions in Turkey.

Technology Plan: A plan of how to get an institution from where it is now to where it wants to be in regard to ICT.

Prospective Teacher: A senior student in a teacher education program except departments of CEIT.

CHAPTER 2

REVIEW OF RELATED LITERATURE

This chapter provides a discussion of related literature that helped direct the development of the research questions. It is presented under eight main sections: (1) ICT and education, (2) ICT and teacher education, (3) ICT perceptions, (4) ICT competencies, (5) evaluating the effectiveness of ICT related courses, (6) ICT usage in the classroom, (7) main barriers and possible enablers for ICT integration into education, and (8) summary of the chapter.

2.1. ICT AND EDUCATION

The term Information and Communications Technologies (ICT) implies the use of, at least, a computer and the Internet. It includes computer hardware and software, the networks, and a host of devices that convert information (text, images, sounds, motion) into general digital formats (ISTE, 1999).

Parallel to above, it was defined in the ETS (2002) and OECD (1997) documents; ICT represents the set of activities and technologies that fall into the union of communication technologies and information technologies which refer to the electronic capturing, processing, display, and storage of information. These technologies consist of five sub-categories (UNRISD, 2001): (1) capturing technologies, (2) processing technologies, (3) display technologies, (4) communications technologies, and (5) storage technologies.

ICT have gained increasing attention and significance in the past twenty years. The availability of enormous amounts of information sources through the Internet, technological developments in the ICT sector, and an increasing flexibility in organizations and enterprises have enhanced the information and knowledge growth in the world (Adelsberger, Collis & Pawlowski, 2002). During this time, ICT affected all of the society's systems, including family, business, military, science, transportation, and particularly education and training. A number of important trends in education and training have emerged over this time, which paved the way for an initiative like this (La Velle & Nichol, 2000).

On the other hand, education has faced important challenges, such as large numbers of people to educate, poor economic conditions, training of trainers, and low quality of education. At the same time (past twenty years), providing high quality education and training has become critical for all who need education, and having them benefit from it in the most cost-effective way. Educators and policy makers have tried to overcome these challenges by developing new approaches in education. ICT is one such approach for enhancing the dissemination of information and meeting these challenges. ICT has been included in education particularly to help teachers perform their teaching profession more effectively.

According to documents of ICT League Paper (2002) and OECD (2001), there are three main rationales for the integration of ICT into education. The first rationale is economic. Many areas of employment require having personnel with ICT skills. In this century, knowledge of and familiarity with ICT are important factors of employability. Education should meet the demands of a changing economy and prepare future workers. Thus, ICT is a necessary aspect of economic perspective. Those who have not developed awareness of ICT will be at great economic disadvantage in the new information era.

The second rationale is sociological. It focuses on familiarity with ICT becoming a requirement for participation in society. Capability using ICT is seen as an essential "life skill" in the same way as literacy and numeracy, so much so that the range of skills and processes supported by ICT is brought together in the nation of digital literacy, which becomes both a requirement and a right for all learners. ICT also can provide people with learning difficulties and/or physical

handicaps, better opportunities to study and improve quality of life conditions. Since ICT is instrumental in creating flexible and user compatible training arrangements, it can help to create equal opportunities for competence development regardless of gender, geographical location, social situation, illness or other circumstances.

The last rationale is pedagogical. It concentrates on the role of ICT in teaching and learning. The potential for this role has developed rapidly and dramatically with advances in ICT. It has the ability to increase the breadth and richness of learning. The learning process could be made more attractive and more effective through a well balanced and integrated use of ICT tools. ICT can improve the quality of the learning process and motivate students. ICT can provide rich learning environments challenging students to change their attitudes, requiring them to assume more responsibility for their learning, using inquiry, collaborative, technological, and problem solving skills. ICT is an important factor to help build students' self-esteem, empowering and enabling them as well as building confidence and feelings of success. Consequently, ICT can improve quality of learning. It is also seen as helpful in making the education system more effective and more flexible. In order to face new challenges, the education system must adopt new methods, develop new content, new ways of delivering education, other organization models, and methods of collaboration. The countries here use ICT as a catalyst for change and the development of new roles for students, and teachers. Many countries are involved in major educational reforms in which ICT plays an important, if not leading, role. Therefore, it is a catalyst for change.

According to Roblyer and Edwards (2000), planning and designing for the use of ICT in teaching and learning provide teachers with many opportunities to shape students' depth of exposure to and engagement with the concepts, content, skills, and processes that comprise the curriculum. The use of technology in education has many benefits for students. There are five reasons stated by authors to use technology in education:

(1) Motivation

a. Gaining learner attention

b. Engaging the learner through production work
c. Increasing [learner's] perceptions of control

(2) Unique Instructional Capabilities
a. Linking learners to information sources
b. Helping learners visualize problems and solutions
c. Tracking learner progress
d. Linking learners to learning tools

(3) Support for New Instructional Approaches
a. Cooperative learning
b. Shared intelligence
c. Problem solving and higher-level skills

(4) Increased Teacher Productivity
a. Freeing up time to work with students by helping with production and record-keeping tasks
b. Providing more accurate information quickly
c. Allowing teachers to produce better-looking, "student-friendly" materials more quickly

(5) Required Skills for an Information Age
a. Technology literacy
b. Information literacy
c. Visual literacy

Thus, there is a common expectation on the global scale that whole notions successfully accept embracing the information age and a growing convergence between the economic, social, and pedagogical rationales. The digital literacy acquired and developed through the educational use of ICT is explicitly needed in the work and leisure of contemporary life (OECD, 2001).

According to Hepp, Hinostroza, Laval, and Rehbein (2004), if ICT policies are closely related to the curriculum, teachers will more likely use them for learning practices in classrooms. Hence, curriculum designers should consider the inclusion of ICT as transversal themes in all curricular sectors, and in the curriculum-specification guidelines that will be used by teachers. It is not advisable to have ICT as separate, isolated technical subjects or sectors in the

curriculum, since in this atmosphere teachers will tend to regard ICT as special subjects and may not integrate them in their normal practice. Rather, ICT should be included as teaching and learning resources, along with examples of how to use them in classrooms, in all sectors, and in this way turning them explicitly into a tool for all teachers in all grades and subject areas.

Parallel to the international trend of the increasing importance of ICT in education worldwide, Turkey began ICT-related initiatives as early as 1984. There have been some on-going projects related to integration of ICT in Turkey's educational system. MoNE aims to integrate ICT into the Turkish education system via certain policies and development strategies in order to keep pace with the information age, and become a societal focus on information and technology. In this sense, MoNE (2005) promoted the following goals:

(1) ICT hardware and software will be provided in every school;
(2) secure and fast Internet connection will be provided to all schools;
(3) at least one computer with the Internet connection will be provided in every village school;
(4) all students, teachers, directors, parents, and school staff will be able to access ICT;
(5) one ICT classroom with 20 computers per 500 students, at least 2 computers with the Internet and intranet connection per teachers' room and at least 1 computer will be provided with the same specifications for the guidance services, libraries, and administration offices;
(6) necessary in-service training courses will be provided in order to ensure that teachers, students, directors, and school staff are able to use ICT and successfully take advantage of it during the educational processes;
(7) current curricula will be transformed to student-centered and will be provided so students can access information by using ICT tools by themselves during their learning processes;
(8) a necessary environment will be provided for creating and using qualified digital content. Work will be carried on in order to ensure

that the digital content provides a self-teaching environment for the students;

(9) work will be carried on in order to diminish the digital divide and ICT at schools will be available to all citizens;

(10) school technical support centers will be established in order to provide the necessary technical support for updates and continuous maintenance of the ICT hardware at schools.

There have been a number of parallel projects related to the integration of ICT in Turkey's educational system. At the end of the National Education Development Project (with the support of World Bank and HEC), STE reconstructed in regards to their curriculum to train prospective teachers with abilities and skills to use ICT effectively in their subject areas in 1998. After this year, the number of ICT projects increased. For instance, the first phase of the basic education project (with the support of World Bank) started in 1998. The scope of the project was to build information technology classrooms in at least 2 primary education schools in 80 cities and every town, and the identified schools were grouped according to number of students. In that context, 2,834 information technology classrooms have been scheduled to be built in 2,451 primary education schools all over the country. This number has been increased to 2,802 with 351 newly constructed schools. The establishment of information technology classrooms in these schools has been completed in all cities and towns. Table 3 and the following parts provide a list of projects in which ICT integration and diffusion has been of high importance by the MoNE to supply the aforementioned strategies (Göktaş, 2003; MoNE, 2001; MoNE, 2005; Yildirim, 2005).

MoNE Project for Providing Access to the Internet: The aim of the project is to provide students with access, use, production, and sharing information via e-learning. In cooperation with Turk Telekom Inc., fast, secure, and cheap access to the Internet was intended for time periods between February 2004 and the end of 2005. It was planned that, until the end of 2005, approximately 21,500 K-12 schools would be provided with ADSL broadband Internet connections, that 85 % of the K-12 students have Internet connections in their schools, and the work to improve this continues (Keskinkılıç, 2004).

Education for the Future (in cooperation with Intel): This project aims to train 50,000 teachers in a three year period for computer literacy (Aytaç, 2004). By the end of 2005, 30,000 teachers had completed the program. It aims to train 200,000 more teachers by the end of 2006.

Vocational Training through Distance Learning: With the co-operation of MoNE with Sakarya University, this project aims to improve lifelong learning in accordance with the students' and work life needs, and provide training for a profession.

Learning Centers: This project was launched by MoNE in order to provide access to ICT resources (computer, printer, Internet access, etc.), peer support about the use of ICT, lifelong learning with some certificate programs, and to provide face-to-face learning for open education students.

E-learning-Education Portals: This project aims to establish education portals especially for teachers, students, school administrators, and parents in order to increase the quality of education and reduce the digital gap in education (Aktürk, 2005). In this context, the ministry has initiated 3 national web portal projects:

(1) BEP: An information access portal for school administrators, primary school teachers, parents, and students,

(2) Skoool: Extra-curricular activities about science and mathematics for primary school students,

(3) Teachers' Portal: Includes unit plans, course activities, and support materials for teachers.

On the other hand, General Directorate of Educational Technologies (EGITEK) is the most important institution in the MoNE project in regards to ICT organization and implementation of ICT projects. This institution was established in 1998 by the unification of the General Directorate of Computer Education and Services and the Center for Education through Films, Radio, and Television. EGITEK carries on its services through the Department of Management of Revolving Funds as well as through general budget allocations. The main

functions of the General Directorate of Educational Technologies include (MONE, 2005):

(1) conducting research, project, development, follow up, and assessment and evaluation studies to support education with technological developments, and to plan for extensive usage of technology in education,
(2) offering educational opportunities throughout the country and in some international centers via distance education,
(3) producing or purchasing visual, auditory, printed and computer based educational materials,
(4) establishing computer laboratories in schools, training the related personnel, and offering maintenance services.

The availability of equipment in schools does not mean that ICT will be integrated effectively into education. However, before making ICT investments, teachers should first be trained on ICT usage in education. According to Wright and Wilson (2005), change towards ICT integration in education must begin with prospective teachers, thus teacher training programs are natural places to start integrating ICT in education. To ensure that investments in ICT have an impact on students, schools must develop a thoughtful technology plan (Barnett, 2001). Patrikas and Newton (1999) pointed out that it is crucial to allocate finite ICT funds cost effectively and to positively exploit those expenditures through careful targeting of identified needs. In this point, forming a thoughtful technology plan is very important. There are a number of barriers highlighted in the literature to the use of technology in education. One of them, indicated by Bates and Poole (2003), is lack of reorganization in the way we work. They see this as barrier since without a careful plan, technology leads to more work for instructors. In his Technology Facade book, Tomei (2002) saw the technology plan as the best way for discussing a wide range of resources, from vision and mission statements to the wealth of the local community. Rogers (2005) also pointed out that the most important element of effectively integrating ICT into curriculum is formulating a comprehensive technology plan.

Technology planning was defined in Anderson (1996) as *"an activity that provides direction and helps users understand clearly where they are now and imagine where they want to be"* (p.9). In the same Guidebook, the purpose of technology planning was stated as producing continuous action that creates and maintains a technology-rich educational environment.

2.2. ICT AND TEACHER EDUCATION

ICT is not only used by students; but teachers are also increasingly using ICT for administrative and professional purposes. Communication by computer between teachers and parents or teacher and school management will probably grow, especially through the use of ICT. Teachers can use provided classroom or computer laboratories for record keeping, attendance, student information, and to generate reports to parents. In addition, teachers use ICT for professional use in lesson planning, instruction, and communication (Warren, 2000). According to Collis (1996), students need to be technologically literate in order to use and integrate ICT in future jobs and to be productive citizens. In addition, educators should use technology to boost instruction and thus enhance student learning.

The role of the teacher in teaching/learning process has been changed as new information technologies emerge in the classroom. Teachers' roles have been changed from information presenter to learning resources coordinator (Heinich, Molenda, Russell, and Smaldino, 2002). This new role frees them to work more independently with individuals and small groups while leaving the formal presentations to another medium. Teachers help to students find and process information from many sources. In the future, teachers will become more and more "the guide on the side" rather than "the sage on the stage". The demand for teachers with ICT competencies is increasing.

Similar issues clarified in another study (BECTA, 1998). It is clear that, the role of the teacher has changed because of ICT. The ICT skills that teachers need for the next century are complex. They are not mere users of ICT who can be trained in office applications like employees in some employment sectors. They need to be able to use all the generic packages, plus multimedia applications on CD-ROM, subject-specific software, find suitable resources on the Internet

and, crucially, judge when this is appropriate within school work. Moreover, they have to show their pupils how to use the technology to find information from on-line and off-line sources, help develop information-handling skills, communicate with others, and create information in digital form.

According to Dawes (1999) the current role of the teacher is much more than that of a provider of information; one crucial aspect is the establishment of relationships to ascertain and address learning needs. ICT can support this role but may not necessarily supplant it. Teachers are also commonly represented as having a fear of technology: the reality may be that anyone would be fearful of placing reliance on the sort of computers universally found in schools. Teachers may require a productive purpose for ICT use. The marketing and presentation of computers as `edutainment', and the commonly stated perception that one `plays' on computers may not appeal to some.

While it is easy to over-emphasize the point about the changing role of the teacher, it is hard not to over-emphasize the scale of the challenge facing all national education systems in bringing about the sweeping programs of ICT training needed to help the mass of teachers to enter the digital age. Preservice teacher education is used to provide techniques to integrate ICT into teaching methods. According to Glenn (2002), there are some tasks for institutions, faculty members, and prospective teachers for doing something about teachers' ICT skills. Table 2.1 shows general issues confronting institutions, faculty members, and prospective teachers.

Table 2.1: Tasks of STE, faculty members, and prospective teachers for ICT integration

STE	Faculty Members	Prospective Teachers
- Initial technology skills	- Acquiring technologies	- Initial technology skills
- Ability to use various tools and software programs	- Staffing issues	- Ability to use various tools and software programs
- Creating a learning environment infused with technology	- Classroom configuration	- Creating a learning environment infused with technology
- Linking to student standards	- Distance education issues	
	- Linking with K-12 schools	
	- Budgets	

Table 2.1 (Continued)

STE	Faculty Members	Prospective Teachers
- Assessing student learning outcomes - Examining beliefs about teaching and learning - Continuing to acquire new skills - Lessening the anxiety about learning new skills and program delivery	- Accreditation	- Linking to student standards - Assessing learning student outcomes - Examining beliefs about teaching and learning - Continuing to acquire new skills

Adapted from Glenn (2002)

Kay (2006) reviewed 68 refereed journal articles that focused on introducing technology to prospective teachers. He defined ten key strategies based on the review including: (1) delivering a single technology course, (2) offering mini-workshops, (3) integrating technology in all courses, (4) modeling how to use technology, (5) using multimedia, (6) collaboration among prospective teachers, mentor teachers, and faculty, (7) practicing technology in the field, (8) focusing on faculty members, (9) focusing on mentor teachers, and (10) improving access to software, hardware, and/or support. The author evaluated these strategies based on impact on computer attitude, ability, and use. According to his conclusion, more rigorous and comprehensive research is needed to fully understand and evaluate the impact of key technology strategies in preservice teacher education.

The importance of teacher education goes hand in hand with the inclusion of ICT in the education of pupils. Indeed, only teachers who have themselves been trained in the use of ICT will be in a position to supervise their pupils effectively as they become fully familiar with, and gradually master, its essential resources.

The Society for Information Technology and Teacher Education (SITE) has identified three principles for ICT in teacher education (SITE, 2002). These are:

(1) Technology should be infused into the entire teacher education program: Prospective teachers should learn about and with ICT and how to incorporate it into

their teaching. Limiting ICT experiences to a single course or to a single area of teacher education, such as methods courses, will not prepare students to be ICT-using teachers. Prospective teachers should learn about a wide range of educational technologies across their professional preparation, from introductory and foundations courses to student teaching and professional development experiences.

(2) Technology should be introduced in context: Teaching prospective teachers a basic computer literacy course, which includes operating system, word processor, spreadsheet, database, and telecommunications topics is not enough. As with any profession, there is a level of literacy beyond general computer literacy. This more specific or professional literacy involves learning to use technology to foster the educational growth of students. Professional literacy is best learned in context. Prospective teachers should learn many uses of technology because they are integrated into their coursework and field experiences. Prospective teachers should watch instructors modeling innovative uses of technology; they should use it in their own learning, and they should explore creative uses of ICT in their teaching. Teacher educators, content specialists, and mentor teachers should expose prospective teachers to regular and pervasive modeling of technology and provide opportunities for them to teach with technology in K-12 schools.

(3) Students should experience innovative technology-supported learning environments in their teacher education programs: ICT can be used to support traditional forms of learning as well as to transform learning. A PowerPoint presentation, for example, can enhance a traditional lecture, but it does not necessarily transform the learning experience. On the other hand, using multimedia cases to teach topics that have previously been addressed through lectures may well be an example of a learning experience transformed by technology. Students should experience both types of uses of ICT in their programs; however, the brightest promise of ICT in education is as a support for new, innovative, and creative forms of teaching and learning. The same institution also proposed six actions (SITE, 2002):

(1) identify and make public positive models of technology-infused teacher education programs;

(2) encourage and support collaboration of teacher education programs with model technology-rich K-12 schools that can serve as authentic environments for teacher education;

(3) establish two to three national centers for technology and teacher education;

(4) support innovative models of faculty development;

(5) support models of technology infusion;

(6) fund the development of promising teacher education materials.

Most of the countries in the world aim to adapt their teacher education system to the philosophical issues of education by encouraging reform. While examining the results of the teacher education systems, new changes of the philosophical issues should also be considered.

Rapid technological changes have affected the educational paradigms of world. In this aspect, teacher education programs across the country have been challenged to respond to the shift that is taking place in the world. Parallel to the international practices in reforming preservice teacher education for the new millennium, the STE were reconstructed with a new curriculum, which aimed to train prospective teachers with abilities and skills to use instructional technology effectively in their subject areas, by the HEC in 1998. According to the new curriculum, it became compulsory for every students of STE to take “Computer” and “ITMD” courses, to fulfill the requirements for teaching credentials. CEIT departments mainly offer these courses (HEC, 1998).

2.3. ICT PERCEPTIONS

In the literature, perception has a number of meanings and implications. Most of them are amazingly general or specific. This lack of restrictedness is to be found even if the usages of the terms differ by those who study the field (Bartley, 1969). As Saglam (2006) stated, there are two approaches for the definition of perception: direct and indirect. The supporters of a direct approach have stated that perception is the detection of information about an environment, and this happens through the interactions between animal and environment.

Conversely, the supporters of the indirect approach stated perception is an action process of information, which involves both memory and representation. They believed that the senses do not provide complete information about an object so the gathered information must go through cognitive operations in order to become rich, elaborate, and accurate.

Ashcraft (2006) described perception as the process of interpreting and understanding information gathered by the senses. As humans adapt to their environment, they extract certain information about the environment through their senses. This information extraction process is called perception (Forgus & Melamed, 1976). Also Hentschel, Smith, and Draguns (1986) stated two important features for perception: (1) perception is not an immediate reaction to an object; rather it is a process extended in time, and (2) perception is interlinked to previous experiences and memories. In this study, perception was used based on definitions stated above and these attributes.

In the ICT integration process, positive perceptions of stake holders are crucially important for success. Ropp (1999) clarified this importance as: *"If prospective or in-service teachers demonstrate proficiency integrating technology into their teaching but do not believe that technology has a use in the classroom, they will probably not teach with technology despite their proficiency*" (p.403). Parallel to Ropp's ideas, Elwood-Salinas (2001) believed that by investigating the perceptions of prospective teachers, regarding ICT integration experiences, their professional development can provide essential knowledge for preservice teacher education curriculum designers. On the other hand, Sugar (2002) stated the idea that positive perception of teachers toward ICT integration in the classroom is the most important incentive. By changing perceptions toward the use of technology in schools, teachers could potentially remove several obstacles to effective ICT integration.

As shown in the aforementioned literature, ICT perceptions are crucially important; however, they can be affected by other components. Loveless (2003), has studied the interaction between primary teachers' perceptions of ICT and their pedagogy. A development of his model highlights the interactions between subject knowledge, pedagogic knowledge, didactic, identity, and community, which are held in tension by the teachers' experiences of, and reflections upon, change in their

practice. In his model, he highlighted the dynamic, mutual interaction between the different dimensions of professional knowledge applied to the particular perspective of ICT capability (see Figure 2.1).

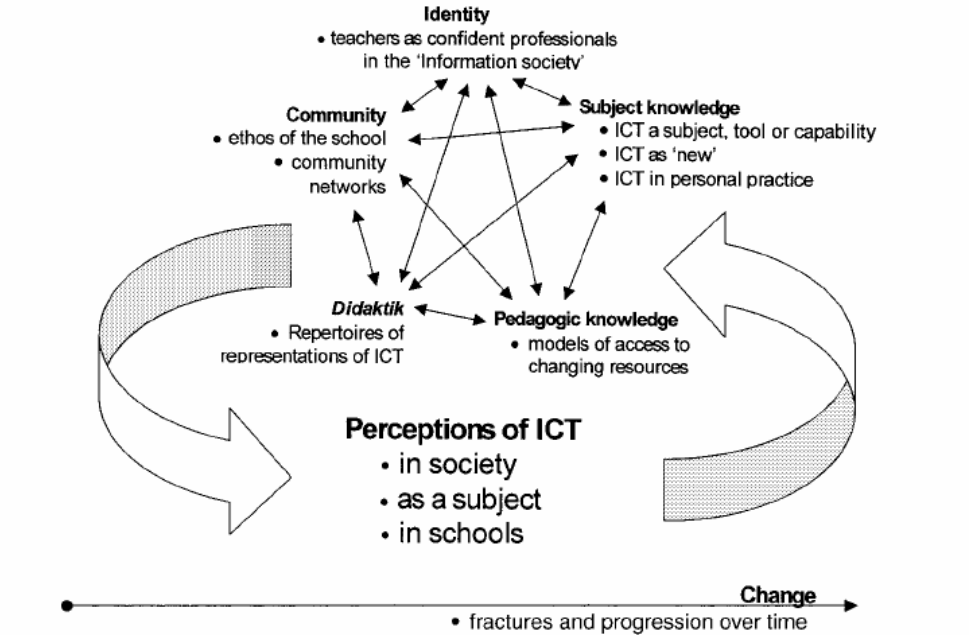

Figure 2.1: A model of the interaction between dimensions of professional knowledge and perceptions of ICT (Adapted from Loveless, 2003)

According to Karsenti, Brodeur, Deaudelin, Larose, and Tardif (2002), the factors that are important for positive perceptions of K-12 teachers toward integration of ICT are: (1) integration of ICT by the associate teacher encountered during the practicum; (2) their degree of computer literacy; (3) presence of model instructors; (4) their expectations of success in integrating ICT; and (5) the value they place on ICT. They pointed out that these factors could provide interesting avenues for exploration to maximize the presence of ICT in schools.

The literature contains many studies about ICT perceptions and attitudes of faculty members, prospective teachers, and K-12 teachers in the world, particularly in Turkey, the scope of this study (Altun, 2003; Asan, 2002; Brush, Glazewski, Rutowski, Berg, Stromfors, Van-Nest, Stock, & Sutton, 2003; Çelik, & Bindak,

2005; Çiğdem, 2005; Deniz, 2005; Erkan, 2004; Loveless, 2003; Smith, & Kubasko, 2006; Tınmaz, 2004; Williams, Wilson, Richardson, Tuson, and Coles, 1998; Watson, & Prestridge, 2001).

Altun (2003) investigated the relationship of 68 prospective teachers' attitudes toward computers and their cognitive styles. He selected his sample from the STE at Abant İzzet Baysal University in Turkey. He found that generally prospective teachers were undecided in their attitude toward computers. He also found that there was a significant difference between attitudes of those who have taken a "Computer" course earlier and those who have not in favor of the ones who have taken the course earlier.

Asan (2002) examined the computer attitudes of 265 prospective teachers from the department of science education and social science education at Karadeniz Technical University in Turkey. The findings of the study indicated, in general, prospective teachers valued computers very much and felt quite comfortable with computers.

Brush et al. (2003) examined perceptions of prospective teachers about technology integration in education. They surveyed 100 prospective teachers enrolled in the elementary education program. Their results indicated that 92% of participants agreed with the statements, *"Given a learning goal, I am able to develop ideas for integrating technology,"* and *"A variety of technologies are important to enhance student learning."* 86% agreed with the statement, *"I am confident about integrating technology into language arts, social studies, math, science or other content area lesson"* (p.62).

Çelik and Bindak (2005) studied computer attitudes of primary school teachers. They collected data through a questionnaire of 261 primary school teachers in Siirt which is a small province in Turkey. According to their results, K-12 teachers had positive attitudes (M=4.23 on a five-point Likert scale) toward computers, in general. Also, their results implied that computer attitudes of teachers did not change according to gender, branch, or work place. It was determined that the positive attitudes of teachers who had a computer were significantly higher than those who did not have a computer. It was also determined that there were positive and

significant relations between computer self-efficacy and the frequency of computer use with positive attitudes toward computers.

Deniz (2005) conducted a survey of K-12 teachers to determine attitudes regarding computers. His sample consisted of 564 primary school teachers (339 classroom teachers and 225 subject teachers) from 20 different primary schools in İstanbul. He found that K-12 teachers had positive attitudes (M=3.83 on a five-point Likert scale) toward computers, in general.

Erkan (2004) examined the attitudes of pre-school teachers toward computers and whether there were significant differences in computer attitudes between age, previous computer literacy, and access to computers at home. Her research participants included 164 pre-school teachers working for the MoNE pre-school institutions in Turkey. The results of her data analysis indicated that the attitudes of most of the preschool teachers towards computers were positive (M=4.14 on a five-point Likert scale). The results also indicated that there was a significant mean difference between the scores of attitudes towards computers and age and previous computer literacy.

Loveless (2003) focused on the interaction between elementary teachers' perceptions of ICT and their pedagogy using a qualitative case study in England. ICT perceptions in his study were grouped into three sub-themes: perceptions of ICT in society, perceptions of ICT capability, and perceptions of ICT in schools. According to his qualitative results, teachers had positive perceptions to ICT. Also it can be highlighted from his article that the teachers' perceptions of ICT were as a social and cultural phenomenon, as an ambiguous area constructed as a discrete subject, a curriculum resource and higher-order capability, and as a 'new' field in primary schools.

Smith and Kubasko (2006) collected data through a questionnaire from 60 prospective teachers and 60 K-12 teachers (partnership teacher) in the USA concerning beliefs about technology use in classrooms. Their results indicated that both groups rather strongly agreed with regard to the following statements: (1) I support the use of technology in the classroom (Mean of partner teachers=3.5 and Mean of prospective teachers=3.6), (2) Incorporating technology into instruction

helps students learn (Mean of partner teachers=3.4 and Mean of prospective teachers=3.5), and (3) Student motivation increases when technology is integrated into the curriculum (Mean of partner teachers=3.3 and Mean of prospective teachers=3.2). However, the item of *"teaching students how to use technology is my job",* K-12 teachers (Mean=2.7) and prospective teachers (Mean=2.6) on average only moderately agreed.

In his study Tınmaz (2004) focused on technology perception of prospective teachers with 696 senior prospective teachers from eight different subject areas of Burdur STE, Süleyman Demirel University in Turkey. His study showed that prospective teachers perceived technology in education favorably (M=3.85 on a five-point Likert scale), but not very favorably. Tınmaz used the Technology Perception Scale (TPS) and two subscales to determine belief of positive effects of technology in education (M=4.31) and effects of undergraduate program (M=3.68). It can be implied from his mean results of subscales that the positive effects of technology in education were valued more than the effects of teacher training program by prospective teachers. He explained this situation as *"this might be implied that even though prospective teachers agreed that technology integration would provide for them a lot of advantages, they were not satisfied with their teacher training program"* (Tınmaz, 2004, p.160).

According to Williams et al. (1998), 352 primary and 329 secondary school teachers were chosen at random in Scotland. The results of their study were that teachers were generally positive and the vast majority wanted to develop their ICT skills and knowledge.

In their study, Watson and Prestridge (2001) asked prospective teachers to rate attitudes with respect to computers on a scale of 1 to 5 in 1999 and 2001. They found means 3.74 and 3.59 for "*I am enthusiastic about using computers*", 4.11 and 4.02 for "*I think computers are an important part of teaching*", and 4.26 and 4.10 for "*I want to learn more about computers*" respectively.

2.4. ICT COMPETENCIES

Competency was defined in the literature as the state or quality of being adequately or well qualified to perform a task. Generally, competency is used

synonymous with ability. A person gains competency through education, training, experience, or natural abilities. While there are many definitions of competency, most of them have two common components: (1) the competencies are observable or measurable knowledge, skills, and abilities; (2) these knowledge, skills, and abilities must distinguish between superior and other performers (Clark, 1999).

As shown in the aforementioned literature, ICT plays a critical role of enhancing the quality of education. This importance includes, in particular, helping teachers perform their teaching profession more effectively. To achieve this goal, teachers should be equipped with adequate ICT competencies in education. ICT competencies of teachers and how they perceive the role of ICT in teaching/learning process play key roles in the integration of ICT in schools. Analysis, design, development, implementation, use, evaluation, and management of educational technologies require diversified competencies and knowledge (Adelsberger, Collis & Pawlowski, 2002).

In the literature (Algozzine, Bateman, Flowers, Gretes, Hughes, & Lambert, 1999; Tınmaz, 2004; Toker, 2004), there are two cluster of ICT competencies: (1) basic competencies are represented by entry-level skills related to basic computer operation and the use of an array of software that supports and enhances professional productivity; (2) advanced competencies extend the application of basic competencies to teaching, administration, and counseling and to other professional activities.

On the other hand, according to Adelsberger, Collis, and Pawlowski (2002), rapid changes are occurring in ICT. Faculty members, prospective teachers, and K-12 teachers will need new competencies to function effectively in the changing situation. Thus, Snider (2003) conducted a similar study, he mentioned three types of ICT competencies in which he suggested the addition of the Internet.

Everyone defines adequate competencies differently. In 1997, the National Council for Accreditation of Teacher Education (NCATE) and the ISTE joined to form standards for preservice teacher education. The new standards expect teachers to possess up-to-date technology skills, as well as be able to create lesson plans that incorporate technology into the curriculum (ISTE, 2000). In 1998 Moursund and

Bielefeldt (1999) solicited ISTE to determine how colleges were training new teachers to use technology in the classroom.

ISTE (2003) has prepared standards for all kinds of teachers called National Educational Technology Standards for Teachers (NETS-T), which focus on preservice teacher education, define the fundamental concepts, knowledge, skills and attitudes for applying technology in educational settings. All teacher candidates seeking certification or endorsements in teacher preparation should meet these educational technology standards. It is the responsibility of STE across the universities and at cooperating schools to provide opportunities for teacher candidates to meet these standards listed below:

(1) Technology Operations and Concepts: Teachers demonstrate a sound understanding of technology operations and concepts.

(2) Planning and Designing Learning Environments and Experiences: Teachers plan and design effective learning environments and experiences supported by technology.

(3) Teaching, Learning, and the Curriculum: Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning.

(4) Assessment and Evaluation: Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies.

(5) Productivity and Professional Practice: Teachers use technology to enhance their productivity and professional practice.

(6) Social, Ethical, Legal, and Human Issues: Teachers understand the social, ethical, legal, and human issues surrounding the use of technology in K-12 schools and apply those principles in practice.

In Turkey, MoNE (2006) also prepared standards for multiple types of teachers for effective and efficient ICT integration into educational settings. These standards reflect fundamental concepts and skills of teachers for applying information technology in educational setting. It is the responsibility of teacher

preparation programs in Turkey to provide opportunities to meet these standards for whole teachers. In terms of these standards the teacher:

(1) recognizes the legal and ethical responsibilities on ICT and informs the students on these responsibilities;

(2) is ICT literate;

(3) follows the developments of ICT;

(4) utilizes ICT to support his professional development and to increase productivity;

(5) benefits from ICT (online journals and magazines, packaged software, e-mail, etc.) to be able to share knowledge;

(6) prepares appropriate learning environments for the students having diverse kinds of experiences, characteristics, and abilities by using ICT;

(7) includes ways to utilize ICT in his course plan;

(8) makes use of ICT to develop course materials;

(9) reaches the relevant teaching – learning resources in the technological environments (databases, online sources, etc.) and determines the accuracy and appropriateness of these resources;

(10) acts as a model to use ICT related sources effectively and teaches how to use them;

(11) uses ICT that support student centered strategies by considering different student needs;

(12) performs necessary health and safety precautions in the learning environments where ICT related equipments and materials are in use;

(13) analyzes data by using ICT;

(14) shares the assessment results with parents, school administration, and other educators by using ICT.

The literature has many studies about ICT competencies of faculty members, prospective teachers, and K-12 teachers in the world, particularly Turkey (Akkoyunlu and Orhan, 2003; Askar and Umay, 2001; Çınar, 2002; Glazewski, Ku, Brinkerhoff, Brush, 2001; Iding, Crosby and Speitel, 2002; Nanasy, 2001; Snider, 2003; Smith and Kubasko, 2006; Tınmaz, 2004; Toker, 2004; Turkmen, 2006; Watson and Prestridge, 2001).

According to Akkoyunlu and Orhan (2003), prospective teachers were proficient (M=4.05) about ICT competencies. They surveyed 159 fourth year prospective teachers from 5 university departments of CEIT in Turkey. The undergraduate program in CEIT departments is designed to offer B.S. degree in computer education and instructional technology, and the graduates of this department are qualified to teach in ICT at basic and secondary education schools.

Another similar study conducted by Askar and Umay (2001) took 155 prospective elementary mathematics teachers responses on Computer Self-Efficacy, Attitudes toward Computers, and Perception of Computer-Enriched Teaching Environment. Their study showed that prospective elementary mathematics teachers had positive attitudes toward using computers, as well as learning and teaching with computers. Their participants believed that computer aided instruction is a better and more comfortable way of learning than conventional methods. On the other hand, their self efficacy with using computers was low. They indicated that one reason for this result is the lack of computer experience of the students. They also proposed that self-efficacy on computers increases with more computer experience and usage as a result of positive and significant correlation between variables, $r = .42$ and $r = .37$ respectively.

Çınar (2002) examined the computer competencies of Turkish K-12 teachers. According to his results, the teachers felt themselves partly competent with computers, with the mean score of 2.62 (on a 4 level). They rated themselves most competent with word processing programs (M=3.56) and least competent with presentation and desktop publishing programs.

Glazewski, Ku, Brinkerhoff, and Brush (2001) surveyed 139 prospective teachers and 37 K-12 teachers about their technology beliefs and skills. Their results showed that prospective and K-12 teachers held positive attitudes regarding technology overall, but may not possess a technology skill set which enables them to effectively integrate technology. Both prospective (M=3.03 and M=3.27) and K-12 teachers (M=2.92 and M=2.67) felt confident in their competencies with basic computer operations and e-mail communication. In terms of their findings, participants felt least comfortable with technology skills; Multimedia was ranked lowest by prospective teachers (M=2.45), followed by World Wide Web

technologies (M=2.74). K-12 teachers indicated they were least confident with World Wide Web technologies (M=2.25) while ranking Electronic References second to lowest (M=2.51).

Iding, Crosby, and Speitel (2002) conducted a study with 78 participants, who are prospective and practicing teachers from special education and science education courses at a university in the USA. According to their results, 97% of the prospective teachers had a computer at home; while 82% of the prospective teachers had Internet access at home. In addition, 90% of the prospective teachers had a printer at home. Furthermore, 65% of the prospective teachers stated themselves as average, 12% of them stated as high, and 1% of them stated as fair, or using with assistance, as their level of computer knowledge. None described themselves as having poor computer knowledge. Additionally, the participants indicated that the most frequently used technology was e-mail.

Nanasy (2001) also investigated computer competencies of prospective teachers. The results of his study indicated participants felt competent teaching with ICT to their students. The highest level of computer competency appeared to be in word-processing (84.7%), e-mail (78.1%), and using the Internet (76.6%). The lowest level of computer competency seemed to be with presentation programs (29.9%), educational software (28.5%), desktop publishing (17.5%), database management (9.5%), website design (7.3%), and teleconferencing (3.6%). Similar to the Nanasy, according to Watson and Prestridge (2001), prospective teachers had the greatest competence in 'word processing' and the least competence in 'multimedia' and 'web page development'.

According to Smith and Kubasko (2006), prospective teachers (interns) on average rated their skills with using ICT higher than that of their partnership K-12 teachers. The authors collected data from 60 intern teachers and their 60 partnership K-12 teachers using a questionnaire and interviews. Their results indicated that 34% of interns rated themselves as novice or intermediate users; interns rated 58% of their partnership teachers as novice or intermediate. At the opposite end of the range, 65% of the interns rated themselves as advanced or expert users compared to only 42% of their partnership teachers. 62% of partnership teachers believed their technology skills were only intermediate. The results from their study showed the interns, on

average, rated their skills with using technology higher than that of their partnership teachers.

Tınmaz (2004) investigated prospective teachers' competency level on a three-point scale. He found the general mean score was obtained 1.82. He reported results that prospective teachers were graduated with a less than moderate level competency. Consequently, it is not easy that these prospective teachers could infuse technology into their courses successfully. The results of his study indicated the highest level of computer competency appeared to be with e-mail (M=2.31), and the lowest level of computer competency seemed to be with databases (M=1.18).

A similar study by Toker (2004), conducted a survey of 1086 prospective teachers from Primary School Teacher Education department at Süleyman Demirel University in Turkey. He used Technology Use Self-Competency Scale (TUSS) for the study. He found that prospective teachers felt they were intermediate technology users (M = 3.17). Specifically, prospective teachers are at an intermediate level for using technology in educational environments (M = 3.43) and basic computer skills (M = 3.53). In contrast, for advanced computer skills (M = 2.07), their level is novice.

Turkmen (2006) conducted a survey that determined science education faculty members' attitudes toward computer use. 62 science education faculty members from 20 different Turkish universities were surveyed. The results of his study showed that most of the Turkish science education faculty members perceived themselves as intermediate (46.8%) and/or advanced (46.8%) level technology users. It can be implied that the Turkish faculty members had the low mean scores in current knowledge level of educational technology usage and needs of science education, indicating they may not be prepared with skills necessary to succeed in the 21st century.

2.5. EVALUATING THE EFFECTIVENESS OF ICT RELATED COURSES

McKenzie (1998) provided an interesting analogy regarding teacher education in the use of ICT. He stated, "*Installing a network without providing robust professional development is like trying to plant a meadow on the school playground by tossing seeds onto the asphalt. If we fail to cultivate and fertilize the*

soil, we will be lucky to raise any flowers at all". It is true that it is useless to have ICT in schools without educating teachers in its effective use and teaching them the relevance of using ICT.

According to Brand (1998), *"If students are going to be prepared for a technological society, they must be taught by confident and skilled teachers. This can only be done by adequate training and development of teachers"* (p.13). Yildirim (1999) and Yildirim (2000a) recommended to the practitioners and teacher education institutions similarly that the best way to encourage teachers to use computers in the classroom was to increase level of competency. This can be achieved by providing several computer literacy courses that are designed according to the individual's level of confidence, anxiety, and competency.

In the early days of educational computing, dating roughly from the launch of Sputnik in 1957 to the advent of personal computers, teacher education programs addressed professional development needs for technology through in-service programs. Teachers attended workshops or returned to graduate school to obtain advanced degrees. In 1983, when the report A Nation at Risk recommended that students be required to take a high schools computer course, it was still unusual for a preservice program to offer technology training for new teachers (ISTE, 1999).

According to Yildirim (2000a), ever since the advent of technology into society and the workplace, educational institutions have struggled with the question of how to teach, given the variety of technologies that are available to enhance human potential and improve teaching. Likewise, teacher education programs have also struggled with the question of how to prepare prospective teachers for the next century. It is clear that in the 21st century almost all jobs will involve computers in some way. It is crucial for teachers to have appropriate technology training during their preservice education if they are to meet their students' needs for the next century.

Davenport (1995) proposed that ICT related courses should be a model of real classrooms. The author stated the first and predictable requirement for the successful implementation of the use of ICT is the training of teachers at all

levels, mostly during their preservice education. Teaching them to use ICT in in-service training proved difficult for more than a few reasons. For example, teachers were "afraid" of the new and unknown. The second inevitable requirement for the successful implementation of the uses of technology is that the uses of ICT be modeled for the prospective teachers and that they are trained to use it when they become full time classroom teachers.

According to Brush, Igoe, Brinkerhoff, Glazewski, Ku, and Smith (2001), ICT related courses should be acknowledged for their role in helping students achieve this outcome. By training prospective teachers to use ICT, it is expected that they will transfer this knowledge and skills to their classrooms. In this regard, many institutions have written an ICT skills unit into their course structure. These units aim to increase student ICT competencies and generally offer the basics such as word processing, database, spreadsheet, and Internet use.

Willis (2001) believed, similar to Brush et al. (2001), that ICT should be integrated across the entire curriculum, and participants in all areas of teacher education should help to develop and implement an integrated plan that provides students with the models, mentors, content, practice, and experiences needed. Dell and Disdier (1994) stated four common principals for effective ICT training: (1) educational technology training needs to be integrated into the entire teacher education program so that effective technology integration is modelled for prospective teachers; (2) training should link technology with curriculum; (3) training should provide hands-on practice so teachers become comfortable, and (4) training needs to be in-depth.

With the above-mentioned consequences, many action plans were adopted at national and international levels, as well as investments for ICT in teacher education. Most of the teacher education programs have been redesigning their curricula in order for prospective teachers to become competent users of new technologies when they become teachers.

In most countries there are special courses or modules for preparing prospective teachers to use ICT in general and in their area of specializations. Increasingly, ICT related courses such as computer literacy, fundamentals of IT, and

educational technology, are turning out to be compulsory courses within the curriculum of teacher training programs in most countries. However, there are still many countries which only have courses for prospective teachers which may be electives (Yildirim, Kynigos, Potolea, Dumont, & Aufenanger, 2003).

In Turkey, HEC is responsible for the planning, coordination, and supervision of higher education. In 1998, it developed new teacher education curricula for schools of education, and ICT has been included. "Computer" and "ITMD" courses became compulsory in both primary and secondary preservice teacher education programs in the new curricula. The main objective of the "Computer" course is to help prospective teachers process basic computer skills in commonly used computer applications, such as word processors, spreadsheets, databases, telecommunications, and presentation programs. In the "ITMD" course, prospective teachers gain knowledge and skills for a variety of instructional technologies, and develop and evaluate technology-based instructional materials (HEC, 1998).

In the study by Yildirim (2000b), it attempted to explain the effects of the educational computing course on prospective teachers' attitudes; the prospective teachers learnt to express them in general terms. They thought the course helped them develop positive attitudes by: (1) making them more comfortable using applications, (2) helping them achieve more confidence, (3) increasing their consciousness of computers and their applications, and (4) representing how computers could be infused into the school curriculum.

The literature has many studies about evaluating the effectiveness of ICT related courses (Brush et al., 2003; Evans and Gunter, 2004; Molebash, 2001; Tınmaz, 2004; Toker, 2004; and USDE, 2000). USDE (2000) reported that approximately one-third of teachers felt well prepared or very well prepared to use computers and the Internet for classroom instruction, with less experienced teachers indicating they felt better prepared to use technology than their more experienced colleagues. For many instructional activities, teachers who reported feeling better prepared to use technology were generally more likely to use it than teachers who indicated that they felt unprepared.

According to Brush et al. (2003), prospective teachers were not satisfied with ICT integration courses and they needed more training and support for effective ICT integration into their future classrooms. Results indicated 53% (n=100) of participants disagreed with the statement, *"I feel that my technology course has prepared me to integrate technology,"* 57% disagreed with the statement, *"I do not need more training on how to integrate technology,"* and 36% disagreed with the statement, *"I do not need assistance to deliver a technology-integrated lesson"* (p.64).

Sahin (2003) recommended a constructivist approach to enhance the effectiveness of instructional technology and material preparation course. She gathered data from 80 Turkish prospective teachers in an elementary teacher education program. Her results showed that prospective teachers wanted to be active in the process of instructional technology and material preparation course. The participants thought individual preparation of materials and the feedback of scores were very important. It can be implied from her study that ICT related courses can be more effective and efficient if the courses are offered in a constructivist approach. Prospective teachers like to prepare their own materials.

ICT related courses not only have advantages, but also there are many challenges faced. Duran (2000) expressed that because of the limitations of stand-alone technology courses emphasizing only conceptual issues about technology, this type of course does not fulfil teachers' needs related to ICT usage in their future profession. The need is for more practical courses which cover the utilization of technology in educational settings and classroom management strategies.

Molebash (2001) explored a technology-enriched elementary social studies method course. He gathered data via classroom observations, participant interviews, document analysis, and videotaped microteaching lessons from 1 faculty member and 23 prospective teachers. His conclusions indicated that the course can play an important role in preparing prospective teachers to effectively integrate ICT into their teaching. However, he said that it does not guarantee prospective teachers will integrate ICT their future classrooms. He believes that constructivist beliefs and teaching practices of the instructor played a key role in effectiveness of ICT related courses.

Evans and Gunter (2004) surveyed prospective teachers to determine whether or not they received the training and support that is needed to gain ICT proficiency. They collected data from 40 prospective teachers who had completed their technology integration courses. According to their results, around 97.5% of the prospective teachers felt that technology integration into the curriculum was important. However, 70% of prospective teachers felt that they had sufficient training on how to integrate ICT into the K-12 schools and 55% reported that the courses they took during their teacher preparation program were sufficient to teach the needed technology skills. It can be implied from this study many of the prospective teachers felt they needed more ICT training to prepare them.

According to Tınmaz (2004) prospective teachers were not strongly satisfied with their teacher training program in terms of ICT related courses. He used a subscale in order to evaluate effects of an undergraduate program. It included three important items which are primarily items 23, 24, and 25. These entire items focused on increasing the quality of the teaching profession with respect to an ICT facet concerning three important ICT related courses. The mean score of item 23, dealing with "Computer" course was 3.42 (on a five-point Likert scale), mean score for item 24, dealing with Fundamentals of Information Technology course was 3.44 and the mean score of item 25, about "ITMD" course, was 3.95. There are two approximate mean scores between "Computer" and "Fundamentals of Information Technology" courses found. However, it is satisfying that the Educational Technology and Material Preparation course was found to be an impressive course on the behalf of the quality of teacher professionalism.

Toker (2004) also studied the effectiveness of ICT related courses in Turkey. The author stated that a majority of the first and second year prospective teachers (69% for first, 78% for second year prospective teachers) declared that ICT related courses were effective in developing their competency. However, a majority of the third and fourth year prospective teachers (53% for both) mentioned that ICT related courses were partially effective in developing their competency. According to his study, instructors were the main factor for the different results for level of prospective teachers. Moreover, 53.4% of the prospective teachers declared that ICT related courses were effective in developing their ICT competency, 38.5% of the

prospective teachers declared that ICT related courses were partially effective in developing their competency, and only 8% of the prospective teachers declared that ICT related courses were not effective.

2.6. ICT USAGE IN THE CLASSROOM

New teachers entering classrooms in the mid 1990s and beyond must have training and skill to merge today's technologies into learning activities that will stimulate and maintain student interest, and at the same time prepare young people for the world in which they live (Barker, 1993).

The use of technology serves as a perfect example of constancy and change in schools. Changes come and go and many things may remain the same. Since the early 1900's, a succession of new technologies entered into the classroom with the teacher usually being blamed for their failure to succeed (Milligan, 1999).

The results of the surveys of Dusick and Yildirim (2000) indicated that an effective way to encourage instructors to use ICT in the classroom is to increase their level of competency. This can be achieved by providing training that is designed for each individual's level of anxiety, liking, and confidence when using computers.

Whetstone and Carr-Chellman (2001) surveyed 49 prospective teachers who were taking an interdisciplinary methods course, using a questionnaire. The authors stated that prospective teachers had positive attitudes toward a technology-rich environment. 76% of prospective teachers responded that they were partially or very comfortable with computers in their studies. However, their study indicated that, prospective teachers rarely transfer their technology skills into their own teaching and learning practices. In other words, they found that computers were seen as important to education; however, teachers did not prepare themselves to implement computers successfully and powerfully into future classrooms.

According to Collis (1996), the teacher is the gatekeeper of ICT and ironically is the key person who has to use ICT. The school may have the highest facilities of ICT; the classrooms may be equipped with the latest ICT technologies.

In spite of the place or method of instruction, a result that is consistent is that teachers are the role players in successful or unsuccessful implementations.

Support for teaching and learning activities is obvious in several ways. It is not easy to generalize how to use ICT in classrooms, although there are some examples in the literature. For instance, Thorsen (2006) stated ways common software is used. According to the author, word processors can be used in some learning activities such as newspapers, research reports, rewrite (style, content), revision editing, journaling, laboratory reports, note taking, group investigations, compositions, creative writing, substitution exercises, ordering, sorting, outlining, logical sequencing, grammar, thesaurus, spell checker, following directions, writing directions, etc. Databases can be used for describing an unknown, making a prediction, and making a decision. Spreadsheets can be used to solve story problems, teach what-if thinking, teach estimation, and to show relationships. Presentation software can be used to classify and describe knowledge, illustrate steps in procedures or processes, expose students to information in many different contexts, and provide students an opportunity to construct knowledge in unique ways and different contexts. Internet and e-mail can be used talk to experts, data collection, newspapers, simulations, role playing, electronic debates, classroom discussion, research, communication, and presentations.

With the integration of ICT into education, the faculty members and K-12 teachers who offer the courses in teacher education programs or K-12 schools have important roles. By integrating ICT into the courses, they can enhance the effectiveness of the courses and become role models for the prospective teachers.

The literature has many studies about the use of ICT in the classroom (Odabasi, 2000; SEIRTEC, 1998; SEIRTEC, 1999; USDE, 2000; Yiğit, Zayim and Yıldırım, 2002; and Williams et al., 1998). Odabasi (2000) conducted a study about faculty members' familiarity and use of technology resources in a Turkish University. She used a questionnaire consisting of 61 Likert-type items with 144 faculty members. Her results indicated the faculty members knew and therefore used the traditional technologies. They were not familiar with current technology resources. According to her results, 81% of faculty members never used computer conferencing to promote classroom discussion, multimedia in classroom (79%),

multimedia for individualized learning (76%), e-mail for individual contact with students (72%), and computer-assisted instruction (69%). Her results also indicated faculty members did not have any competencies with e-mail (44%), word processing (42.4%), presentation software (30.6%), and Internet (29.9%). Word processing was the most used computer program according to her results.

Yiğit, Zayim and Yıldırım (2002) conducted a study to explore the discrepancy pertaining to the current and the expected technology utilization in Turkish Higher Education. They collected data with qualitative and quantitative approaches from 7 administrators, 42 faculty members, 44 research assistants, 24 administrative personnel, and 957 prospective teachers. They reported their major findings in an article and also in an official report (METU, 2000) with some other authors, that faculty members used computer technologies mostly in course related activities rather than in classroom. The study indicated that faculty members used computers mostly to communicate (95%), to prepare course materials and exams (92%), to search on the Internet (91%), and to prepare presentation (90%).

SEIRTEC (1998) investigated the most used hardware and software of 164 faculty members in the USA. Their results showed the VCR was rated the most used (48.8% high use; 44.4% middle use). Technologies reported to have low usage by faculty members, in the teaching of their methods courses, were the computer (54%), CD-ROM (57%), integrated multiple technologies (54.7%), and image/page scanner (53.7%). On the other hand, the highest use of software by faculty was word processing with 73% reporting high use and 20.2% reporting middle use for a combined score of 93.2%. At the lower end, 79.7% of the professors do little or no HTML/web page development. It can be implied they do not digitize images much, nor do they use portfolio tools, or scanning, or desktop publishing often.

SEIRTEC (1999) conducted a survey about educational software use from a random sample of 579 K-12 public school teachers in 4 states of the USA. According to the report, 83.6% of teachers never used software in their teaching. Productivity tools and research tools were the most frequently used software but instructional software were the least utilized software.

USDE (2000) presented a report based on three sources (the Fast Response Survey System, the Current Population Survey, and the National Assessment of Educational Progress). The findings of the study showed that around half of the public school teachers who had computers or the Internet available in their schools used them for classroom instruction. Participant teachers of the study assigned students to use these technologies for word processing or creating spreadsheets most frequently, followed by Internet research, practicing drills, and solving problems and analyzing data. Furthermore, many teachers used computers or the Internet to conduct a number of preparatory and administrative tasks and communicative tasks. Among teachers with computers available at home, teachers with the fewest years of experience were more apt to use computers or the Internet at home to gather information for planning lessons and creating instructional materials than teachers with the most years of experience. They were also generally more likely than more experienced teachers to use these technologies to access model lesson plans at school and at home.

According to the same report (USDE, 2000), around all public school teachers (99%) reported having computers available somewhere in their schools in 1999; 84% had computers available in their classrooms, and 95% had computers available elsewhere in the school. Teachers were generally more likely to use computers and the Internet when located in their classrooms than elsewhere in the school, while their students were more likely to use computers and the Internet outside the classroom than inside. 82% of public school teachers reported having a computer available at home, 63% of public school teachers had the Internet available at home, and 27% reported that their school had a network that they could use to access the Internet from home.

Ward (2003) surveyed ICT usage in classroom from 199 secondary school teachers in New Zealand. The overall mean of his study was low (M=2.01; on a four-point scale) suggesting that computers are only rarely used in classroom practice. Their results showed that ICT usage for “Research using the Internet” (M=2.88), “Finding out ideas and information” (M=2.68), and “Using computer applications such as word processing, spreadsheets, etc” (M=2.49) which are the most used by the teachers. While “Collaborating with classmates on projects”

(M=1.56), “Games for practicing skills” (M=1.52), and “Using multimedia software for projects/reports” (M=1.37) are the least used programs by the teachers. The author asked participants how prepared they felt to use computers in the classroom with their students. They felt least prepared to integrate computers into their classrooms (M = 2.41) or to adopt a new teaching style (pedagogy) where necessary (M = 2.28). They did feel more confident about using basic applications (M= 2.9). She asked the teachers about their skills. The participants felt well skilled in the generic uses of the computer: word processing (M = 3.43); the use of e-mail (M=3.35); accessing information on the web (M= 3.17); and managing and organizing computer files (M = 3.14). Teachers perceived themselves to be poorly skilled in the areas of multimedia software and publishing on the web.

Megan (2003) gathered data from 66 teachers to examine *“when do teachers use the Internet”* and *“What do teachers use the Internet for”*. The results indicated 78% of teachers used the Internet after school regularly or sometimes. Whereas 39% said they regularly or sometimes used it during lessons. His results also showed that the teachers were mainly using the Internet as an information resource, both to support their teaching (78%) and for personal use (83%). The second main use of the Internet by teachers is for work related (60%) and social e-mail (71%). Teachers rarely used the Internet for creating and maintaining web pages for personal use (5%) and work related (17%).

According to Williams et al. (1998), there was a very slight use of the Internet and e-mail by either primary or secondary teachers. Resources such as video conferencing and network computer conferencing were rarely used. Their findings were collected from 352 primary and 329 secondary school teachers in Scotland in regards to perceptions of the current stage of development in their schools, their needs and priorities for further development, and their views of the factors which help or hinder them from making effective use of ICT.

These standards have a function of leading teachers to emphasize deeply on integration technology into their classrooms. These standards point out teachers are required to use computers in a proper and appropriate way in accordance with the level of their students. Yet, computer usage in instruction is far from the intended rate. The result of the study, based on survey of 1,215 schools with 4,100 teachers of

grades 4-12, indicated that the percent of mathematics teachers in secondary schools using computers in their classrooms on more than 20 occasions for about a 30-week period is only 11%. Moreover, word processing, CD-ROM references, and skill games were the computer applications that teachers used most. Essentially, the objectives that mathematics teachers in using computer technology emphasize deeply are reinforcement and remediation of skills (Becker, 2001).

Nowadays, it is necessary for teachers to use technology in their classrooms. Although the use of computers in K-12 schools have been encouraged by many national, state, and local level efforts, in the past 20 years the use of computers have had minimal effect on teaching and learning. In this aspect, technology, support, and training are the selections thought by the school districts as problematic issues (Sandholtz, 2004).

One of the substantial resources for educators is ICT. ICT usage in the classroom can be seen as a challenge. However, the positive effects on students do not get measured exactly. In reality, the basic ICT skills and also more in-depth knowledge are requirements for collage graduates. It is difficult for students to learn this kind of knowledge on their own; educators are needed to use ICT in their classrooms whenever it is possible.

2.7. MAIN BARRIERS AND POSSIBLE ENABLERS FOR ICT INTEGRATION INTO EDUCATION

Bromme, Hesse, and Spada (2005) described a barrier as *"it comes from psychological research on problem solving and creativity. There it refers to the gap between an initial and end state. In other words, barriers are challenges which have to be overcome in order to attain a goal"* (p.1). The authors also stated it has also become apparent that the localization of difficulties always depends on theoretically based assumptions concerning the nature of barriers. Working with ICT is often difficult, simply because they are new, and because individual and social routines have to be established in using them. Additionally, the use of ICT is difficult because they are not just alternative tools for dealing with old conventional problems but they are also expected to help with meeting new challenges (Bromme, Hesse, and Spada, 2005).

In spite of the various action plans for ICT integration into teacher education, many barriers for effective integration still exist in practice. To facilitate these plans, main barriers need to be overcome. While some of the teacher education programs do not face these barriers, others have certain problems due to those barriers. Therefore, the current situation of integrating ICT into teacher education is still a struggle all around the world. In their study, Ertmer, Addison, Lane, Ross, and Woods (1999) stated about the struggle of using technology effectively, *"it may be important to look at what they have (in terms of beliefs and practices) in addition to what they do not have (in terms of equipment)"* (p.68). Despite these two reasons, significant barriers can be identified for infusing technology into teacher education programs. They classified these barriers into two primary categories: extrinsic (first-order) and intrinsic (second-order). While extrinsic barriers include lack of resources, adequate training, technical support, and time, intrinsic barriers include teacher beliefs, visions of technology integration, and views about teaching, learning, and knowledge.

The authors (Ertmer et al., 1999) classified enablers, like barriers, as being either intrinsic or extrinsic. For example, access to hardware, quality software, the Internet, technical support, as well as administrative and peer support might be viewed as being extrinsic whereas personal beliefs, previous success with technology, and self-efficacy might be viewed as being intrinsic enablers.

Critiques of teacher education's performance in technology training of new teachers generally focus on three areas. First, teacher educators do not sufficiently model appropriate use of computers for instructional purposes, either in courses or field experiences (Bosch & Cardinale, 1993). Second, these programs do not, typically, incorporate technology across the curriculum (Walters, 1992). Third, the instruction that is provided to prospective teachers tends to focus more on the older and simpler instructional applications of computer technology (e.g., computer assisted instruction, word processing) and less on exposure to and practice with newer, more sophisticated tools (e.g., electronic networks, integrated media, problem-solving applications), which

support development of students' higher-order thinking and problem-solving skills (Baron & Golman, 1994; OTA, 1995).

According to Topp, Mortensen, and Grandgenett (1995) and Baron and Goldman (1994) barriers for integrating ICT into preservice teacher education were: (1) limited availability of equipment; (2) lack of faculty training; (3) no clear expectation that faculty will incorporate technology in academic activities; (4) lack of funds; (5) lack of time to develop facility in using equipment and software; (6) doubt about the pedagogical validity; (7) lack of technical support; (8) lack of appropriate materials; and (9) absence of clear programmatic goals for the teacher education program as a whole.

Mehlinger and Powers (2002) also stated barriers to effective ICT integration into preservice teacher education programs. The authors delineated these barriers as lack of vision, lack of planning, inadequate support, weak human and equipment infrastructures, inadequate access to technology, lack of incentives, inadequate professional development, and lack of money.

Similar to the above barriers, the report of SchoolNetAfrica (2004) identified barriers as: (1) lack of ICT experience and skills among teacher educators; (2) lack of access to technology in preservice training institutions; (3) lack of access to ICT training content; (4) lack of access to good quality research (including content examples) from institutions that are already integrating ICT into preservice training.

In a similar study, Glazewski, Brush, Ku, and Igoe (2001) also studied barriers. While findings of the study stated similar barriers, they proposed *"prospective teachers did not perceive potential problems such as preparation time and implementation as main barriers to effective integration",* but *"lack of or limited access to computers in schools", "not enough software available in schools"*, and *"lack of knowledge about technology*". On the other hand, "*the faculty indicated that lack of preparation time and implementation time was a major reason why technology was not being effectively integrated in many instructional settings"* (p.4).

Odabasi (2000) stated the most effective factors for use of ICT were its availability, increase in student interest, and improvement on student learning. The

enablers were time release, clerical assistance, and grants, whereas the most important barrier was the lack of easily accessible resources. Williams et al. (1998) explained main barriers as: (1) teachers identify a range of issues which they regard as inhibitors to effective use of ICT, (2) lack of access/availability of hardware/software, and (3) lack of familiarity, skills and knowledge.

USDE (2000) indicated barriers to the use of computers and the Internet for instruction most frequently reported by public school teachers were: not enough computers (78%), lack of release time for teachers to learn how to use computers or the Internet (82%), and lack of time in schedule for students to use computers in classroom (80%).

Cuban, Kirkpatrick, and Peck (2001) pointed to the following barriers for the use of technology more innovatively: (1) teachers do not have the time to find and evaluate software; (2) computer and software training was seldom offered at convenient times; (3) most of the available training was too generic and not specific to the needs of the teachers.

According to Mumtaz (2000), there were three interlocking factors that affected teachers' use of ICT. First was the school as an institution providing insufficient time to teachers to manage and familiarize themselves with ICT. Second were limited resources within schools, which are great obstacles to the integration of ICT. Lack of computers and software in the classroom can seriously limit what teachers are able to do with ICT. And last were teacher factors that involved beliefs about the way the subject should be taught and skills associated with competence in managing classroom activities and computer-handling technical skills, as the most influential in teachers' use of computers.

In light of the above-mentioned literature, it is obvious that technology integration is influenced by many barriers. To prepare prospective teachers better and to overcome these barriers more successfully in order for technology integration, enablers should be proposed.

According to Scrimshaw (2004), there were two factors, which enable ICT use in education. One of them was individual factors such as the availability of high quality resources, high level of technical support, full access to software and

hardware at all times, and availability of good quality training. Second was school level enabling factors which included a staff program of ICT training, effective timetabling of rooms and equipment, access to resources, on-site technical support, and whole school policies on using ICT across the curricula.

According to Sugar (2002), positive attitudes of teachers toward ICT integration into the classroom was the most important enabler. By changing their attitudes toward the use of technology in schools, teachers could potentially remove several obstacles to effective ICT integration.

The following items might also be enablers to overcome the significant barriers: adequate equipment and resources in the literature (Becker, 1994; Fabry & Higgs, 1997; Hadley & Sheingold, 1993; OTA, 1995; Topp, Mortensen, and Grandgenett, 1995); allocating specific units or personnel for peer support and to help reduce the teacher workload (Becker, 1994; Japonite, 2001; OTA, 1995; Pricewaterhousecoopers 2001; Ronnkvist, Dexter, & Anderson, 2000); staff development (OTA, 1995; Willis, 1993); and preparation of technology plans for implementing ICT in STE and universities (UNESCO, 2002).

While the limited use of computers in K-12 schools cannot be attributed exclusively to preservice teacher education, schools, colleges, and departments of education are considered to be lagging behind in meeting the needs of new teachers to develop technological competencies (Walters, 1992).

An additional obstacle is disagreement among teacher educators about the best approach to preparing teachers who are proficient in computer-based instructional technologies. One source of contention is whether computer literacy courses, which expose prospective teachers to K-12 computer applications and teach them how to use basic computer tools, should be phased out. Instead of discrete computer literacy courses, computer instruction would be integrated into existing methods and foundations courses (Weibe, 1995). A related concern is the need to infuse technology, in a coordinated fashion, across the college curriculum, into the liberal arts content areas where students acquire their subject-area skills and knowledge, as well as education specialties (OTA, 1995).

However, according to the research in Turkey, the teachers classified some problems related to integration of computer to the curriculum as follows (Çağıltay, Çakıroğlu, Çağıltay, and Çakıroğlu, 2001):

(1) lack of enough computers,

(2) lack of teacher education about computer literacy,

(3) inappropriate instructional programs,

(4) lack of teacher knowledge about how to use computers in instruction,

(5) load of the curriculum.

Toprakci (2006) investigated barriers for the integration of ICT into the schools in Turkey. He used the "School Survey of Obstacles in Integration of the Schools and ICT", and administered it to 1564 teachers and administrators in 214 schools of Turkey in the 2003-2004 educational year. In the context of the findings of this study, the barriers read as follows starting with the decreasing order of importance: ICT budget limitations; scarcity of technical support resources of the school staff to be trained in ICT, the limited number of computers, outdateness/slowness of the system related to ICT , limited numbers of educational software, resistance in being open to changes, interest and drive of the city directorships of the Ministry of Education, educational expertise of the teachers and principals and the defiance of being open to changes, interest and motivation of both teachers and principals.

According to Çınar (2002), MoNE aims to expand the coverage of education and improve the quality of education at basic education schools via the instructional technology rooms which were set up in 2451 schools across Turkey. According to his results they were not used as effectively and conveniently as expected at the beginning of the project. His results showed that there are many reasons such as: lack of technical and economical support for schools, lack of guidance and coordination of the schools, lack of continuous control and evaluation of schools, lack of good quality instructional software, incapacity of IT rooms at schools, insufficient number of formator (master) teachers, deficiency of in-service training programs, deficiency of encouragement and rewards for teachers, conservativeness of administrators, illiteracy of administrators,

reluctance of administrators, lack of support and encouragement for teachers, low-level computer competency, lack of teachers' positive attitudes toward computers, lack of teachers' enthusiasm about computer aided instruction, and nonexistence of computers at teachers' homes.

2.8. SUMMARY OF THE CHAPTER

Studies discussed above show that ICT have critical roles in education. Some of them are as a tool to help create equal opportunities, as a catalyst for change, and as a means to improve the quality of learning. The literature indicated that most of the studies reflected positive perceptions about the integration of ICT into teacher education programs as well as K-12 schools. ICT competencies play key roles in integration/use of ICT. In the literature, there are two main ICT competencies for faculty members, prospective teachers, and K-12 teachers: basic and advanced. However, some authors also stated the Internet as a third competency. Some institutions defined standards to form common ICT competencies. The literature indicated faculty members, prospective teachers, and K-12 teachers have intermediate ICT competencies in the world, particularly in Turkey. For the adequate ICT competencies, some ICT related courses are offered in almost whole preservice teacher education programs. According to the literature, ICT related courses affected learners, but not strongly. Since the early 1990's ICT entered into K-12 and higher education schools with their instructors. A majority of the literature showed e-mail and word processing were the most used software by the instructors. Based on the literature, all stakeholders typically encounter a variety of barriers (i.e., limited availability of equipment; lack of in-service training) that make the integration of ICT difficult. However, despite these barriers, the literature mentioned many of the enablers (i.e., allocating specific units or personnel for peer support, reduce of the teacher workload). As a summary of the literature it can be concluded effective and efficient ICT integration into schools is greatly dependent on positive perceptions, adequate competencies, ICT resources, planning, and successful preservice and in-service training.

CHAPTER 3

METHODOLOGY

The research and procedures used in this study are presented in this chapter, which includes design of the study, selection of participants, instruments of the study, procedures of the study, analysis of the data, validity and reliability of the study, and a summary of the chapter.

3.1. DESIGN OF THE STUDY

The purpose of this study is to investigate the current status of ICT integration into teacher education and K-12 schools and to examine the ICT readiness of those schools in Turkey. Consequently, the overarching question this study sought to answer is how schools of teacher education in Turkey prepare future teachers to use ICT in their professions and how K-12 teachers employ ICT in their work. The research questions that guide this study are listed below:

(1) What are the deans', faculty members', prospective teachers', and K-12 teachers' perceptions about ICT integration into teacher education programs?

(2) What are the prospective teachers' and K-12 teachers' perceptions about ICT integration into K-12 schools?

(3) What are the faculty members', prospective teachers', and K-12 teachers' perceived ICT competencies?

(4) How do faculty members, prospective teachers and K-12 teachers perceive the effectiveness of ICT related courses in teacher education programs?

(5) To what extent do faculty members and K-12 teachers use ICT in their courses?

(6) What are the barriers and enablers for integrating ICT into teacher education programs?

(7) What are the barriers and enablers for integrating ICT into K-12 schools?

(8) Is there a significant difference between K-12 teachers' perceived ICT competencies in regard to gender, computer ownership, ICT related courses taken, and in-service training taken about ICT?

In order to answer these research questions, a mixed method approach as described by Johnson and Christensen (2003) and Johnson and Onwuegbuzie (2004) was used as the primary design for the study. This was realized by utilizing interviews and questionnaires to collect data as described by Fraenkel and Wallen (2000) and Krathwohl (1993). In the following paragraphs, the justifications for selecting a mixed method approach, interview, and cross-sectional survey are described.

The debates among advocates of different research paradigms are still an ongoing issue in the field of social research (Tashakkori & Tedlie, 1998). Based on their epistemological beliefs on the nature of truth and knowledge creation, Positivists and Constructivists (or Interpretivists) have described their own way to investigate the phenomena to be studied in the social sciences. In their historical developments, basically two main research methodologies Quantitative (first wave) and Qualitative (second wave), have gained more popularity among the social researchers. Although it is not the main focus of this study to discuss philosophical underpinnings of these two main movements in detail, the researcher believes that there is a need to note main points of these discussions between qualitative and quantitative methods that eventually explain why it was decided to use a mixed methods approach (third wave) for this research.

According to Mertens (2005), mixed method design is described as *"it is one in which both quantitative and qualitative methods are used to answer research questions in a single study"* (p. 292). Johnson and Onwuegbuzie (2004)

point out that mixed method sits between quantitative and qualitative research methodologies as more of a complementary approach rather than competitive with qualitative and quantitative approaches. Authors note that *"the goal of mixed methods research is not to replace either of these [Qualitative and Quantitative] approaches but rather to draw from the strengths and minimize the weaknesses of both in single research studies and across studies"* (p. 14-15). For given reasons, the researcher in this movement uses both quantitative and qualitative research approaches within this research design. Through using different sources, as found in different studies focused on methodological issues, the researcher may be in a better position to strengthen the validity of the results.

Using different sources in a research design is simply described as the process of triangulation of data. In this process, researchers basically use different data sources to investigate the phenomena and are expected to have broader and deeper understanding of the phenomena (Johnson & Christensen, 2003). In more elaborated discussions, Greene, Caracelli, and Graham (1989) summarize the merit of a mixed method approach as *"a design strategy is that all methods have inherited biases and limitations, so use of only one method to assess given phenomenon will inevitably yield biased and limited results. However, when two or more methods that have offsetting biases are used to assess a given phenomenon, and the results of these methods converge or corroborate one another, then the validity of inquiry findings is enhanced"* (p. 256).

Based on the discussion above, the researcher delineated four reasons for using a mixed method approach in this study (Creswell, Clark, Gutman, & Hanson, 2003; Greene, Caracelli, and Graham, 1989; Johnson & Christensen, 2003; McMillan & Schumacher, 1993; Rudestam & Newton, 1992; Tedlie & Tashakkori, 2002). First, when qualitative and quantitative methods are used for the same purpose, the two methods tend to build upon each other and offer insights that each alone could not. Second, qualitative and quantitative methods have biases, by using both the truth is more likely to prevail. Third, mixed methods can be used to increase the generalizability of the results. Finally, for the nature of current study, mixed method seemed to be the more appropriate approach because of several reasons:

(1) There is little body of research found that informs the current conditions of the ICT integration into preservice teacher education programs in Turkey. To understand and interpret the current conditions in this context, there is a need for both qualitative and quantitative research.

(2) Because of diverse conditions (different body of prospective teachers in teacher education programs because of the university entrance exam, the development level of the teacher education program, technical and other facilities, etc) in each region, the researcher is forced to have varying participant groups from different regions of the country to gain a broader understanding of the phenomena. Therefore, there was a strong need for more quantitative approaches to collect data from this large body of subjects and analyze the general thoughts on the research questions.

(3) Since there are few instruments specifically related to the study developed, there was a need to develop our own instruments, which could have several drawbacks. To minimize any issues, the need for more qualitative input from the research site was inevitable. Using qualitative for quantitative can provide triangulation by confirming or complementing each other. Also can help to best understand and make inferences from quantitative results.

In this study, quantitative and qualitative instruments were also used for methodological triangulation, which was applied by gathering data through questionnaires and interviews. Triangulation involves the collecting of data from more than one data source to complement each other (Bogdan & Biklen, 1998; Krathwohl, 1993). In addition to data collection, both qualitative and quantitative methods were used for data analysis and inferences stages.

The basic idea behind a questionnaire is to measure variables by asking people questions and then to describe what is occurring in research data (Krathwohl, 1993). Popham (1993) recommended the questionnaire for the collection of data from a large population. Therefore, four questionnaires were used in order to collect data from large samples and examine the several items regarding the ICT perceptions, ICT competencies, ICT usage, effectiveness of ICT related courses, main barriers, and possible enablers for integrating ICT into

teacher education and K-12 schools. The most commonly seen questionnaire uses the cross-sectional design, which asks questions of people at just one point in time (Fraenkel & Wallen, 2000) as in this study.

Interviews and open-ended questions allow the researcher to collect in-depth data from participants. They also offer an opportunity to uncover additional information regarding the participants' information seeking process. Furthermore, utilizing these multiple data collection techniques allows for triangulation of the data, thus enhancing reliability and validity of the information. Data sources (participants), data collection instruments, and the types of data collected for each of the research questions are detailed in Table 3.1.

Table 3.1: # of Research Questions, Data Sources, Data Collection Instruments, Types of Data Collection, and Types of Data Analysis

# of RQs			Data Sources	Data Collection Instruments	Types of Data Collection	Types of Data Analysis
1	1		Deans	Questionnaire 1	Open-ended	Content analysis
	2		Faculty Members	Questionnaire 2 + Interview 2	Open-ended + Interviews	Content analysis
	3		Prospective teachers	Questionnaire 3 + Interview 3	Likert-type + Interviews	Descriptive + Content analysis
	4		K-12 Teachers	Questionnaire 4 + Interview 4	Interviews	Content analysis
2	1		Prospective teachers	Interview 3	Open-ended + Interviews	Content analysis
	2		K-12 Teachers	Interview 4	Open-ended + Interviews	Content analysis
3	1		Faculty Members	Questionnaire 2 + Interview 2	Likert-type + Interviews	Descriptive + Content analysis
	2		Prospective teachers	Questionnaire 3 + Interview 3	Likert-type + Interviews	Descriptive + Content analysis
	3		K-12 Teachers	Questionnaire 4 + Interview 4	Likert-type + Interviews	Descriptive + Content analysis
4	1	1	Faculty Members	Questionnaire 2 + Interview 2	3-point scale + Open-ended + Interviews	Descriptive + Content analysis
		2	Prospective teachers	Questionnaire 3 + Interview 3	Likert-type + Open-ended + Interviews	Descriptive + Content analysis
		3	K-12 Teachers	Questionnaire 4 + Interview 4	Likert-type + Interviews	Descriptive + Content analysis
	2	1	Faculty Members	Questionnaire 2 + Interview 2	3-point scale + Open-ended + Interviews	Descriptive + Content analysis
		2	Prospective teachers	Questionnaire 3 + Interview 3	Likert-type + Open-ended + Interviews	Descriptive + Content analysis
		3	K-12 Teachers	Questionnaire 4 + Interview 4	Likert-type + Interviews	Descriptive + Content analysis
5	1		Faculty Members	Questionnaire 2	Multiple choices items + Likert-type	Descriptive
	2		K-12 Teachers	Questionnaire 4	Multiple choices items + Likert-type	Descriptive
6	1	1	Deans	Questionnaire 1	Likert-type + Open-ended	Descriptive + Content analysis
		2	Faculty Members	Questionnaire 2 + Interview 2	Likert-type + Interviews	Descriptive + Content analysis
		3	Prospective teachers	Questionnaire 3 + Interview 3	Open-ended + Interviews	Descriptive + Content analysis
	2	1	Deans	Questionnaire 1	Likert-type + Open-ended	Descriptive + Content analysis
		2	Faculty Members	Questionnaire 2 + Interview 2	Likert-type + Interviews	Descriptive + Content analysis
		3	Prospective teachers	Questionnaire 3 + Interview 3	Open-ended + Interviews	Content analysis
7	1		K-12 Teachers	Questionnaire 4 + Interview 4	Likert-type + Interviews	Descriptive + Content analysis
	2		K-12 Teachers	Questionnaire 4 + Interview 4	Likert-type + Interviews	Descriptive + Content analysis
8	1		K-12 Teachers	Questionnaire 4	Multiple choices items + Likert-type	Descriptive + Inferential
	2		K-12 Teachers	Questionnaire 4	Multiple choices items + Likert-type	Descriptive + Inferential
	3		K-12 Teachers	Questionnaire 4	Multiple choices items + Likert-type	Descriptive + Inferential
	4		K-12 Teachers	Questionnaire 4	Multiple choices items + Likert-type	Descriptive + Inferential

3.2. SELECTION OF PARTICIPANTS

ICT integration into Turkey pertaining to teacher education and K-12 schools can be made possible through being in closer contact with some stakeholders such as deans, faculty members, prospective teachers, and also K-12 teachers.

As shown in Table 3.2, a total of 5,755 questionnaires were distributed among the various stakeholders requesting their participation by completing the questionnaire. Of these, 2,921 responded, representing a return rate of 50.75 percent. In these processes, census and convenience with representative methodologies were used.

In this study, the entire population (census) was surveyed from deans. In the selection of representative samples from faculty members, prospective teachers, and K-12 teachers, 12 regional breakdowns based on NUTS level 1 were used. Within representative sample from each region, convenience methodology was used to collect data. The reason for convenience methodology was particularly on behalf of increasing the credibility of the research. In data collection process, the questionnaires were distributed and collected with assistance of volunteer people. Most of these volunteers were ICT experts. It was also intentional that, they could help participants who need assistance for the terminology of the questions while filling the questionnaires.

For the interviews, a total of 18 were conducted with 6 faculty members, 6 prospective teachers, and 6 K-12 teachers through convenience and purposeful sampling approach using the criterion technique. The details about the approach are described in the following sections.

Table 3.2: The Numbers of Distributed and Responded Questionnaires and the Sampling Methodologies

Stakeholders of the Study	# of Distributed Questionnaires	# of Responded Questionnaires	Sampling Methodology	Interview	Sampling Methodology
Deans	63	51	Census	-	
Faculty Members	223	111	Convenience	6	Convenience + Purposeful + Criterion
Prospective teachers	2,116	1,330	Convenience with a representative technique	6	Convenience + Purposeful + Criterion
K-12 Teachers	3,353	1,429	Convenience with a representative technique	6	Convenience + Purposeful + Criterion
TOTAL	5,755	2,921		18	

3.2.1. Deans of STE:

The first population used in this study consisted of deans of teacher education schools. There are 69 public and private schools of teacher education that train teachers for primary and secondary education in Turkey as of spring 2005 (see Appendix J). However, 6 of them did not have any students. They were only preparing their schools for future students while collecting data for the study. Deans of 63 schools, which serve preservice teacher education, consist of the population of the research. In order to collect data on ICT integration into preservice teacher education programs, the entire population (census) was surveyed. However, 51 deans responded to the "deans' questionnaire" with a return rate of 81 percent.

3.2.2. Faculty Members:

The faculty members, who are teacher educators and teach ICT related courses in teacher education schools, were the second population in this study. Initially, the faculty members were clustered into twelve statistical regions using NUTS level 1 to be representative of the population. After that, 18 SET, at least

one school from each region were selected by convenience sampling method (see Table 3.3). Then, 223 questionnaires were distributed to faculty members from these schools, requesting their participation by completing the questionnaire through convenience sampling method. Of these, 111 faculty members responded the questionnaire with a return rate of 49.8 percent.

Table 3.3: Selected Provinces and Universities for the Faculty Members in Terms of NUTS Level 1

Codes of Regions	Provinces of STE	Name of the STE	Universities of STE
TR1	İstanbul	Hasan Ali Yücel	İstanbul University
TR2	Balıkesir	Necatibey	Balıkesir University
TR3	İzmir Denizli	Buca Pamukkale	Dokuz Eylul University Pamukkale University
TR4	Bolu Eskişehir	Abant İzzet Baysal Anadolu	Abant İzzet Baysal University Anadolu University
TR5	Ankara	METU Gazi Başkent	METU Gazi University Başkent University
TR6	Adana	Çukurova	Çukurova University
TR7	Sivas	Cumhuriyet	Cumhuriyet University
TR8	Samsun Amasya Kastamonu	Ondokuz Mayıs Amasya Kastamonu	Ondokuz Mayıs University Ondokuz Mayıs University Gazi University
TR9	Trabzon	Fatih	Karadeniz Technical University
TRA	Erzurum	Kâzım Karabekir	Atatürk University
TRB	Van	Yüzüncü Yıl	Yüzüncü Yıl University
TRC	Gaziantep	Adıyaman	Gaziantep University

The researcher also collected data via interviews in order to obtain in-depth data from participants and triangulate data. For this, the interviews with faculty members were done by selecting 6 faculty members from 3 STE in the capital city

(Ankara). First, the province and 3 STE from the province were selected by convenience sampling method. After that, 6 faculty members were chosen through a purposeful sampling approach using the criterion technique from these STE. The criterion technique is a type of purposeful sampling method, which is an appropriate way of consistently choosing all cases that meet some criterion (Patton, 1990). For this purpose, the criteria used for the selection of this group were as follows:

(1) participants who instruct ICT related courses,

(2) participants who have three years of teaching experience in teacher education schools.

3.2.3. Prospective Teachers:

The third population used in this study consisted of senior-level (4^{th} year) prospective teachers who had taken ICT related courses before spring semester of 2005. Approximately, there are 33,035 4^{th} year prospective teachers (excluding the departments of CEIT) at schools of teacher education in Turkey (see Appendix H). For the third sample of the study, the prospective teacher population was clustered into twelve statistical regions using NUTS level 1 and the researcher made the decision to sample around 6.4% of the prospective teachers from each region to be representative of the population. After that, 19 STE (see Table 3.4), at least one STE from each region, were selected through a convenience sampling method. Thus, a representative sample of 2,116 prospective teachers was selected from the population of 33,035 (HEC, 2001). However, 1,330 prospective teachers responded the questionnaire with return rate of 62.9 percent (see Figure 3.1).

Table 3.4: Selected Provinces, STE, and Universities for the Prospective Teachers in Terms of NUTS Level 1

Codes of Regions	Provinces of STE	Name of the STE	Universities of STE
TR1	İstanbul	Hasan Ali Yücel	İstanbul University
TR2	Balıkesir Canakkale	Necatibey Canakkele 18 Mart	Balıkesir University 18 Mart University
TR3	İzmir Denizli	Buca Pamukkale	Dokuz Eylul University Pamukkale University
TR4	Bolu Eskişehir	Abant İzzet Baysal Anadolu	Abant İzzet Baysal University Anadolu University
TR5	Ankara	METU Gazi	METU Gazi University
TR6	Adana	Çukurova	Çukurova University
TR7	Kırıkkale Sivas	Kırıkkale Cumhuriyet	Kırıkkale University Cumhuriyet University
TR8	Samsun Amasya Kastamonu	Ondokuz Mayıs Amasya Kastamonu	Ondokuz Mayıs University Ondokuz Mayıs University Gazi University
TR9	Trabzon	Fatih	Karadeniz Technical University
TRA	Erzurum	Kâzım Karabekir	Atatürk University
TRB	Van	Yüzüncü Yıl	Yüzüncü Yıl University
TRC	Gaziantep	Adıyaman	Gaziantep University

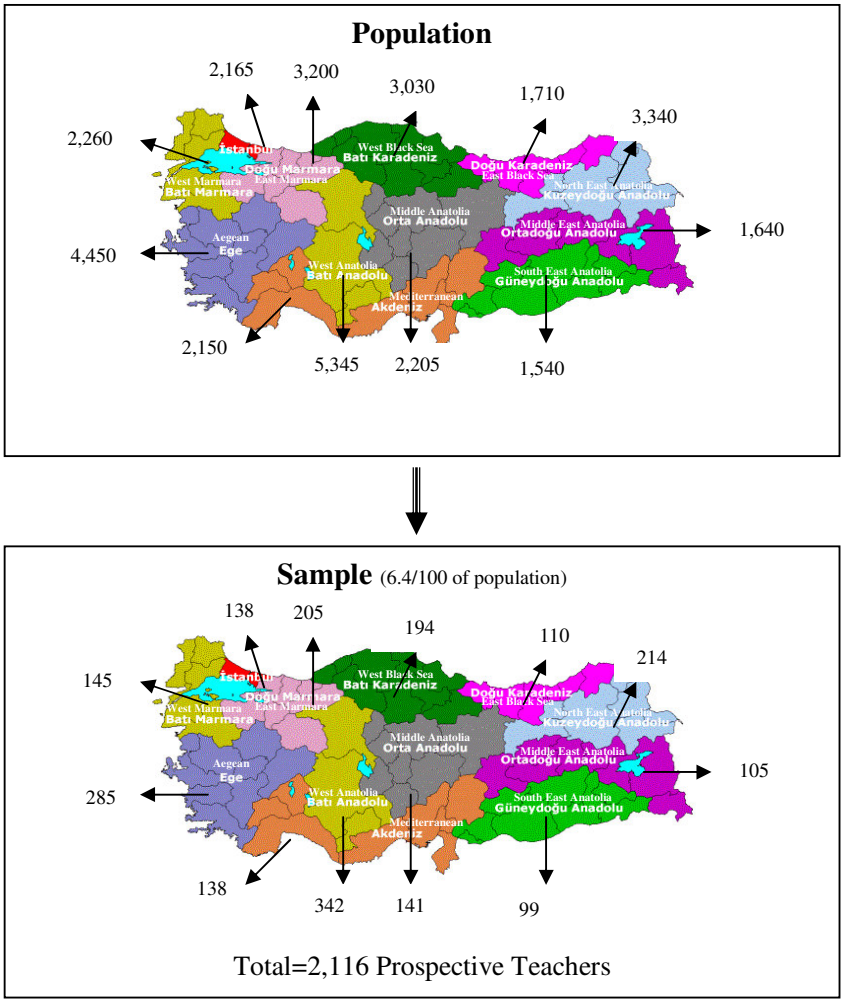

Figure 3:1: The Number of Senior Prospective Teachers' Population and Sample in Terms of NUTS Level 1 (HEC, 2001)

The researcher also collected data through interviews from a sample of 6 prospective teachers for triangulation utilizing the same sample. Initially, the capital city (Ankara) and 2 STE were selected by a convenience sampling method. The researcher also collected data through interviews from a sample of 6 prospective teachers utilizing purposeful sampling, using the criterion technique from 2 STE. For this purpose, the following criteria were used for the selection of this group:

(1) participants who had taken ICT related courses before spring semester of 2005,

(2) participants who are prospective teachers (senior students) in a teacher education program excluding departments of CEIT,

(3) participants who have rich information about ICT integration into teacher education programs.

3.2.4. K-12 Teachers:

The last population used in this study consisted of K-12 teachers. According to MoNE (2004) statistics, there were 558,876 primary and secondary school teachers in Turkey as of 2004. The teacher population was clustered into twelve statistical regions using NUTS level 1 and sample was selected 6‰ of the teachers from each region to be representative of the population. After that, 92 K-12 schools in 35 provinces (see Table 3.5) were selected through a convenience sampling method. Hence, a representative sample of 3,353 teachers was selected from the total population. 1429 questionnaires were returned, yielding a 43 percent return rate (see Figure 3.2).

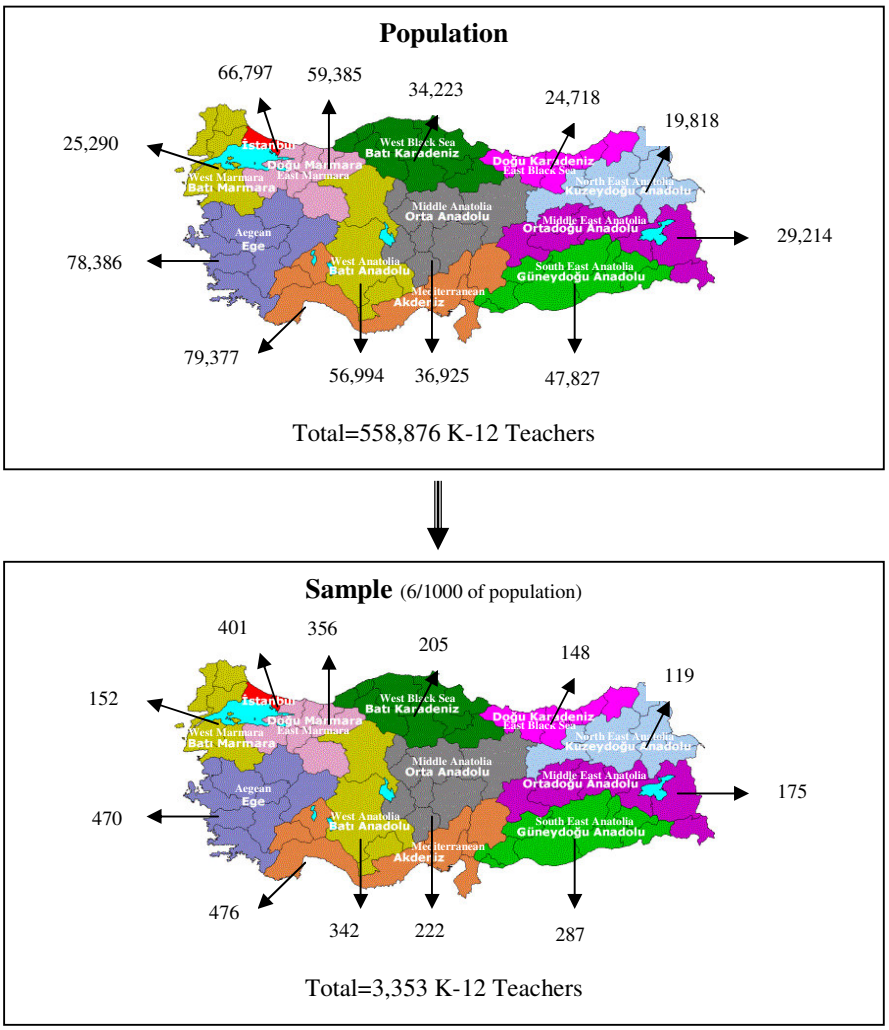

Figure 3:2: The Number of K-12 Teachers' Population and Sample in Terms of NUTS Level 1

Table 3.5: Selected Provinces for the K-12 Teachers in Terms of NUTS Level 1

Codes of Regions	Name of the Provinces
TR1	İstanbul
TR2	Tekirdağ Edirne
TR3	İzmir Aydin Muğla
TR4	Kocaeli Yalova Sakarya

Table 3.5 (Continued)

Codes of Regions	Name of the Provinces
TR5	Ankara
	Konya
TR6	K. Maraş
	Adana
	Antalya
	Isparta
TR7	Kayseri
	Kırşehir
	Sivas
TR8	Çankırı
	Samsun
	Kastamonu
	Amasya
	Çorum
TR9	Trabzon
	Giresun
TRA	Erzurum
TRB	Van
	Elazığ
	Bitlis
	Malatya
TRC	Adıyaman
	Şanlıurfa
	Diyarbakır
	Mardin
	Gaziantep

For the qualitative data collection, the capital city (Ankara) was selected by a convenience sampling method. Then six K-12 teachers were chosen through purposeful sampling approach using the criterion technique from 4 K-12 schools. The criteria used for the selection of the teachers were as follows:

(1) have at least two years of teaching experience in K-12 schools,

(2) have basic knowledge and skills about ICT integration in education,

(3) have experience in ICT integration into education,

(4) have taken ICT related courses in their undergraduate programs,

(5) have graduated from a teacher education school except technical and vocational education facilities.

3.3. INSTRUMENTS OF THE STUDY

In this study, data were collected through seven different instruments which consisted of four questionnaires and three interview guides. Three of four questionnaires and all interview guides were developed the researcher based on related literature. One of the questionnaires (see Appendix C) was developed by Tınmaz in 2004.

3.3.1. Questionnaires

The questionnaires were designed to survey baseline data on the current status of ICT integration into preservice teacher education programs in Turkey. All of the questionnaires include both qualitative and quantitative data collection sections. Each question represented a type of knowledge about the baseline data. The questions on the instruments were developed with the following guidelines (Fink & Kosecoff, 1998):

(1) each question was relevant to the subjects' role,

(2) each question was concrete,

(3) each question attempted to avoid biased words or phrases,

(4) each question represented just one thought.

3.3.1.1. Questionnaire 1 (Q1) for Deans of STE

The first questionnaire (Q1) was developed to collect data from deans of schools of teacher education and consisted of 34 items. It included 15 multiple choices items, 13 fill-in-the-blank items, 3 five-point Likert-type items, and 3 open-ended items. Q1 was developed by the researcher based on related literature (Queitzsch, 1997; Roblyer, 1994; SEIRTEC, 1998; SCRTEC, 1998; Vagle, 1995; Vagle & College, 1995) as well as issues investigated in this study. Items in Q1 were grouped around seven major topics: (1) personal and institutional information, (2) ICT facilities of teacher education schools, (3) ICT usage in classroom, (4) main barriers of integrating ICT, (5) possible enablers of integrating ICT, (6) ICT competencies of personnel and physical resources for the teacher education schools, and (7) comments-proposals.

After the questionnaire was developed, it was reviewed by five graduate students (see Appendix L), and subsequently revised. Then, four experts (2 deans, 1 IT expert, 1 EA expert; see Appendix K) examined the questionnaire and based on their suggestions, it was revised again. Before the final version, Q1 was checked by a Turkish language expert for clarity of the language. After gathering data from 51 deans, the Cronbach alpha coefficient of the questionnaire was calculated as .91 denoting a satisfactory reliability.

3.3.1.2. Questionnaire 2 (Q2) for Faculty Members

The second questionnaire (Q2) was developed to gather information from the faculty members and consisted of 24 items. Q2 included 13 multiple choices items, 7 five-point Likert-type items, and 4 open-ended questions. It was developed by the researcher based on a review of related literature (Baron & Goldman, 1994; İmer, 2000; Topp, Mortensen, & Grandgenett, 1995) and issues investigated in this study. The items were grouped around seven major topics: (1) personal information, (2) ICT usage in classroom, (3) effectiveness of the ICT related courses, (4) perceptions of ICT integration, (5) main barriers of integrating ICT, (6) possible enablers of integrating ICT, and (7) ICT competencies and experiences.

After a peer review by four graduate students (see Appendix L); four experts (see Appendix K) examined the questionnaire, and the instrument was revised according to their feedback. It was then checked by a Turkish language expert for clarity of the language. After the revision, a pilot test was conducted with 64 faculty members in three different universities in Ankara. The Cronbach alpha coefficient was calculated as .87 denoting a satisfactory reliability. Subsequently, a factor analysis was applied to the scale to determine whether the items measured two factors: advanced ICT competencies (Factor 1) and basic ICT competencies (Factor 2). The items between d and t except item o belonged to factor 1 and the other items belonged to factor 2 (see Appendix B).

After gathering data from 111 faculty members, the Cronbach alpha coefficient of the questionnaire was re-calculated and found to be .97 denoting a satisfactory reliability. Subsequently, a factor analysis was applied to the scale to

determine whether the items measured two factors. The Cronbach alpha of Factor 1 was .96 and the Cronbach alpha of Factor 2 was .92.

3.3.1.3. Questionnaire 3 (Q3) for Prospective Teachers

The third questionnaire (Q3) was used to collect data from prospective teachers and consisted of 42 items. Q3 included 6 multiple choices items, 4 fill-in-the-blank items, 2 five-point Likert-type items, and 6 open-ended questions. The questionnaire was developed originally by Tınmaz (2004), and was adapted for this study. The items were grouped around four major topics: (1) personal information, (2) ICT competencies and experiences, (3) ICT perceptions, and (4) effectiveness of the ICT related courses.

After peer review by three graduate students (see Appendix L), four experts (see Appendix K) examined the questionnaire, and in response to the feedback, the instrument was revised. It was then checked by a Turkish language expert for clarity of the language.

The Cronbach alpha coefficient was calculated as .86 indicating an acceptable reliability by Tınmaz (2004). For this study the Cronbach alpha coefficient was re-calculated after gathering the data from 1,330 prospective teachers, as .91 denoting a satisfactory reliability. Subsequently, a factor analysis was applied to the scale to determine whether the items measured two factors. The items between 1 and 16 belonged to factor 1 (belief on positive effect of technology in education) and the remaining items (17-25) belonged to factor 2 (effects of undergraduate program). Item descriptions can be found in Appendix C. The Cronbach alpha of Factor 1 was .93 and the Cronbach alpha of Factor 2 was .86.

3.3.1.4. Questionnaire 4 (Q4) for K-12 Teachers

The final questionnaire (Q4) was used to gather data from the K-12 teachers and consisted of 16 items with multiple choices items, five-point Likert-type items and 4 open-ended questions. The questionnaire was developed by the researcher based on a review of related literature (MirandaNet, 2000; Orhun, 2000; Queitzsch, 1997; SCRTEC, 1998) and issues investigated in this study. The items were grouped around eight major topics: (1) personal information, (2) ICT

usage in classroom, (3) main barriers of integrating ICT, (4) possible enablers of integrating ICT, (5) the main factors of positive ICT knowledge and skills, (6) ICT competencies and experiences, (7) effectiveness of ICT related courses, and (8) ICT perceptions.

After peer review by four graduate students (see Appendix L), seven experts (see Appendix K) examined the questionnaire, and in response to their feedback, the instrument was revised. It was then checked by a Turkish language expert for clarity of the language. After the revision, a pilot test was conducted with 121 teachers in three different provinces (Ankara, Konya, and Çankırı), and the Cronbach alpha coefficient was calculated as .81 denoting a satisfactory reliability. Subsequently, a factor analysis was applied to the scale to determine whether the items measured two factors.

After gathering data from 1,429 K-12 teachers, the Cronbach alpha coefficient was recalculated as .97 indicating a satisfactory reliability. Subsequently, a factor analysis was calculated to identify whether the items measured two factors. The items between b and o belonged to factor 1 (advanced ICT competencies) and the others belonged to factor 2 (basic ICT competencies). Item descriptions can be found in Appendix D. The Cronbach alpha of factor 1 was .97 and the Cronbach alpha of factor 2 was .94.

3.3.2. Interviews

Interviews are an excellent vehicle for data collection providing one-to-one interaction between the researcher and the participant being studied. Interviews provide researchers and participants an opportunity to clarify questions. They also offer an opportunity to uncover additional information regarding participants' information seeking process. In this study, the participants agreed to an audiotaped, semi-structured interview session where they had an opportunity to clarify any actions taken in completing the tasks (Tashakkori & Teddlie, 1998).

In this study, semi structured interviews were used to collect in-depth data from faculty members, prospective teachers and K-12 teachers. In this type of interview, open-ended questions were developed in advance, along with prepared probing questions. Unplanned, unanticipated probes may also be used in semi

structured interviews (Morse & Richards, 2002). This format allows the researcher to respond to the situation at hand, to the emerging worldview of the respondent, and to new ideas on the topic (Merrian, 1998).

For these reasons, three interview guides were developed for the "faculty members (I2)", "prospective teachers (I3)" and "K-12 teachers (I4)". The interview guides were developed by the researcher based on issues investigated in this study, a review of related literature, and format used in previous studies by Smith (2002) and Zayim (2004). Each of the guides was examined first by three graduate students and then four experts (see Appendix K and Appendix L), for the clarity of the questions and how well they addressed the themes in February 2005. After experts' reviews, pilot sessions were undertaken with two prospective teachers, one faculty member, and two K-12 teachers in order to determine if interview procedures were acceptable and to determine if any additional interview questions needed to be asked in order to answer the research questions. After the pilot sessions, interview protocols were modified and interview questions added and modified. A Turkish language expert then revised the interview guides for language clarification. The final forms of each interview guide included ten main questions with a focus on the seven topics: (1) personal information, (2) ICT usage in classroom, (3) main barriers, (4) possible enablers of integrating ICT, (5) ICT perceptions, (6) effectiveness of ICT related courses, and (7) ICT competencies and experiences.

3.3.3. Instruments Validity and Reliability

Consideration of the validity and reliability of the instruments used is important in establishing the efficacy of a study (Millington, Leierer, & Abadie, 2000). The term validity, as it applies to survey research, can be described as the degree to which the instrument *"measures what is purported to be measured"* (p. 122) whereas reliability can best be described as *"the extent to which an instrument provides consistent results"* (Schloss & Smith, 1999, p.113). In order to assure that these aspects of research are adequately addressed it is imperative the researcher provides a clear description of the relationship of validity and

reliability to the study and a rationale for the statistical tests used in the analysis of each of these factors.

According to Jacobs and Chase (1992), an *"instrument's validity deals with appropriateness of information for making decisions"* (p. 32). There are several types of validity data; the one researchers are mainly interested in is content validity. Content validation deals with the content and format of the instruments (Fraenkel & Warren, 2000). There are several factors that affect content validity positively. Most notable among these are adequate and appropriate content sampling in the test and avoidance of nonfocal skills, clear directions, well written test items, and less complex and subjective scoring (Jacobs & Chase, 1992).

Expert and peer review of the initial instrument is a frequently used method to establish instrument validity in the social sciences and educational researches (Gay, 1987). In this study, the initial consideration is the content validity which was provided by asking for peer and expert opinions. To determine the content validity of the questionnaires and interview guides, peer and expert juries were used (see Appendix K and L). Each jury member was selected for his/her expertise in teacher education and ICT. Each of the questionnaires and interview guides were sent to at least three graduate students and four experts. The juries critiqued questionnaires and interview guides and recommended necessary changes to the instruments. Once input from the jury of graduate students and then from the jury of experts was returned, the questionnaires and interview guides were revised. The feedback was used to revise organization of the questionnaires and interview guides statements and wording of items.

According to Jacobs and Chase (1992), an *"instrument's reliability deals with the consistency of measurements"* (p. 32). There are several factors that influence test reliability. Most prominent among positive influences are adequate test length to sample the course content well, sufficient time for all to finish, a moderate level of difficulty, and clear directions. The majority of the studies assessing reliability of the instruments have done so through the standard coefficient of internal consistency, Cronbach's alpha level (Cornieles, 2003). It was also used to verify reliability in this study. The questionnaires (Q2 and Q4)

were validated and reliability tested through a pilot study. Participants were administered questionnaires on baseline data on the current status of ICT integration into preservice teacher education programs in Turkey. Cronbach's Coefficient Alpha (α) was used to test the questionnaires. As a result of these pilot studies, modifications were made to the original questionnaires.

Table 3.6: Criteria Lists for the Instruments' Validity and Reliability

Strategy	Application
1. Validity	1.1. The questionnaires (Q1, Q2, and Q4) and all interview guides were developed after doing a literature review.
	1.2. Each of the questionnaires and interview guides were examined by at least three peers (graduate students).
	1.3. Each of the questionnaires and interview guides were reviewed by at least four experts.
	1.4. Pilot tests were conducted to decrease the researcher's biases for the questionnaires (Q2 and Q4) and all guides.
	1.5. All instruments were checked by a Turkish language expert for clarity of the language.
	1.6. Each question on the questionnaires and interview guides had just one thought.
2. Reliability	2.1. The questionnaires (Q1, Q2, and Q4) and all interview guides were developed after doing a literature review.
	2.2. Pilot tests were conducted to check reliability of the questionnaires (Q2 and Q4) and all guides.
	2.3. Most of the questions on the questionnaires and guides were relevant to answering the research questions.

3.4. PROCEDURES OF THE STUDY

Quantitative research procedures included nine primary activities: (1) develop the questionnaires, (2) peer review, (3) expert review, (4) language check, (5) pilot test, (6) distribute questionnaires, (7) follow-up on distributed questionnaires, (8) enter data into SPSS, and (9) analyze and write interpretations. A timeline of procedures is diagrammed in Table 3.7.

Table 3.7: Procedures of the Study

	Q1	Q2	Q3	Q4	Interviews
2004	1	1		1	a
2005 January	2	2	2	2	a
February	3; 4	3	3	3	b
March	6	4	4	4	c; d
April	6	5		5	e; d
May	7	6	6	6	f
June		7	7	7	f
July	8	8			f
August			8	8	g
September					g
October				9	h
November				9	i
December				9	
2006	9	9	9	9	j

In February, March, and April 2005, the survey instruments were revised based on pilot studies (except Q1 and Q3) and peer and expert reviews. In March and April 2005, 63 Q1s were distributed to the deans of STE at all universities, requesting their participation. A follow-up the questionnaire was sent in May and June 2005 to the deans who did not respond during the first query. In May 2005, 223 Q2s were distributed to the faculty members at 18 STE requesting their participation in completing a questionnaire. Follow-up questionnaires were sent in June 2005 to faculty members that did not respond during the first query. In May 2005, 2,116 Q3s were distributed to the prospective teachers at 19 STE, requesting their participation in completing a questionnaire. Follow-up questionnaires were sent in June 2005 to prospective teachers that did not respond during the first query. In May 2005, 3,353 Q4s were distributed to K-12 teachers requesting their participation in completing a questionnaire. Follow-up questionnaires were sent in June 2005 to teachers that did not respond during the first query. After the data collection process, all quantitative parts of the

questionnaires were entered into the SPSS program. Then, the data were analyzed and interpretations written. Qualitative data collected from questionnaires were coded and joined/merged with the interview data.

Qualitative research procedures included the following primary activities: (a) develop interview guides, (b) solicit peer review, (c) solicit expert review, (d) language check, (e) conduct pilot study, (f) conduct interviews, (g) transcribe interviews, (h) checked by volunteers, (i) coded, and (j) analyze and write interpretations (see Table 3.7). In May, June, and July 2005, interviews were conducted with six faculty members, six prospective teachers, and six K-12 teachers using a digital voice recorder.

All participants were volunteer respondents who agreed to give up their time, for no rewards. In the study and whole written documents, all participants have been assigned pseudonyms for the purpose of the study to protect their identity. All pseudonyms were selected using the most common Turkish citizens' names according to NVIGM (2006) which is responsible for collecting and archiving the population data of Turkey.

In the study and whole written documents, all participants have been assigned pseudonyms for the purpose of our study to protect their identity. Prior to the interview session, potential participants were contacted via e-mail and phone. These sessions took place in various locations from a university campus to individual offices, time and location convenient to participants. Subsequent interviews were transcribed using windows media player. After the process of reading and re-reading, the transcripts were checked by volunteer colleagues in order to increase the credibility of the research. Finally, the collected data were coded, analyzed, and interpreted into findings.

3.5. ANALYSIS OF THE DATA

Collected data were analyzed utilizing concurrent mixed data analysis, more specifically the parallel mixed analysis model as described by Tashakkori and Teddlie (1998). According to them, *"in survey research, there often is a combination of open-ended and close-ended response options. These close-ended responses are analyzed statistically, and the open-ended responses are content*

analyzed" (p. 128). In this study, the quantitative responses were analyzed using descriptive and inferential statistics. The qualitative responses were analyzed using the content analysis.

The descriptive analysis was used to investigate the current status of ICT integration into preservice teacher education programs. The data were coded and prepared for analysis using the statistical analysis software SPSS 12.0. Descriptive statistics were used to describe trends in that data. Thus, they consisted of computing deans', faculty members', prospective teachers', and K-12 teachers' responses to the questionnaires. The descriptive statistics were calculated frequencies, means, percentages, and standard deviations of questionnaire items. To calculate descriptive statistics survey items were grouped according to subject area taught.

The inferential analysis was used to investigate the significant differences among dependent variable (DV) across independent variables (IVs). For this reason, Pearson Correlation, Univariate Analysis of Variances (ANOVA), and Post-Hoc tests were calculated. Pearson Correlation analyses examined if there were relationships between independent variables and dependent variable. ANOVA examined if there were differences between independent variables and dependent variable. Post-hoc tests were performed to see which group(s) caused significant difference(s) (Green, Salkind & Akey, 2000). Both analyses include four independent variables and one dependent variable:

Independent Variables:

(1) Gender: It is a categorical variable with two levels (1 = male, 2 = female)

(2) Computer ownership: It is a categorical variable with two levels (0=No Taken ICT Related Courses, 1=Taken "Computer" Courses, 2= Taken "ITMD" Courses, and 3= Taken both Courses)

(3) Taken ICT related courses: It is a categorical variable with four levels (0= 1= Computer, 2= ITMD)

(4) Taken in-service training about ICT: It is a categorical variable with two levels (1 = Yes, 2 = No)

Dependent Variables:

Perceived ICT competencies: It is a continuous variable with five levels: (5 indicating "Completely Sufficient", 4 indicating "Sufficient", 3 indicating "Neutral", 2 indicating "Insufficient", and 1 indicating "Completely Insufficient"). The higher score on ICT Competency Scale more competent K-12 teachers feel themselves. It contains two sub-scales; which are basic ICT competencies and advanced ICT competencies.

For the content analysis, the model by Miles and Huberman (1994) was used to guide the process, which involves data reduction, data display, and conclusion drawing / verification phases. These processes began after the recorded interview sessions were transcribed into text for analysis using Windows Media Player. During the process of reading and re-reading the transcripts, researcher, advisor, and co-advisor of the study discussed the resulting interpretations.

Data reduction refers to the process of selecting, focusing, simplifying, abstracting, and transforming. During this process, data reduction activities included coding and inserting under the pre-identified themes. The researcher identified these themes based on each research question. After that, the open-ended data from questionnaires and the handwritten notes of the interview process were coded and inserted into the themes.

Data display refers to organizing and compressing information in a way that permits conclusion drawing and action. During this phase, data around themes was organized as labeled concepts into data display matrixes and structured summaries.

Conclusion drawing / verification involves the researcher in drawing meaning from displayed data. This final phase included comparison-contrast, clustering, using metaphors, triangulation, and looking for negative cases. In order to attain interpretative validity, all of the interpretations and this study have been verified by the advisor, and co-advisor of the study.

3.6. VALIDITY AND RELIABILITY OF THE STUDY

Ensuring validity and reliability for qualitative and quantitative differs as *"the quantitative study must convince the reader that procedures have been followed faithfully while the qualitative study provides the reader with a depiction in enough detail to show that the author's conclusion makes sense"* (Merriam, 1998, p.199).

In mixed methods research, quantitative and qualitative approaches are combined. In the study, different methods are combined in order to ensure validity and reliability. The most important issue for validity and reliability is triangulation which includes methods, data sources, and analysis being employed to improve validity and reliability of the study (Tashakkori & Teddlie, 1998).

According to Cresswell (2003) verification is a process that occurs throughout data collection, analysis, and report writing of a study, while standards of criteria are imposed by a researcher and others after the study is complete. The model in Table 3.8 was used to develop strategies that would introduce standards of quality into this study. While developing the model, the researcher considered using quantitative and qualitative validity strategies in the study, and mixed those in a way that best works for the mixed research study. The strategies implemented were internal validity/credibility, external validity/transferability, reliability/dependability, and objectivity/conformability.

Table 3.8: The Reliability and Validity Criteria List for the Study

Strategy	Criteria	Application
1. Internal Validity / Credibility	1.1.Triangulation	1.1.1. The data collection methods, data analysis, and literature review were used to verify interviews and categorization of the data gathered.
	1.2.Member checking	1.2.1. Interview participants reviewed the accuracy of the details in the transcriptions of each interview. Transcripts and open-ended responses were also triangulated with literature.
	1.3.Peer examination	1.3.1. The synthesis of all data gathered was reviewed by peers, advisor, and co-advisor of the study.
	1.4.Researcher's biases	1.4.1. The researcher's assumptions, limitations, delimitations, and theoretical orientation at the outset of the study were clarified.
		1.4.2. The results of the study were compared to the literature in the chapter 5.
2. External Validity / Transferability	2.1.Nominated sample	2.1.1. Every used sampling technique and the criteria for selecting participants were provided in "population and sample" sections.
	2.2.Dense description	2.2.1. A complete description of methodology was given in this chapter (3).
3. Reliability / Dependability	3.1.Dependability audit	3.1.1. All questions in the instruments were developed after doing a literature review and conducting pilot interviews. A full description of the data analysis protocol is provided in this chapter (3). In addition, advisor and co-advisor of the study provided valuable input with respect to interview and open-ended material.
	3.2.Methodology Triangulation	3.2.1. The research methodology was fully described. The data collection methods and data analysis were used to triangulate and verify interviews and categories were identified from the data gathered.
	3.3.Peer examination	3.3.1. The synthesis of all data gathered was reviewed by peers, advisor, and co-advisor of the study.
	3.4.Evaluation	3.4.1. A consensus discussion of the synthesized data was held with the researcher, advisor, and co-advisor of the study.
	3.5. Reliable transcribe	3.5.1. Tapes/transcripts open to inspection by others. 3.5.2. Multiple listenings and transcriptions of audio tape by the researcher and a different person.
4. Objectivity / Conformatibility	4.1.Confirmability Audit	4.1.1. The synthesis of all data gathered was reviewed by peers, advisor, and co-advisor of the study.

3.7. SUMMARY OF THE CHAPTER

Chapter 3 included (1) a description of type of the study conducted and explanation regarding why this design assisted the researcher in answering the research questions. (2) A description of the study participants, rationale for selection, and means for dividing them into categories for data collection purposes. (3) A summary of data collection, indicating how each data source (questionnaire and interview) investigate the research questions. (4) The procedures for how, when, and where the data were collected and how the data were recorded. (5) A description of how data were gathered from each source and analyzed, combined, and reported. (6) The last section of the chapter explains how the researcher addressed issues of validity and reliability.

CHAPTER 4

RESULTS

This chapter presents the findings of the study concerning research questions and each sub-question stated formerly. The focus of this study is to reveal the current situation of STE in Turkey in terms of how they prepare new teachers to use ICT in their professions and the current situation of K-12 schools in terms of how teachers employ ICT in their work. Before presenting the results of this study, basic information of the STE and demographic information of the participants are provided in the following parts. Finally, results of the study are provided based on the research questions.

4.1. BASIC AND DEMOGRAPHIC INFORMATION

The section was organized based on the basic information about STE perceived by their deans, as well as demographic information of the faculty members, prospective teachers, and K-12 teachers.

4.1.1. Basic Information of the STE related with ICT:

Basic information of the STE were clarified in regard to ICT resources and methods of their usage, planning and in-service training, and the level of physical and human resources conditions. Data were collected from 51 deans of STE through questionnaire consisting of multiple choice items, fill-in-the-blank items, and five-point Likert-type items.

ICT Resources and Methods of Usage in STE:

The results of the questionnaire revealed 47 (92%) of the STE have at least one computer laboratory in the school. 4 (8%) of the deans of STE who participated in this study reported they do not have any computer laboratories at their school (see Figure 4.1).

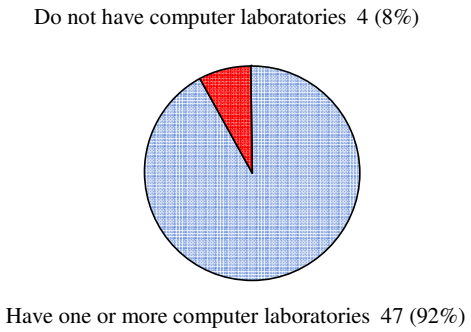

Figure 4.1: Percentage of STE having at Least one Computer Laboratory

16 (31.4%) of 51 STE have only one computer laboratory, 12 (23.5%) have two computer laboratories, and 8 (15.7%) have three computer laboratories. While only 10 (19.6%) have 4 or more computer laboratories, a STE having 9 computer laboratories is the school with the most computer laboratories (see Table 4.1).

Table 4.1: The Number of Computer Laboratories Allocated for Student Use in STE

Number of Laboratories	***f***	**%**
0	4	7.8
1	16	31.4
2	12	23.5
3	8	15.7
4 or more	10	19.6
No Response	1	2.0
TOTAL	51	100.0

When the number of computers for student usage was investigated, it was found there were 27 STE with less than 41 computers, 9 with 41-60 computers, 4 with 61-80, and 11 schools with 81 or more computers.

Table 4.2: Number of Computers Allocated for Student Use in STE

Number of Computers	*f*	*%*
0	4	7.8
1–20	8	15.7
21–40	15	29.4
41–60	9	17.6
61–80	4	7.8
81 or more	11	21.6
TOTAL	51	100.0

When investigating the number of students, computers allocated for student use and students per computer in STE (see Appendix J), it was found that there are 81 or more students for per computer in 9 STE and this interval is 1-20 (21.6%) in 11 schools (see Table 4.3). Considering the 51 STE in this study, average number of students per computer is 46.

Table 4.3: Distribution of STE by Number of Students per Computer

Number of Students per Computer	*f*	*%*
0	4	7.8
1–20	11	21.6
21–40	11	21.6
41–60	7	13.7
61–80	9	17.6
81 or more	9	17.6
TOTAL	51	100.0

The findings of the rate of Internet access show, 70.6% of STE have computers serving student use with Internet access, 13.7% have partial Internet access, while 3.9% do not have any Internet access (see Table 4.4).

Table 4.4: The rate of Internet Access in Computers Allocated for Student Use

Internet Access	***f***	**%**
Full	36	70.6
Partial	7	13.7
None	2	3.9
No Response	6	11.8
TOTAL	51	100

The findings of the hours of computer laboratory availability show around half (47.1%) of the computer laboratories in STE are open to use for 8 or less hours in a day, and 29.4% are open between 9 and 12 hours (see Table 4.5).

Table 4.5: Computer Laboratories' Open Hours per Day

Hours	***f***	**%**
1–4	5	9.8
5–8	19	37.3
9–12	15	29.4
13-16	8	15.7
No Response	4	7.8
TOTAL	5	100

The times that these laboratories are open for student usage during students' free time is indicated in Table 4.6. The majority of the computer laboratories (80.4%) are open during working hours (08:30 – 17:00) on weekdays when the school is in session. The numbers provided in the table 4.6 indicate the rate of computer laboratories open hours is significantly lower after working hours (35.3%).

Table 4.6: The Rate of the Computer Laboratories Open for Student Use, Out of the Class Session

	Working Hours		After Working Hours	
	f	%	*f*	%
Open	41	80.4	18	35.3
Closed	6	11.8	22	43.1
No Response	4	7.8	11	21.6
TOTAL	51	100	51	100

Given the overall facilities available in STE, it is important to know whether or not administrators of these schools are satisfied with the effective and efficient use of these facilities by students as well as by faculty members. As indicated in Table 4.7, 35.3% of deans stated that ICT were used sufficiently during class in their STE, while 58.8% of deans stated that ICT were partially used sufficiently. Only three deans (5.9%) perceived that ICT was used insufficiently during class in their STE.

Table 4.7: Sufficient Use of ICT during Class

Use During Class	*f*	%
Sufficient Use	18	35.3
Partial Sufficient Use	30	58.8
Insufficient Use	3	5.9
TOTAL	51	100

As stated in Table 4.8, 42 deans (82.4%) stated that the Internet is used for supporting instruction sufficiently in their schools, and 7 deans (13.7%) determined the Internet was not used sufficiently in supporting instruction.

Table 4.8: Internet Support of Instruction

Support During Instruction	***f***	**%**
Sufficient Support	42	82.4
Partial Sufficient Support	7	13.7
Insufficient Support	2	3.9
TOTAL	51	100

Table 4.9 shows that online courses were offered in only 6 (11.8%) STE, and 45 (88.2%) do not offer online courses at all.

Table 4.9: Number of STE Online Courses Offered

Online Courses	***f***	**%**
Offered	6	11.8
Not offered	45	88.2
TOTAL	**51**	**100**

The analysis of the deans' survey items including more than one selection revealed that while "Computer" courses generally take place in computer laboratories or electronic classrooms, "ITMD" courses take place in computer laboratories or traditional classrooms (see Table 4.10).

Table 4.10: Educational Environment Provided for "Computer" and "ITMD" Courses

	"Computer" Courses		**"ITMD" Courses**	
	f	**%**	***f***	**%**
Computer laboratory	48	92.3	35	67.3
Electronic classroom	18	34.6	19	36.5
Traditional classroom	13	25.0	25	48.1

Technology Planning and In-service Training in STE:

Based on the given picture of what STE have and do not have in terms of technological facilities, hardware and so on in the earlier sections, it is also important to understand whether or not STE have a technology plan for the future. It can be seen that 27.5% of STE have technology plans, while 31.4% of STE are still working on a technology plan. However, about half of the STE (41.2%) do not have any technology plan (see Table 4.11).

Table 4.11: Number of STE with Technology Plans

	f	*%*
Have technology plan	14	27.5
Working on technology plan	16	31.4
No technology plan	21	41.2
No Response	-	-
TOTAL	**51**	**100**

According to deans' statements, in 45% of the universities there are units (Educational/Instructional Technology Support Center, Technological Resources Center, and Distance Education Center, etc.) attempting to integrate ICT into the instructional process, while in 55% of universities there are no such units (Table 4.12).

Table 4.12: Number of Units Attempting to Integrate ICT into Instructional Process

	f	*%*
Units integrating ICT	23	45.1
No units integrating ICT	28	54.9
TOTAL	**51**	**100**

As indicated in Table 4.13, two-thirds of STE (66.7%) do not provide in-service training about ICT for academic staff.

Table 4.13: Rate of In-Service Training Provided to Staff about ICT

In-service Training	***f***	**%**
Provide in-service training	17	33.3
Do not provide in-service training	34	66.7
TOTAL	**51**	**100**

Level of Physical and Human Resources of STE

The deans of STE were asked to rate their schools in terms of physical and human resources. They rated their schools by selecting their levels of agreement with the statements by using a five-point Likert-type scale (5 indicating "Completely Sufficient", 4 indicating "Sufficient", 3 indicating "Neutral", 2 indicating "Insufficient", and 1 indicating "Completely Insufficient").

Most of the deans of STE perceive their schools to be "completely sufficient" and that it provides "Internet access for academic staff" (M=4.28). When standard deviations were investigated, it can be seen that the first item represented had SD lower than 1.00, while the other items had standard deviations higher than 1.00. This can mean that "Internet access for academic staff" deviated more than the others. On the other hand, deans stated that schools were "insufficient" in "the number of technical service staff" (M=2.24), "the number of educational software that can be used by students" (M=2.30), "the variety of educational software that can be used by students" (M=2.32) and "the number of education software that can be used by academic staff" (M=2.58). Deans were undecided about the overall mean (M=2.92) and other statements (see Table 4.14).

Table 4.14: Physical and Human Resources Conditions of STE Pertaining to ICT (n=51)

	M	SD
Internet access for academic staff use	4.28	.70
Number of hardware (computer, projector, printer etc.) that can be used by academic staff	3.36	1.24
Variety of hardware that can be used by academic staff	3.34	1.22
Providing motivation to the academic staff about ICT for instructional purposes	3.22	1.08
Internet access for student use	3.18	1.18
Number of computer laboratories	2.94	1.26
Obtaining and developing new skills and resources for the purpose of integrating ICT into the curriculum	2.91	1.05
Number of hardware that can be used by students	2.90	1.16
Variety of hardware that can be used by students	2.88	1.23
Basic knowledge and skills of academic staff about ICT	2.85	1.12
Variety of educational software that can be used by academic staff	2.63	1.16
Number of educational software that can be used by academic staff	2.58	1.14
Variety of educational software that can be used by students	2.32	1.02
Number of educational software that can be used by students	2.30	.97
Number of technical support staff	2.24	1.05
Overall mean	**2.92**	

4.1.2. Demographic Information of the Faculty Members:

Results in Table 4.15 indicate the majority of faculty members were assistant professors (29.7%), research assistants (28.8%), and instructors (25.2%). 66 participants offered "ITMD" courses and 61 of them offered "Computer" courses. As it is presented in Table 4.15, 27% of the faculty members had an undergraduate background in IT, 22.5% of the faculty members had a master's background in IT, and 11.7% of the faculty members have a PhD background in the field of IT. 12.6% of the faculty members indicated they have earned a certificate about ICT usage, while 85.6% have not. While 12.6% of the faculty members received in-service training on ICT usage, 87.4% have not received any training. 91.9% of the faculty members indicated that they have computers in their office, and 100% of those have Internet access. 95.5% of the faculty members have computers at home, and 74.5% of the faculty members who own home computers have the Internet access. Only 37.8% of the faculty members have a personal Web page.

Table 4.15: Demographics of Faculty Members (n=111)

Academic Title	*f*	%
Professor	2	1.8
Associate Professor	4	3.6
Assistant Professor	33	29.7
Dr. Instructor	7	6.3
Instructor	28	25.2
Research Assistant Dr.	1	0.9
Research Assistant	32	28.8
Lecturer Dr.	1	0.9
Lecturer	3	2.7
ICT Related Courses Offered		
Computer	61	
ITMD	66	
Undergraduate Background		
IT	30	27
Education Science	9	8.1
Comp. or Electronic Eng.	4	3.6
Other	66	59.5
No Response	2	1.8
MS Background		
IT	25	22.5
Education Science	15	13.5
Comp. or Electronic Engin.	4	3.6
Other	50	45
No Response	17	15.3
PhD Background		
IT	13	11.7
Education Science	10	9
Other	27	24.3
No Response	61	55
Certificate about ICT		
Have earned certificate	14	12.6
No certificate earned	95	85.6
No Response	2	1.8

Universities and STE	*f*	%
İstanbul Univ. H. Ali Yücel STE	4	3.6
Balıkesir Univ. Necatibey STE	5	4.5
Dokuz Eylul Univ. Buca STE	5	4.5
Pamukkale Univ. STE	4	3.6
Abant İzzet Baysal Univ. STE	3	2.7
Anadolu Univ. STE	7	6.3
METU STE	16	14.4
Gazi Univ. Gazi STE	9	8.1
Başkent Univ. STE	2	1.8
Çukurova Univ. STE	5	4.5
Cumhuriyet Univ. STE	5	4.5
Ondokuz Mayıs Univ. STE	4	3.6
Ondokuz Mayıs Univ. Amasya STE	4	3.6
Gazi Univ. Kastamonu STE	7	6.3
KTU Fatih STE	10	9.1
Atatürk Univ. K. Karabekir STE	13	11.7
Yüzüncü Yıl Univ. STE	3	2.7
Gaziantep Univ. Adıyaman STE	5	4.5
Inservice Training about ICT		
Have in-service training	14	12.6
No in-service training	97	87.4
Office Computer		
Do not have	9	8.1
Have (with the Internet access)	102	91.9
Home Computer		
Do not have	5	4.5
Have computer	106	95.5
With Internet access	79	74.5
Without Internet access	27	25.5
Personal Web Page		
Have personal webpage	42	37.8
Do not have personal webpage	69	62.2

The profiles of the interviewed faculty members for qualitative data purposes have very similar characteristics due to purposeful sampling with criterion technique used in quantitative sampling. Generally, they are between 25 and 35 years old with at least three years of teaching experience. As it is presented in Table 4.16, all of the participants have both home and office computers.

Table 4.16: Profile of Faculty Members as Interview Participants (n=6)

Bas. Info. / Pseudonyms	Ali	Hasan	Murat	Elif	Hüseyin	Zeynep
Gender	M	M	M	F	M	F
Academic Title	Res. Asst.	Res. Asst.	Assist Prof.	Instructor	Assist Prof.	Dr. Instruct
Experiences	4	3	11	6	9	8
Home Computer	+	+	+	+	+	+
Office Computer	+	+	+	+	+	+

4.1.3. Demographic Information of the Prospective Teachers:

As it is illustrated in Table 4.17, 49.4% of the prospective teachers were male, and 50.6% of them were female. Majority of their backgrounds were elementary (32.7%) and science education (24.1%). 30.9% of the prospective teachers have personal computers at their home/dormitory, and 69% of the prospective teachers do not have. 68.6% of the prospective teachers indicated that they have computers at school.

Table 4.17: Demographics of Prospective Teachers (n=1330)

Gender	*f*	%	Universities and STE	*f*	%
Male	657	49.4	İU Hasan Ali Yücel STE	24	1.8
Female	673	50.6	Balıkesir Univ. Necatibey STE	103	7.8
Departments			Canakkele 18 Mart Univ. STE	40	3.0
Biology	30	2.3	Dokuz Eylul Univ. Buca STE	80	6.0
Chemistry	46	3.5	Pamukkale Univ. STE	137	9.5
Elementary	435	32.7	Abant İzzet Baysal Univ. STE	111	8.3
Elementary School Math.	103	7.7	Anadolu Univ. STE	59	4.4
English Language	37	2.8	METU STE	52	3.9
German Language	35	2.6	Gazi Univ. Gazi STE	42	3.2
Hearing Impaired	8	0.6	Çukurova Univ. STE	30	2.2
Mathematics	40	3.0	Kırıkkale Univ. STE	43	3.2
Mentally Disabled	15	1.1	Cumhuriyet Univ. STE	69	4.4
Music	10	0.8	Ondokuz Mayıs Univ. STE	47	3.6
Arts and Crafts	36	2.7	OMU Amasya STE	125	10.9
Philosophy	22	1.7	Gazi Uni. Kastamonu STE	48	3.6
Physics	23	1.7	KTU Fatih STE	76	5.7
Psycholo. Coun. & Guidance	11	0.8	Atatürk Univ. K. Karabekir STE	164	12.3
Science	321	24.1	Yüzüncü Yıl Univ. STE	24	1.8
Social Sciences	77	5.8	Gaziantep Univ. Adıyaman STE	56	4.2
Turkish Language	81	6.1			

Table 4.17 (Continued)

Home Computer			School Computer		
No Response	1	0.1	No Response	28	2.1
No home computer	918	69.0	No school computer	389	29.2
Have home computer	411	30.9	Have school computer	913	68.6
With Internet access	169	12.7	With Internet access	864	94.6
Without Internet access	242	18.2	Without Internet access	49	5.4

Due to using purposeful sampling with criterion technique, basic profiles of the prospective teachers were very similar to interviewed participants. Three participants were female and three were male. As it is presented in Table 4.18, three participants have home computers.

Table 4.18: Profile of Prospective Teachers as Interview Participants (n=6)

	Ayşe	Fatma	Hatice	Ahmet	Mehmet	Mustafa
Gender	F	F	F	M	M	M
Subjects	ELT	ELT	Math	Chemistry	Social Sc.	Elementary
Home Computer	+	-	-	+	+	-

4.1.4. Demographic Information of the K-12 Teachers:

As it is shown in Table 4.19, 61.2% of the K-12 teacher participants were male, and 38.8% were female. 59.8% of the teachers have computers at home, and 35.3% of the teachers who own a computer have Internet access. While 26.3% of the teachers had never used the Internet before, 34.5% of them use the Internet less than 1 hour, and 22.4% of them use the Internet 1-4 hours a day. 87.1% of the teachers indicated that they have computers at school, and 75.4% of those have Internet access. While 33.4% of the teachers received in-service training on ICT usage, 59.2% have not received any training. 16% of the teachers indicated that they have earned certificates in ICT usage, while 72.4% have not earned any certificates. As it

is presented in Table 4.19, approximately 40% of the teachers had taken ICT related courses during their undergraduate study. Only 5.5% of the teachers have a personal Web page.

Table 4.19: Demographics of K-12 Teachers (n=1429)

Gender	*f*	%	**School Type**	*f*	%
Male	875	61.2	Public Schools	1401	98
Female	554	38.8	Private Schools	28	2
Home Computer			**School Computer**		
No Response	19	1.3	No Response	25	1.7
No home computer	556	38.9	No school computer	160	11.2
Have home computer	854	59.8	Have school computer	1244	87.1
With Internet access	504	35.3	With Internet access	1077	75.4
Without Internet access	350	24.5	Without Internet access	167	11.7
Entrance Year of School			**Inservice Training about ICT**		
1961-1980	185	12.9	Have in-service training	477	33.4
1981-1985	149	10.4	No in-service training	846	59.2
1986-1990	234	16.4	No Response	106	7.4
1991-1997	469	32.8	**Certificate about ICT**		
1998-2000	186	13.0	Have certificate	228	16.0
No Response	206	14.4	No certificate	1034	72.4
Graduation School Type			No Response	167	11.7
School of Education	629	44.0	**Taken ICT Related Courses**		
School of Arts and Sciences	255	17.8	Computer	594	41.6
Other Schools	146	10.2	ITMD	558	39.0
Voc. & Tech. Educ. Schools	177	12.4	**Personal Web Page**		
No Response	222	15.5	Have webpage	79	5.5
Amount of Internet Use (per day)			Do Not have webpage	1258	88.0
None	376	26.3	No Response	92	6.4
Less than 1 hour	494	34.5	**Graduation Degree**		
1-4 hours	319	22.4	MS	72	5.0
5-8 hours	44	3.1	PhD	2	0.1
No Response	196	13.6			

The profiles of the interviewed participants in regards to qualitative data have very similar characteristics due to purposeful sampling and criterion technique used in quantitative sampling. Generally, interviewed teachers are between 26 and 30 years old with at least two years of teaching experience. As it is presented in Table 4.20, all had taken ICT related courses and the majority of them (4 teachers) had also

attended in-service training on ICT. Commonly, they liked their jobs and using ICT but they also reported underutilization of ICT in their classrooms due to some barriers.

Table 4.20: Profile of K-12 Teachers as Interview Participants (n=6)

	Yusuf	**Emre**	**Merve**	**İrem**	**Büşra**	**Furkan**
Gender	F	F	F	M	F	M
Subject	History	TLT	Elementary	History	TLT	ELT
Home Computer	+	+	-	+	+	-
Teaching Experience	2	3	2	3	3	3
Inservice Training	+	+	+	-	+	-

4.2. ICT INTEGRATION INTO TEACHER EDUCATION PROGRAMS (RESEARCH QUESTION 1)

The first research question that this study addressed was about the perceptions of deans, faculty members, prospective teachers, and K-12 teachers in regards to ICT integration into teacher education programs. The data for deans' perceptions were collected with open-ended responses through questionnaire. The faculty members' perceptions were collected with open-ended responses and interviews. While prospective teachers' perceptions were collected with interviews and a Likert-type scale, K-12 teachers' data were collected with interviews.

4.2.1. Perceptions of Deans about ICT Integration into Teacher Education Programs:

The majority of the deans (n=51) who participated in this study expressed positive perceptions about the integration of ICT into teacher education programs. The common perceived theme found was the necessity of the integration process in their schools. One dean noted the importance of this process as:

> *"Integration of ICT into education programs is a matter of concern that HEC should be taking care of, especially in the*

schools of education. We are training teachers of future. If we want to integrate ICT into K-12 schools, we have to teach ICT integration into their subjects during the preservice teacher education".

They also valued the ICT integration process as the backbone of up-to-date and quality instruction in schools of education. They mentioned that they needed to develop better plans and strategies in this process to be successful in their schools. One dean remarked that: *"In order to increase the quality of instruction in our schools, we were seeking ways to surpass the barriers we were facing in the integration process"*. Another dean, however, noted that while this process is inevitably necessary for the STE, the expectations for better quality of instruction should not be overemphasized. It was suggested a more systematic approach be followed in this process.

4.2.2. Perceptions of Faculty Members about ICT Integration into Teacher Education Programs:

The faculty members were asked about their perceptions of ICT integration into teacher education programs through open-ended responses, and they were also interviewed to deeply investigate the issues they mentioned in these responses. Open-ended questions in the survey revealed that faculty members perceived the integration of ICT as a necessary mission in their programs. One faculty member noted the reason for this necessity as:

"To succeed, in Information Society, we need citizens equipped with necessary knowledge and skills in ICT. Every citizen in society should be able to at least use basic ICT skills for sure. In this process; I believe that the best way would be to begin with preservice teacher education programs".

Another important theme emerging through the open-ended questions was relative advantages of integration of ICT into teacher education programs. It was stated that by using a variety of materials, methods and equipments in courses, teachers can enhance performance in their instruction, and they could also benefit from ICT to increase the quality of instruction more efficiently. All interviewees

mentioned these advantages and noted that ICT integration into their teaching would be very supportive and effective for teachers. One faculty member (Hasan) summarized these opinions by stating:

> *"Integration of ICT can increase the quality and ease the process of teachers' instruction in their classes. They can be better professionals by benefiting from the eases of technology".*

All respondents of both open-ended questions (n=111) and interviews (n=6) mentioned that all preservice education programs should support their students with ICT skills and ICT literacy. One faculty member (Elif) stated these basic skills as:

> *"Teachers should be knowledgeable about how to use MS Office very well. In addition, they should know how to use Internet, and they should be taught how to search information in the Internet environment, how to use e-mails, and design web pages".*

The last concern that one faculty member (Murat) emphasized was the importance of integrating technology not only at a subject-matter level, but rather as an institutional approach. He also noted the importance of practice as a support for theoretical knowledge for an ICT integration process. He stated:

> *"ICT integration process should be taken into consideration in a more context and institutional based approach including STE, rather than only a content-based approach. I believe that theoretical information of this process should be supported by school experiences".*

4.2.3. Perceptions of Prospective Teachers about ICT Integration into Teacher Education Programs:

The perception items of prospective teachers in the technology perception scale (TPS) included their beliefs of the effect of technology in education and effect of their undergraduate programs. The participants rated their levels of agreement with the statements by using a five-point Likert-type scale (5 indicating "Strongly Agree", 4 indicating "Agree", 3 indicating "Neutral", 2 indicating "Disagree", and 1 indicating "Strongly Disagree").

The mean scores and standard deviations are illustrated in Table 4.21 as an insightful analysis of the perception items on the questionnaire. The results indicate that a majority of the participants have positive perceptions in both "belief of the positive effect of technology in education" (the first factor; M=4.40) as indicating "Strongly Agree" level and "effect of undergraduate program" (the second factor; M=3.47) as indicating "Agree" level. When the factors are investigated, it can be seen that the first factor represented higher mean than the second factor. It can be concluded that prospective teachers have positive perceptions about "belief of the positive effect of technology in education" more than the "effect of undergraduate program". On the other hand, the analysis of the survey items revealed that the highest mean score was for the item "Computers should be used in education" (M=4.72), while the lowest mean score was for the item "My instructors used technology in their courses in my undergraduate years" (M=2.95).

Table 4.21: ICT Perceptions of Prospective Teachers

	M	**SD**
Computers should be used in education	4.72	.69
Use of technology enriches teaching/learning environment	4.65	.71
Use of technology in classroom enhances quality in education	4.63	.73
Use of technology in education increases student achievement	4.63	.74
Use of technology in classroom increases learning	4.53	.78
Instruction supported by use of technology provides opportunities that traditional instruction cannot provide	4.52	.77
Today's teacher needs to integrate technology with instructional activities	4.49	.81
Use of technology in my subject area maintains enjoyment during learning-teaching process	4.49	.81
The budget allocated for technology use in education is a valuable investment for the future	4.47	.85
Use of technology in education helps teachers to implement in-class activities	4.35	.83
Up-to-dateness of technological equipments plays a key role in my use of them in classes	4.34	.85
Use of technology in classroom enriches curriculum programs	4.31	.89
Use of technology in education helps teachers to plan in-class activities	4.23	.84
Use of technology in education helps teachers to evaluate in-class activities	4.12	.96
Use of technology in schools helps revising the instructional strategies to be used	4.09	.92
Use of technology in classroom enhances student-centered instruction	3.87	1.04
"Instructional Technologies and Material Preparation" course that I took in my undergraduate education increases the quality of my teaching profession	3.85	1.13
I can easily integrate technology into every subject of my area	3.78	.98
The technology courses in my undergraduate years helped me to change my attitude toward technology positively	3.75	1.11

Table 4.21 (Continued)

	M	SD
"Computer" course in my undergraduate education increases the quality of my teaching profession	3.59	1.30
I am capable of providing technology-based instruction with the help of technology-based courses that I took in my undergraduate years	3.53	1.12
I am a prospective teachers that is capable of today's technology criteria	3.42	1.17
I was taught to (how to) use technology in learning-teaching environments by my instructors in undergraduate years	3.26	1.22
I was taught about the effects of technology use in society by my instructors in undergraduate years	3.12	1.20
My instructors used technology in their courses in my undergraduate years	2.95	1.23
Factor 1 (belief of the positive effect of technology in education)	**4.40**	
Factor 2 (effect of undergraduate program)	**3.47**	
Overall mean	**4.07**	

On the other hand, according to analysis of interview results, when the prospective teachers were asked about their perceptions of ICT integration into teacher education programs, almost all interviewees stated their positive perceptions. They stated that they believed the importance of gaining ICT skills when they become teachers. Parallel to the survey analysis, one common theme that most interviewees mentioned was the use of technology would enhance quality in their future classes.

Other interviewee (Mehmet) expressed that they had positive perceptions towards using ICT in their future classes since they learned how to access knowledge via technology and how to use technology in class during their undergraduate classes.

One exception was for one prospective teacher. Hatice stated negative perceptions and perceived the use of computers in education as "*time killers*". She stated the use of computers was a waste of time and useless for education, since it cannot provide the benefits that traditional environments and teachers can provide. When asked about her undergraduate classes and the use of technology, she stated that she had not benefited from the technology courses at all and she perceived them as "*boring and useless for educational purposes*".

4.2.4. Perceptions of K-12 Teachers about ICT Integration into Teacher Education Programs:

K-12 teachers were asked about their perceptions of the ICT integration into teacher education programs via interviews. The analysis of the interview data revealed that they valued this process as an effective way to make learning and teaching better. They also believed that technology should be available anytime and anywhere (within or outside of classrooms) for both teachers and prospective teachers. All interviewees stated that they were using technology for different purposes; while some were using it to preparing exam papers and having a database of student records, others were using it to search for information on their subjects or unit plans on the Internet, etc.

Another theme the teachers mentioned was the importance of the ICT related courses they took in their undergraduate education. All interviewees stated that these courses should be more practice oriented. Two interviewees (Yusuf and İrem) stated that they should not link what they have learned in these courses with real classroom settings. They argued that while these courses were beneficial in terms of providing them with a fundamental understanding of the concepts in ICT, more emphasis should be given on how they could use this knowledge and these skills in their subjects and future classes.

One last concern that one interviewee (Merve) stressed was other teachers' attitudes towards her in terms of her knowledge and skills in ICT integration into her courses. Merve stated that when she began her profession, she helped other older teachers, who were not so familiar with using technology in their classes, like a change agent. She stated that ICT integration and related courses provided her with a lot of benefits to successfully use them in class.

4.3. ICT INTEGRATION INTO K-12 SCHOOLS (RESEARCH QUESTION 2)

This study also deals with prospective and K-12 teachers perceptions of ICT integration into K-12 schools. The data were collected through open-ended responses and interviews from prospective teachers and K-12 teachers.

4.3.1. Perceptions of Prospective Teachers about ICT Integration into K-12 Schools:

The analysis of the responses of prospective teachers to open-ended questions and the interview data revealed three major themes as: (1) the capabilities of ICT integration into K-12 schools, (2) advantages of ICT for students, and (3) advantages of ICT for teachers from prospective teachers' perspectives.

Regarding the capabilities of ICT integration into K-12 schools, prospective teachers remarked that ICT arouses students' curiosity and help them be interested in course subjects. As the reason for this one participant stated *"is making instruction more enjoyable for students by enriching the learning environment*". Almost all open-ended responses and interviewees indicated that ICT integration helps to incorporate audiovisual support into the learning environment. One participant also mentioned the importance of ICT integration in education as offering various alternatives for the learning environment, which leads students to be self-motivated in their courses. One participant noted one important thing about ICT as being a part of the modern world by saying:

> *"[ICT] makes instructional environment very enjoyable for sure. It also helps us to keep up the pace of today's world."*

Almost all participants stated that ICT integration increases the quality of instruction. They believed it enriches the learning environment and helps concretization of leaning subjects. One interviewee (Fatma) explained her perceptions on this issue as:

> *"With the integration of ICT into primary and secondary education, I believe that courses will be more active and motivating, which would lead learning to be easier for students. It will also lead to the improvement of instruction in many subject fields by arousing scientific interest".*

For the second major theme, advantages of ICT integration for students, the prospective teachers remarked on a variety of issues. They stated that ICT integration helps students to recognize contemporary technologies and use them

in their lives. Directing students to develop more research was another common issue that they emphasized. One participant (Mustafa) noted this concern by saying:

> *"It [ICT] directs students to make research and to think critically. They can realize how applicable what they learn throughout their education lives are, and see different perspectives easily…"*

Most participants also indicated that ICT integration improves students' learning level in a student-centered learning environment, and hence increases the student success in their courses. The major concern in this context can be inferred as "making students active" and "think in a broader perspective". One participant noted this by saying:

> *"Learning by doing and practicing can be regarded as the most effective constituents of what today's instructional programs pursue. ICT, supporting multiple senses and enhancing real-world experiences, can help students remember what they learn, and use their knowledge gathered in schools in their real lives."*

As in the above statement, many other participants put emphasis on making students active. They argued that using ICT in courses helps students to note what they see in addition to what they hear in courses. They remarked that students can concretize abstract concepts with the help of ICT. It is also noteworthy to state what one participant underlined at this point. He remarked that students realize computers were not just gaming environments.

For the last theme, advantages of ICT integration for teachers, the prospective teachers stated that ICT helps teachers to enrich the learning environment in their courses. One interviewee (Ahmet) explained her perceptions as:

> "*Thanks to ICT, we can now have access to wide ranges of information from everywhere in the world. With the use of ICT in courses, teachers can have access to a variety of learning materials and resources to be used in their courses, which can*

improve their teaching skills and support them in teaching processes."

Helping teachers have better time management skills and find concrete learning materials are the other issues that participants mentioned in this theme. However, they also noted that teachers should be very careful while choosing those materials. One participant stated that computers/technology should not take the place of teacher, but rather be used as a support tool. Another participant remarked that it is important to use ICT effectively and efficiently, otherwise it can keep students away from socialization.

4.3.2. Perceptions of K-12 Teachers about ICT Integration into K-12 Schools:

About ICT integration into K-12 education, the findings from open-ended responses and interviews revealed three main themes as: (1) features of ICT in general, (2) what ICT provides for education in terms of students, teachers, and instruction in class, and (3) limitations of the ICT integration process. In the followings paragraphs, these themes will be explained.

The first issue that the teachers put forward was the general features of ICT. They stated that ICT provides people with access to a variety of information and communication opportunities. They also remarked that in this Digital Era/ Information Age, it was a necessity for people to catch up with developments in ICT in order to become an Information Society. Therefore, the young population of the society, especially students, has a curiosity to use these technologies in their lives. One participant (Furkan) stated this as:

"*… Everywhere we go, we see computers around within every range of everyday life issues. Young people are more enthusiastic since this technology arouses their curiosity very much."*

The second issue teachers stressed was that what ICT provides for education in terms of the benefits for students, teachers, and instruction in class. For the students' benefits for the use of ICT in their courses, almost all teachers argued that it provided motivation and concentration for the content of the course, since they are very enthusiastic to use ICT tools. Some participants also stated that using ICT in courses challenges students to develop research, which leads

them to improve their critical thinking skills. One participant also mentioned that one of the most important advantages was improving students' problem solving and analysis-synthesis skills. In addition to these, almost all participants stated that with the wide range of information access, ICT provides students with the knowledge of how to access necessary information rather than just to gather information. One interviewee (Yusuf) also remarked on another concern as individual development by saying the following:

> "*I believe that students feel themselves as unique individuals of this world when supported by the use of ICT in our courses effectively. The reason is, they get rid of rote memorizing and express their own ideas. And this enhances to develop their critical thinking skills, which is, I believe, the core of individual development."*

For teachers' benefits for the use of ICT in their courses, the common theme was expressed as the motivation of teachers to use ICT in their courses. Almost all teachers mentioned that it provides permanent learning and rapid information gathering, which supports them with practical solutions in effective and efficient courses. They also believed that with appropriate in-service and preservice training, teachers can be more comfortable integrating ICT in their courses. They stated that ICT integration provides them with updated information and a variety of sources.

Another benefit to integrating ICT in education is stated as the total benefits regarding instruction. The teachers believed that the integration of ICT in education enhances knowledge permanence, learning effectiveness and efficiency; and increases learning quality in the courses. The reason for this is stated as supporting audio-visual features together and incorporating multiple senses into learning. One participant expressed this in her open-ended responses as:

> *"… In our era, music is even visualized. Visual applications in education increase the quality of education for sure. Learning by hearing is not the same thing with learning by seeing. Nobody*

knows how "Mount Kaf" (imaginary and mythical expression which is used for impossible objectives to reach in Turkish literature) was formed. Why? Because, s/he has not seen at all. But, everyone knows "Mount Ararat". Why? Because s/he has seen it in TV. Just an example. ICT provides contributions to education since it incorporates visualization, that is concretization, not due to its electrical working feature"

The last issue that the teachers mentioned about the integration of ICT in education was its limitations. They stated that current curriculum was too loaded for them to be involved in such an integration process. One participant stated that he believed this process could be more successful for informal education than formal education in the future. Another participant stated that the role of ICT is important in support services, but its role was overemphasized for in-class activities.

A Turkish language teacher noted that the major limitation of ICT integration was in the lack of appropriate transfer of terminology into Turkish. He also argued that machines should be "in" education, but not be the whole education itself. He was resistant to use ICT that would hinder socialization, but rather cause individualization.

One other argument was about the integration process. One participant argued that instead of short-term solutions, long-term plans should be undertaken. Another teacher stated that since he believed our society to have low-level reading abilities, knowledge retrieved from the Internet is not being read. Therefore, he argued that research in verbal subjects (i.e, Literature, History, etc.) should be directed to books.

4.4. ICT COMPETENCIES (RESEARCH QUESTION 3)

The third issue in this study is the perceived ICT competencies of the faculty members, prospective teachers, and K-12 teachers. Perceived ICT competencies were examined through the ICT competency subscale in the questionnaires and interviews. The competencies include fundamental concepts, knowledge and skills on basic ICT competencies, and advanced ICT competencies.

Participants rated their levels of agreement with the statements by using a five-point Likert-type scale (5 indicating "Completely Sufficient", 4 indicating "Sufficient", 3 indicating "Neutral", 2 indicating "Insufficient", and 1 indicating "Completely Insufficient").

4.4.1. Perceived ICT Competencies of Faculty Members:

Means and standard deviations, and total percentages of faculty members who marked their ICT competencies as "sufficient" or "completely sufficient" are provided in Table 4.22. The results indicate that a majority of the participants perceive themselves as competent (M=4.23) in both basic ICT competencies (M=4.45) and advanced ICT competencies (M=4.11). They are "completely sufficient" in basic ICT competencies and they are "sufficient" in advanced ICT competencies. As it is shown in the Table, "use of word processors for personal and institutional purposes" (M=4.78) was perceived as the highest competency. On the contrary, "use of ICT in analysis process of a course" (M=3.86) was perceived as the lowest competency.

Table 4.22: ICT Competencies of Faculty Members

Competencies	**M**	**SD**	**% of "completely sufficient (5)" + "sufficient (4)"**
Use of word processors for personal and institutional purposes	4.78	.50	91.0
Use of presentation software for personal and institutional purposes	4.72	.58	89.2
Identify legal, ethical and societal issues related to use of ICT	4.56	.85	83.8
Use of spreadsheets for personal and institutional purposes	4.50	.90	83.8
Use of ICT for communication	4.48	.79	85.6
Use of operating systems	4.44	.88	84.7
Use of ICT for collecting data	4.40	.91	83.8
Use of ICT to enhance personal and professional development	4.31	.97	79.3
Use of computer aided instruction materials	4.30	.97	80.2
Use of ICT to support instruction process in classroom	4.28	.94	82.8
Use of communication tools to support instruction	4.28	.91	81.0
Use of hypermedia and multimedia tools to support instruction	4.19	.98	78.3
Use of ICT for problem solving	4.15	1.06	73.8
Use of ICT in implementation process of a course	4.14	.96	77.4

Table 4.22 (Continued)

Competencies	M	SD	% of "completely sufficient (5)" + "sufficient (4)"
Identify, select and evaluate ICT resources	4.10	1.05	72.0
Use of ICT to support instruction out of classroom	4.09	1.08	75.6
Use of ICT for knowledge management	4.06	1.10	71.1
Integrate ICT into courses (curriculum)	4.02	1.04	75.6
Evaluation of computer aided instruction materials	4.02	1.18	69.3
Use of ICT for decision-making	4.00	1.02	64.8
Use of ICT in design process of a course	3.98	1.12	72.0
Use of ICT in development process of a course	3.96	1.06	72.9
Use of ICT in assessment process of a course	3.93	1.09	65.7
Use of ICT in analysis process of a course	3.86	1.17	65.7
Factor 1 Advanced ICT competencies	**4.11**		
Factor 2 Basic ICT competencies	**4.45**		
Overall mean	**4.23**		

4.4.2. Perceived ICT Competencies of Prospective Teachers:

Means and standard deviations, and total percentages of prospective teachers who marked their ICT competencies as "sufficient" or "completely sufficient" are provided in Table 4.23. The results indicate that a majority of the participants did not perceive themselves as competent (M=3.13) overall, and they were neutral on these competencies. A majority of the prospective teachers perceive their highest competency levels "receiving and sending e-mail" (M=4.04) as "sufficient". In contrast, the results indicate that "use of LMSs" (M=2.04) by the prospective teachers was listed as the least competent item in the list.

Table 4.23: ICT Competencies of Prospective Teachers

Competencies	M	SD	% of "sufficient completely (5)" + "sufficient (4)"
Receiving/sending e-mail	4.04	1.20	79.9
Identify basic terms of computers	3.93	.93	81.9
Use of word processors (e.g., MS Word)	3.91	1.09	76.9
Use of the Internet - World Wide Web (WWW)	3.78	1.27	72.2

Table 4.23 (Continued)

Competencies	M	SD	% of "sufficient completely (5)" + "sufficient (4)"
Use of presentation programs (e.g., MS PowerPoint)	3.65	1.21	66.5
Use of spreadsheets (e.g., MS Excel)	3.54	1.17	64.5
Use of chat programs	3.32	1.45	55.2
Use of image editing programs (e.g., Paint) and graphics programs (e.g., Photoshop)	3.09	1.35	49.0
Identify basic hardware of a computer	3.07	1.27	49.0
Use of forums	2.74	1.34	32.0
Identify and use of web development programs (e.g., MS FrontPage, Dreamweaver)	2.55	1.35	31.3
Use of video conference programs	2.27	1.24	19.3
Use of database programs (e.g., MS Access)	2.22	1.22	18.2
Identify and use of web programming software (e.g., HTML, Java)	2.05	1.25	16.7
Use of LMSs (e.g., WEB CT)	2.04	1.15	12.8
Overall mean	**3.13**		

The prospective teachers interviewed considered themselves proficient in word processing, Internet usage, PowerPoint, and Excel use. They said they learned the skills in a variety of ways and from two primary sources: "Computer" course and on their own. All of them know Word processing program and how to use the Internet and also all of them want to know Excel. Two prospective teachers interviewed had negative perceptions about their instructors' knowledge and skill in technology. A prospective teacher (Ahmet) indicated this by saying;

> *"Most of the instructors cannot use ICT in our courses. They do not have enough knowledge and skills in technology. Some of them cannot use a projector in classroom. In my opinion, faculty members should be prepared to use technology. For example, they can take an in-service training like "Computer" and "ITMD" course content".*

A second prospective teacher (Fatma) stated that she wants to use the Internet more effectively. She said, "*when I search any subject on Internet, I find too many results. So, I kill my time on Internet"*. The other prospective teacher remarked that she wants to be able to type quickly with ten fingers.

4.4.3. Perceived ICT Competencies of K-12 Teachers:

Means and standard deviations, and total percentages of teachers who marked their ICT competencies as "sufficient" or "completely sufficient" are provided in Table 4.24. The results indicate that majority of the participants do not perceive themselves as competent in both basic ICT competencies (M=3.26) and advanced ICT competencies (M=2.97) overall, and they are neutral on most of these competencies. On the other hand, when the researcher focused only on the K-12 teachers who started STE in 1998 or later, the means were calculated 3.61 for basic ICT competencies and 3.25 for advanced ICT competencies. A majority of the K-12 teachers perceive their competency levels as "sufficient" or "completely sufficient" in the "use of operating systems" (71.5%, M=3.64), "identifying legal, ethical, and societal issues related to ICT" (64.5%, M=3.57), and "use of word processor for personal and institutional purposes" (68%, M= 3.55). On the contrary, "use of hypermedia and multimedia tools to support instruction" (M=2.61) was perceived as the lowest competency. The means of the remaining competency statements are at "neutral" or "insufficient" levels (ranging from M=3.26 to M=2.61).

Table 4.24: ICT Competencies of K-12 Teachers

Competencies	**M**	**SD**	**% of "completely sufficient (5)" + "sufficient (4)"**
Use of operating systems	3.64	1.19	71.5
Identify legal, ethical and societal issues related to use of ICT	3.57	1.35	64.5
Use of word processors for personal and institutional purposes	3.55	1.29	68.0
Use of spreadsheets for personal and institutional purposes	3.26	1.34	55.9
Use of ICT for communication	3.24	1.33	56.3
Use of ICT for collecting data	3.22	1.33	55.8
Use of communication tools to support instruction	3.16	1.26	53.4
Use of ICT to enhance personal development	3.16	1.30	53.2
Use of ICT to support instruction out of classroom	3.15	1.27	53.4
Use of ICT to support instruction process in classroom	3.08	1.32	50.8
Use of computer aided instruction materials	3.07	1.32	51.3
Use of ICT for knowledge management	3.07	1.32	49.0

Table 4.24 (Continued)

Competencies	M	SD	% of "completely sufficient (5)" + "sufficient (4)"
Use of presentation software for personal and institutional purposes	3.04	1.37	47.7
Use of ICT in assessment process of a course	2.98	1.33	46.8
Evaluation of computer aided instruction materials	2.95	1.29	44.1
Use of ICT in implementation process of a course	2.94	1.34	45.9
Identify, select and evaluate ICT resources	2.92	1.25	40.9
Use of ICT for decision-making	2.90	1.29	40.5
Use of ICT in design process of a course	2.87	1.31	40.9
Use of ICT in development process of a course	2.86	1.30	41.5
Integrate ICT into courses	2.86	1.27	39.5
Use of ICT for problem solving	2.85	1.31	40.4
Use of ICT in analysis process of a course	2.76	1.27	35.7
Use of hypermedia and multimedia tools to support instruction	2.61	1.34	33.1
Factor 1 (advanced ICT competencies) overall	**2.97**		
Factor 1 for K-12 teachers who started STE in 1998 or later	3.25		
Factor 1 for K-12 teachers who started STE in 1997 or before	2.93		
Factor 2 (basic ICT competencies) overall	**3.26**		
Factor 2 for K-12 teachers who started STE in 1998 or later	3.61		
Factor 2 for K-12 teachers who started STE in 1997 or before	3.21		
Overall mean	**3.10**		
Mean for K-12 teachers who started STE in 1998 or later	3.40		
Mean for K-12 teachers who started STE in 1997 or before	3.05		

In addition to the ICT competency subscale, perceived ICT competencies of the K-12 teachers were also investigated through another subscales in the questionnaire. Although it was parallel to the above subscales, it was included particularly software which were used mostly in professional and daily life. K-12 teachers who were using ICT in their courses ranked their level of knowledge (5 indicating "Expert", 4 indicating "Experienced", 3 indicating "Intermediate", 2 indicating "Novice", and 1 indicating "don't know what it is").

The results, related to the level of teachers' skills for basic software, are presented in Table 4.25 (M=2.40). When the researcher focused only on the K-12 teachers who started STE in 1998 or later, the mean was calculated 2.58. The teachers' skills "word processing" software (M=3.35) was rated at the highest level, "Internet" (M=3.22) for the information search at the second level, and then

"receiving/sending e-mail" (M=3.13) at the third level. The results indicate that the use of "Authoring Languages" (M=1.46) by the teachers in their courses is listed as the least competent item in the list.

Table 4.25: The Level of K-12 Teachers' Skills for Basic Software

Skills	**M**	**SD**	**% of "Expert (5)" + "Experienced (4)"**
Word Processor (e.g., MS Word)	3.35	1.18	48.6
Web Browsers (e.g., Internet Explorer)	3.22	1.34	50.1
Receiving/sending e-mail	3.13	1.41	47.8
Spreadsheets (e.g., MS Excel)	2.93	1.24	34.2
Presentation Programs (e.g., MS PowerPoint)	2.70	1.33	29.1
Operating Systems (e.g., Windows)	2.66	1.48	33.8
Game	2.35	1.28	21.9
Chat	2.32	1.38	24.9
Image Editing (e.g., Photoshop)	2.07	1.21	14.5
Forum	2.00	1.30	17.2
Databases (e.g., MS Access)	1.98	1.20	14.5
Reference Programs (e.g., Dictionary)	1.92	1.29	15.7
Web Page Development (e.g., MS FrontPage)	1.91	1.27	15.0
Animation Programs (e.g., Flash)	1.79	1.13	10.8
Web Programming (e.g., HTML)	1.78	1.21	13.3
Simulation	1.72	1.10	10.9
Video Conference Programs	1.70	1.11	10.5
Desktop Publishing (e.g., Corel Draw)	1.68	1.07	9.0
Programming Language (e.g., Visual Basic)	1.64	1.10	9.7
Tutorials	1.63	1.06	9.2
Learning Management System (e.g., WEB CT)	1.47	.90	5.6
Authoring Languages (e.g., Authorware)	1.46	.90	5.7
Overall mean	**2.40**		
Mean for K-12 teachers who started STE in 1998 or later	2.58		
Mean for K-12 teachers who started STE in 1997 or before	2.37		

The findings from interviews show that K-12 teachers consider themselves proficient in word processing and MS PowerPoint usage. On the other hand, all of them want to develop their knowledge and skills in using MS Excel and the Internet.

One of the teachers stated that she wanted to use the Internet effectively in her courses and daily life. She said parallel to the prospective teachers, "when I search any subject on the Internet, I find too many things. So, I spend to a lot of time on the Internet". Another finding was related to typing speed by using the computer keyboard. As well as one prospective teachers, one of the teachers remarked that she wanted to be able to type faster with ten fingers.

4.5. EFFECTIVENESS OF ICT RELATED COURSES (RESEARCH QUESTION 4)

This study also looks at perceptions of the faculty members, prospective teachers and K-12 teachers about the effectiveness of ICT related courses in teacher education programs. There were two ICT related courses, so there are two major categories in this theme. The first category is "Computer" and second is "ITMD". The data were collected from faculty members through surveys consisting of 3-point quantitative scales (3 indicating "Agree", 2 indicating "Neutral" and 1 indicating "Disagree"), open-ended responses, and interviews. The data from prospective teachers were collected with a five point Likert-type scale (5 indicating "Strongly Agree", 4 indicating "Agree", 3 indicating "Neutral", 2 indicating "Disagree", and 1 indicating "Strongly Disagree"), open-ended responses, and interviews. On the other hand, the data of K-12 teachers were collected with a Likert-type scale and interviews. The means and standard deviations of the quantitative scales for all participants are detailed in Table 4.26.

Table 4.26: Perceived Effectiveness of ICT Related Courses, and their Contribution on ICT Competencies

	"Computer" Course		**"ITMD" Course**	
	M	**SD**	**M**	**SD**
Faculty Members (on a 3-point scale)	2.60	.55	2.45	.56
Prospective Teachers (on a 5-point Likert scale)	3.59	1.30	3.85	1.13
1. K-12 Teachers (on a 5-point Likert scale; acquisition)	3.02	1.43	3.08	1.33
K-12 teachers who started STE in 1998 or later	3.55	1.30	3.58	1.18
2. K-12 Teachers (on a 5-point scale; effectiveness)	2.94	1.32	2.98	1.36
K-12 teachers who started STE in 1998 or later	3.46	1.13	3.56	1.10

4.5.1. Computer Courses:

In this section, in terms of ICT integration into preservice teacher education programs perceived effectiveness of "Computer" courses of faculty members, prospective teachers, and K-12 teachers were examined in teacher education programs. The findings were presented under the related themes.

4.5.1.1. Perceptions of Faculty Members about Computer Courses:

Faculty members were asked about the effectiveness of the course titled "Computer" in terms of ICT integration into preservice teacher education programs. They showed a high degree of overall contentment (M= 2.60, on a 3-point scale) with their ICT related courses and felt well prepared for professional life (see Table 4.26).

When asked how to improve the course retrospectively, the findings show that, "the whole course should be offered in a computer laboratory based on applications" (*f*=13), was ranked first and "the course content should be redesigned to acquire more benefit from ICT based on today needs" (*f*=11) is second according to the course instructors (see Table 4.27).

Table 4.27: Ways to Improve the "Computer" Course According to Faculty Members

	f	%
In whole the course should be offered in a computer laboratory based on applications	13	32
The course content should be redesigned to acquire more benefits from ICT based on today needs	11	27
Appropriate in-service training should be provided to the faculty members who offer the course	10	24
More hardware and the other equipments should be allocated to the course	7	17
TOTAL	41	100

According to open-ended responses and interviews results, a majority of the faculty members believed that the course titled "Computer" was beneficial and

effective for ICT integration into the learning process. They believe the prospective teachers can learn how to integrate technology into their fields in the course. One of the faculty members (Hüseyin) also remarked that "*the prospective teachers got positive perception to the ICT integration into learning environments with this course. Thus, the course was vital important for every prospective teachers in the preservice teacher education programs*".

However, a majority of the faculty members commented on two key factors in order to make the course more effective and efficient in preservice teacher education programs. The first factor noted in an open-ended response was "*the course should be offered in computer laboratories based on applications every time not in a traditional classroom or an electronic classroom".* A second key factor was *"all of the examples and applications in the course should be related to future professional life of the prospective teachers and related to their subject*".

As well as the aforementioned two key factors to make the course more effective and efficient, one of the interviewee (Zeynep) recommended that:

> *"Computer course should be given in the first year. So, the prospective teachers can use ICT in their undergraduate courses. As a result of this issue, at the time of being a teacher, the prospective teachers can integrate technology to their job easily".*

4.5.1.2. Perceptions of Prospective Teachers about Computer Courses:

The prospective teachers were asked about the effectiveness of the course titled "Computer" in terms of ICT integration into preservice teacher education programs. They showed a degree of overall contentment with their "Computer" course and felt well prepared for professional life (M= 3.59; see Table 4.26).

As shown in table 4.28, prospective teachers were also asked some indirect questions about the effectiveness of both ICT related courses. The findings show the overall mean of this group of items were at the agree level, which means the course was beneficial and effective. Hovewer, "I was taught to (how to) use technology in learning-teaching environments by my instructors in undergraduate years" (M=3.26) and "I was taught about the effects of technology use in society by

my instructors in undergraduate years" (M=3.12) were at the undecided (neutral) level.

Table 4.28: Prospective Teachers' Perceptions of Effectiveness of ICT Related Courses

	M	**SD**
The technology courses in my undergraduate years helped me to change my attitude toward technology positively	3.75	1.11
I am capable of providing technology-based instruction with the help of technology-based courses that I took in my undergraduate years	3.53	1.12
I am a prospective teachers that is capable of today's technology criteria	3.42	1.17
I was taught to (how to) use technology in learning-teaching environments by my instructors in undergraduate years	3.26	1.22
I was taught about the effects of technology use in society by my instructors in undergraduate years	3.12	1.20
Overall mean	3.41	

According to open-ended responses and interviews almost all of the prospective teachers believed that the course titled "Computer" was beneficial and effective for ICT integration into the learning process. One of the interviewee (Ayşe) summarized these benefits by stating:

> *"I think, it increases my teaching ability significantly. It is useful in using technological devices as well. I didn't know how to use computers (in everyday life). I learned in this course how to use Word, Excel and PowerPoint. Then, I learned little bit how to run Front-page programming software by myself. Right now, I have my personal homepage and I put my niece's picture on it".*

Another participant noted this concern (Computer Courses) in an open-ended response as:

> *"Our capabilities of running computer programs were improved in this course. We learned a lot of software well because we had numerous projects and assignments. This was a preparation for our future career".*

However, some of the participants stated important recommendations in order to make the course more beneficial in preservice teacher education programs. One prospective teacher (Mustafa) stated these recommendations in an interview as:

> *"We have learned many fundamentals of the field in this course. In my opinion, however, the theoretical part of the class should never be done. I don't remember anything that was taught by theoretically. I think, to make it more effective; (a) should be paid more attention on practice, and (b) practice sessions should be arranged as one computer for per person".*

4.5.1.3. Perceptions of K-12 Teachers about Computer Courses:

The K-12 teachers were asked to rate the effectiveness of the course titled "Computer" in terms of ICT integration into preservice teacher education programs. They rated their levels of agreement on the effectiveness of the course with the statements by using two themes.

The first theme examined in this study was the way of acquiring ICT competencies by K-12 teachers. As it is presented in Table 4.26, "Computer" course taken at their undergraduate education is one factor contributing to their acquisition of competency (M=3.02). The factor was contributed to acquiring competency in ICT for K-12 teachers are at a "neutral" level (ranging from M=2.61 to M=3.40). When the researcher focused only on the K-12 teachers who started STE in 1998 or later, the mean was calculated at "Agree" levels (M=3.55).

The second theme examined in this study was the effectiveness of "Computer" course in their undergraduate education which increased the knowledge and skills of ICT integration into their teaching profession. K-12 teachers rated their level of agreement related with each contributing factor by using a five-point scale (5 indicating "Strongly Agree", 4 indicating "Agree", 3 indicating "Disagree", 2 indicating "Strongly Disagree", and 1 indicating "They do not have idea / had not taken "Computer" courses during their undergraduate study"). K-12 teachers were undecided (neutral level) about the overall contentment with their ICT related

courses (M= 2.94). When the researcher focused only on the K-12 teachers who started STE in 1998 or later, the mean was calculated at "Agree" levels (M=3.46). K-12 teachers showed a degree of overall contentment with their "Computer" course and felt well prepared for professional life.

According to interviews results, a majority of the K-12 teachers believed that the course titled "Computer" was beneficial and effective in integration of ICT into the learning process. Graduates of the new curriculum perceived satisfaction with their undergraduate "Computer" course and its preparation for them for K-12 practice. Only one of them (İrem) indicated having some negative perceptions to the course as saying by:

> *"I don't know other universities, but the computer classes were theoretical at the university that I was graduated. To be honest, the course was early in the morning and no attendance required. Because the course was conducted in a classroom, attendance was even lower. We went to computer laboratories a few times, yet there were 3-4 students around each computer. However, because it was theoretical one, nobody was appealed by this course".*

İrem also believed that the exams of the course should be conducted via computer saying:

> *"If these courses had involved any practical applications, they would be comprehended well. If the exams had been conducted in front of the computers, they might have been more effective because, to get a good grade, you had to learn the content from somewhere even though you hadn't attended classes. But, it wasn't like that; exams were also theoretical and based on memorization".*

4.5.2. Instructional Technologies and Material Development (ITMD) Courses:

In this section, in terms of ICT integration into preservice teacher education programs perceived effectiveness of the "ITMD" course by faculty members,

prospective teachers and K-12 teachers were examined in teacher education programs. The following categories have been created for this purpose.

4.5.2.1. Perceptions of Faculty Members about ITMD Courses:

Faculty members were asked about the effectiveness of the course titled "ITMD" in terms of ICT integration into preservice teacher education programs. They showed a high degree of overall contentment (M= 2.45, on a 3-point scale) with their ICT related courses and felt well prepared for professional life (see Table 4.26).

They were also asked about how to improve the course retrospectively. Findings show that, "the course benefits (acquirement) should be implemented in the teaching method courses" (*f*=26), is ranked highest and "more electronic classroom and computer laboratories should be allocated to the course" (*f*=20) is the second choice according to the course instructors.

Table 4.29: Ways to improve the "ITMD" Course According to Faculty Members

	f	%
The course benefits (acquirement) should be implemented in the method courses	26	34
More electronic classroom and computer laboratories should be allocated to the course	20	26
Appropriate in-service training should be given to the faculty members, who offer the course	19	25
The course content should be redesigned to acquire more benefit from ICT based on today needs	12	15
TOTAL	77	100

Both open-ended responses and interview results show that faculty members believe the course titled "ITMD" was beneficial and effective in ICT integration into learning process. One of the open-ended responses included, *"It is a very important course for students who had taken a Computer course before to learn how to use and integrate ICT into their classes"*.

However, there were some recommendations in order to make the course more beneficial in preservice teacher education programs. Zeynep stated in an interview that "*ITMD courses should be given in the second year, after the Computer course. So, the prospective teachers can use it in their undergraduate courses".* Second recommendation stated in open-ended responses was that *"problem / project based learning should be used in order to teach how prospective teachers integrate ICT into their fields".* Another recommendation was acknowledged in an interview (Ali) as:

> *"Posters and 3-D materials dominate this course. In my experience, the majority of the posters are hand made. It should have rather constructed on the previously taken Computer course. In my opinion, class activities, given assignments and conducted projects should utilize more computers and other technological devices. Students' subject matter content, in this course, should be integrated with the instructional and computer technologies. In my opinion, it is the best if this (instructional technology and material development) and Computer course should be offered by the department of CEIT. An expert in the field should also help the instructor of the course".*

4.5.2.2. Perceptions of Prospective Teachers about ITMD Courses:

The prospective teachers were asked to rate the effectiveness of the course titled "ITMD" in terms of ICT integration into preservice teacher education programs. Prospective teachers showed a degree of overall contentment (M= 3.85) with their "ITMD" course and felt well prepared for professional life (see Table 4.26).

According to an analysis of open-ended responses and interview results, when the prospective teachers were asked about their perceptions about the effectiveness of the course titled "ITMD" in terms of ICT integration into preservice teacher education programs, almost all interviewees stated positive perceptions. Parallel to the questionnaire analysis, they believed the course to be beneficial when they become teachers. One interviewee (Ahmet) stated that:

"In this course, everyone developed creative materials for their related subjects that they would use in their classes. We taught our topics by using computers. We gained experiences about how to use technology in teaching".

A second prospective teacher also stated that she prepared some activities in the courses about her field. Another prospective teacher stated that "*it demonstrates several aspects of teaching. It promotes creativity. It helps get rid of monotone classroom teaching by diversifying teaching*". The course was also seen as a design slides and web page development course. A prospective teacher (Fatma) of ELT commented:

"In the content of instructional technologies and material development course, we learned how to prepare power point slides and design our own website. As a student of a STE, I think it will be very useful for my teaching career and help me prepare great lesson contents. I think I will able to improve myself more. If I apply this knowledge to my teaching, it will be very useful".

4.5.2.3. Perceptions of K-12 Teachers about ITMD Courses:

The K-12 teachers were asked about the effectiveness of the course titled "ITMD" in terms of ICT integration into preservice teacher education programs. They rated their levels of agreement on the effectiveness of the course with the statements by using two themes.

The first theme examined in this study was the way of acquiring ICT competencies by K-12 teachers. The results indicate that in Table 4.26, "ITMD" taken during undergraduate education, is the highest factor (M=3.08) that contributed to acquiring competency in ICT of K-12 teachers. The factor is at "neutral" levels (ranging from M=2.61 to M=3.40). When the researcher focused only on the K-12 teachers who started STE in 1998 or later, the mean was calculated at "Agree" levels (M=3.58).

The second theme examined in this study was the effectiveness of the "ITMD" course during the K-12 teachers' undergraduate education if the course increased the knowledge and skills of ICT integration into their teaching profession.

They rated their level of agreement related with each contributing factor by using a five-point scale (5 indicating "Strongly Agree", 4 indicating "Agree", 3 indicating "Disagree", 2 indicating "Strongly Disagree", and 1 indicating "They do not have idea / had not taken "ITMD" course during their undergraduate study"). K-12 teachers were undecided (neutral) about the overall contentment with their ICT related courses (M= 2.98). When the researcher focused only on the K-12 teachers who started STE in 1998 or later, the mean was calculated at "Agree" levels (M=3.56). Majority of them showed a degree of overall contentment with their "ITMD" course and felt well prepared for professional life (see Table 4.26).

Most of the K-12 teachers believe that the prospective teachers could learn how to integrate technology into their fields through this course. However, for the same course, one of the K-12 teachers remarked that:

> *"Instructional Technologies and Material Development course should be given in project-based learning. Thus we can explore real-world problems and create solutions related to our fields".*

K-12 teachers do not like the theoretical information in this course. They prefer the practical applications. One of the interviewees of K-12 teachers (Emre) stated this situation by saying:

> *"Because vast amount of course curriculum was theoretical, I won't be able to comment positively. Practice should be emphasized. Besides practice, it is important to be taught in the way of how we are expected to teach. The knowledge needs to be remembered. The ways of how I utilize it while teaching aren't taught in this course. I think that the content of the course should be related to my future career. As a matter of fact, the instructors who teach ICT related courses aren't from subject of instructional technology. I think it is important as well".*

4.6. USING ICT IN THE COURSES (RESEARCH QUESTION 5)

The fifth research question examined is the existing situation of the faculty members and K-12 teachers' ICT usage in their courses. The data were collected with multiple choices items and five-point scales.

4.6.1. Using ICT in the Courses by Faculty Members:

The findings of the study indicate that while 16% (N=18) of the faculty members offer at least one online course, 83% (N=92) of them do not offer any online courses (see Table 4.30). Almost 76% (N=84) of the faculty members stated that they use the Internet as a supportive tool in their courses, and 20.7% (N=23) of them mentioned that they use the Internet partially in their courses (see Table 4.31).

Table 4.30: Online Course Offering by Faculty Members

Online Courses	N	%
Not offered	92	82.9
Offered	18	16.2
No Response	1	.9
TOTAL	**111**	**100**

Table 4.31: Faculty Members Use of the Internet as a Supportive Tool in Their Courses

Internet Usage	N	%
Use	84	75.7
Partial use	23	20.7
None	3	2.7
No Response	1	.9
TOTAL	**111**	**100**

Faculty members who were using the Internet in their courses as a support tool were asked how they were using the Internet by selecting more than item. The findings showed that 95 faculty members used search engines, 83 faculty members

use e-mail, and 63 faculty members use web pages for supporting their lesson. The use of forum and chat (25 and 15 faculty members, respectively) were rated as the least used ways of using the Internet as a support tool (see Table 4.32).

Table 4.32: Faculty Members' Internet Tools Usage

Tools	***f***
Search engines	95
E-mail	83
Webpage for supporting lessons	63
Forum	25
Chat	15

According to faculty members, a majority of the "Computer" courses were offered in a computer laboratory (see Table 4.33). While 26% of the faculty members offer "ITMD" courses in traditional classroom settings; more than half of the faculty members offer these courses in either a computer laboratory (26%) or electronic classroom (29.7%). As it is presented in Table 4.34, generally, they preferred to assess the learning outcomes of the courses through "homework and project-based evaluation" (62.2%) and "performance tests" (55.9%). It can be noted here that, faculty members could select more than one item for this question.

Table 4.33: The Places Where ICT Related Courses Were Offered

Places	**"Computer" Courses**		**"ITMD" Courses**	
	f	%	*f*	%
Computer laboratory	66	59.5	29	26.1
Electronic classroom	16	14.4	33	29.7
Traditional classroom	4	3.6	29	26.1

Table 4.34: Assessment Methods Used in ICT Related Courses

Methods	"Computer" Courses		"ITMD" Courses	
	f	%	*f*	%
Homework and project-based evaluation	69	62.2	71	64.0
Performance tests	62	55.9	55	49.5
Written Exam	30	27.0	31	27.9
Multiple choice exam at the end of the unit	14	12.6	14	12.6

Faculty members who were using ICT in their courses ranked the frequency of use (5 indicating "All the time", 4 indicating "Often", 3 indicating "Rarely", 2 indicating "Never", and 1 indicating "don't know what it is") of their hardware and software usage in their courses. The results of the study show the most frequently used hardware by the faculty members in both courses were the computer (M=3.93 and M=3.34) and second, the LCD projector (M=3.73 and M=2.88) as indicated in the Table 4.35. The least used hardware by the faculty members in their courses were cameras (M=1.43 and M=1.73), videos (M=1.70), and television (M=1.67).

Table 4.35: Hardware Used by Faculty Members in their ICT Related Courses

Hardware	"Computer" Courses		"ITMD" Courses	
	M	SD	M	SD
Computer	3.93	.24	3.34	.80
LCD Projector	3.73	.57	2.88	1.08
Printer	2.01	.86	2.21	1.03
Scanner	1.84	.72	1.98	.94
OHP	1.67	.94	2.53	1.10
Camera	1.43	.57	1.73	1.01
Video			1.70	.83
Television			1.67	1.02
Overall mean	**2.68**		**2.45**	

The most frequently used software by faculty members were "word processing" and then "presentation programs". The results indicate that the use of

"video conferencing programs" by the faculty members in their courses was rated as the least used application (see Table 4.36).

Table 4.36: Software Used by Faculty Members in their Courses

Software	"Computer" Courses		"ITMD" Courses	
	M	SD	M	SD
Word Processor (e.g., MS Word)	3.71	.52	3.16	.86
Spreadsheets (e.g., Excel)	3.46	.73	2.54	.94
Presentation Programs (e.g., PowerPoint)	3.53	.71	3.01	.90
Web Browsers (e.g., Internet Explorer)	3.42	.69	2.95	.93
Operating Systems (e.g., Windows)	3.25	1.09	2.71	1.27
Receiving/sending e-mail	3.21	.89	2.80	1.06
Web Programming (e.g., HTML)	2.32	1.09	1.85	1.12
Web Page Development (e.g., FrontPage)	2.23	1.11	2.22	1.22
Image Editing (e.g., Photoshop)	2.19	1.02	2.13	1.02
Databases (e.g., Access)	2.17	1.11	1.98	1.23
Reference Programs (e.g., Dictionary)	1.87	.95	2.04	1.20
Animation Programs (e.g., Flash)	1.85	.88	2.06	1.20
Forum	1.69	1.00	1.75	1.15
Learning Management System (e.g., WEB CT)	1.63	1.12	1.86	1.48
Chat	1.62	.89	1.56	1.12
Desktop Publishing (e.g., Corel Draw)	1.62	.90	1.93	1.46
Video Conference Programs	1.43	.83	1.31	.90
Instructional Game	-	-	2.18	1.44
Simulation	-	-	2.02	.93
Tutorials	-	-	2.02	1.18
Authoring Languages (e.g., Authorware)	-	-	1.93	1.45
Overall mean	**2.58**		**2.38**	

4.6.2. Using ICT in the Courses by K-12 Teachers:

The results related to computer laboratory usage of the teachers are presented in Table 4.37. The findings of the study indicate that more than 1/3 of the teachers (35%) do not use the computer laboratories at all. While 1/4 of the teachers (25%) use the laboratories, almost 1/5 of the teachers (19%) use the laboratories rarely. The results also showed that 16 percent of the teachers stated that their computer laboratories were insufficient or their schools did not have any computer laboratory.

Table 4.37: K-12 Teachers' Computer Laboratory Usage

Computer Laboratory Usage	N	%
None	490	35
Use	361	25
Rarely use	267	19
The schools do not have any/sufficient computer laboratories	233	16
No Response	78	5
TOTAL	**1429**	**100**

The teachers were asked if they were integrating ICT into their courses. As it is presented in Table 4.38, 37.5% of the teachers did not integrate ICT in their courses. While 1/4 of the teachers (25%) indicated they were integrating ICT in their courses, 1/3 of the teachers (34%) were partially integrating ICT in their courses. 4% (N=51) did not respond to this question.

Table 4.38: K-12 Teachers' ICT Integration in their Courses

ICT Integration into Courses	N	%
No	536	37.5
Partially	482	34
Yes	360	25
No Response	51	3.5
TOTAL	**1429**	**100**

The teachers who were using ICT in their courses ranked the frequency (5 indicating "All the time", 4 indicating "Often", 3 indicating "Rarely", 2 indicating "Never", and 1 indicating "don't know what it is") of their hardware and software usage in their courses. As it is shown in Table 4.39, the most frequently used hardware by the teachers in their courses is computer (M=3.69), and then printer (M=3.53). The least frequently used hardware by the teachers in their course is camera (M=2.5).

Table 4.39: Hardware Used by the Teachers in their Courses

Hardware	M	SD
Computer	3.69	.96
Printer	3.53	.97
Television	3.15	.95
LCD Projector	3.10	.97
OHP	3.09	.94
Scanner	2.93	.97
Video	2.90	.91
IC Recorder	2.81	1.03
Camera	2.50	.82

The results, related with the teachers' use of software in their courses, are presented in Table 4.40. The teachers use "word processing" software (M=3.57) at the highest level, "Internet" (M=3.31) for the information search at the second level, and then "receiving/sending e-mail" (M=3.21) at the third level. Results indicate that the use of "LMS" (M=1.97) by the teachers in their courses is listed as the least used application.

Table 4.40: Software Used by Teachers in their Courses

Software	M	SD
Word Processor (e.g., Word)	3.57	1.09
Web Browsers (e.g., Internet Explorer)	3.31	1.17
Receiving/sending e-mail	3.23	1.22
Spreadsheets (e.g., Excel)	3.20	1.07
Operating Systems (e.g., Windows)	2.93	1.28
Presentation Programs (e.g., PowerPoint)	2.88	1.02
Game	2.51	.91
Image Editing (e.g., Photoshop)	2.47	.95
Chat	2.39	.90
Databases (e.g., MS Access)	2.36	.88
Web Programming (e.g., HTML)	2.27	.93
Reference Programs (e.g., Dictionary)	2.27	.91
Forum	2.26	.87
Animation Programs (e.g., Flash)	2.25	.85
Web Page Development (e.g., FrontPage)	2.22	.83
Simulation	2.18	.83
Programming Language (e.g., Visual Basic)	2.16	.90

Table 4.40 (Continued)

Software	M	SD
Desktop Publishing (e.g., Corel Draw)	2.12	.75
Video Conference Programs	2.08	.73
Tutorials	2.06	.74
Authoring Languages (e.g., Authorware)	1.99	.69
Learning Management System (e.g., WEB CT)	1.97	.67
Overall mean	2.72	

As it is presented in Table 4.41, one-fourth of the teachers (25%) stated that they use the Internet as a supportive tool in their courses, and one-third of the teachers (34%) mentioned that they use the Internet partially in their courses. However 37.5% of the teachers do not use the Internet at all.

Table 4.41: K-12 Teachers Use of the Internet as a Supportive Tool in their Courses

Internet Usage	N	%
None	548	37.5
Partial use	428	34
Use	317	25
No Response	136	3.5
TOTAL	**1429**	

The teachers who were using the Internet in their courses as a support tool were asked survey items about how they were using the Internet by selecting more than one item. As indicated in Table 4.42, 676 teachers mentioned they use web pages to prepare their lectures. 514 teachers use search engines to prepare their courses. The least used tools by the teachers are forum (65 teachers) and chat (51 teachers).

Table 4.42: Teachers' Internet Tools Usage

Tools	Use		Not Use	
	f	%	*f*	%
Web pages for lecture preparation	676	47.3	753	52.7
Search engines	514	36	915	64
Web page for supporting lessons	323	22.6	1106	77.4
E-mail	259	18.1	1170	81.9
Forum	65	4.5	1364	95.5
Chat	51	3.6	1378	96.4

4.7. THE MAIN BARRIERS AND POSSIBLE ENABLERS FOR INTEGRATING ICT INTO TEACHER EDUCATION PROGRAMS (RESEARCH QUESTION 6)

The sixth research question for this study investigated the main barriers and the possible enablers for integrating ICT into preservice teacher education programs. To accomplish this, participants were asked the main barriers and possible enablers they encounter with regard to the use of ICT in their teaching. The data were collected from deans with five-point Likert-type scales and open-ended responses, from faculty members with five-point Likert-type scales and interviews, and from prospective teachers with open-ended responses and interviews. For the Likert-type scales, participants rated their level of agreement on the five-point scale (5 indicating "Strongly Agree", 4 indicating "Agree", 3 indicating "Neutral", 2 indicating "Disagree", and 1 indicating "Strongly Disagree").

4.7.1. Main Barriers:

In this section, the main barriers for integrarating ICT into preservice teacher education programs according to deans, faculty members, and prospective teachers are discussed. Based on their position at STE, the following categories have been created for this purpose.

4.7.1.1. According to Deans:

Mean scores and standard deviations of the barriers perceived by deans are presented in Table 4.43. As it is shown in the table, "lack of in-service training

about ICT" (M=4.08) was the most significant barrier faced in integrating ICT into prospective teacher education programs. The other leading barriers are "lack of appropriate software and materials for instruction" (M=3.81), "lack of basic knowledge-skills" (M=3.79), "lack of hardware" (M=3.72), "inadequate repertoire of knowledge and skills on the integration of ICT in instruction" (M=3.67), "lack of technical support" (M=3.60), which are above the overall mean (M=3.46). The following items are below the mean and majority of deans identified these statements as not representing barriers: "inappropriate course content and instructional programs" (M=3.38), "lack of time for integrating ICT in classroom-lessons" (M=2.60), and the lowest mean score was "inadequate support from upper positions" (2.53).

Table 4.43: Barriers Faced in Integrating ICT into STE According to Deans

Barriers	M	SD
Lack of in-service training about ICT	4.08	.75
Lack of appropriate software and materials for instruction	3.81	.93
Lack of basic knowledge and skills about ICT	3.79	1.06
Lack of hardware (computer, printer etc.)	3.72	1.24
Inadequate repertoire of knowledge and skills on the integration of ICT in instruction	3.67	1.12
Lack of technical support	3.60	1.03
Inappropriate course content and instructional programs	3.38	.97
Lack of time for integrating ICT in classroom	2.60	1.16
Inadequate support from upper positions	2.53	1.10
Overall mean	**3.46**	

According to the results of open-ended responses from the deans' questionnaire, there were some common barriers. The major barriers indicated by deans are:

- insufficient economic resources,
- lack of motivation of the faculty members about ICT integration into their classes,
- lack of plans,

- lack of basic knowledge and skills about ICT.

One of the deans noted of all of the barriers:

> *"Faculty members do not integrate ICT and Instructional Technologies into their classrooms due to disinterestedness which is caused by their insufficient ability and knowledge in the field. Another problem is overwhelming course load on faculty members (that causes less time for research and personal development). Lack of time makes faculty members stayed away from ICT and they cannot fulfill their personal developments in this field".*

4.7.1.2. According to Faculty Members:

Means and standard deviations of barriers for the faculty members are provided in Table 4.44. The results indicate that faculty members perceived "lack of hardware" (M=4.14) as the most significant barrier in integrating ICT into prospective teacher education programs. The other key barriers are "lack of appropriate software and materials for instruction" (M=4.06), "lack of computer access for students' out-of-class" (M=4), "lack of technical support" (M=3.99), "lack of in-service training about ICT" (M=3.95), "inadequate repertoire of knowledge and skills on the integration of ICT in instruction" (M=3.95), "lack of basic knowledge-skills (M=3.94)", all of which are above the overall mean (M=3.79). The items below the overall mean include "the constraints related to hardware" (3.77) and "lack of physical environment for integrating ICT in classroom" (M=3.53). Majority of the faculty members were neutral about the following statements: "inappropriate course content and instructional programs" (M=3.40) and "lack of time for integrating ICT in classroom-lessons" with the lowest mean score observed (M=2.95).

Table 4.44: Barriers Faced in Integrating ICT into STE According to their Educators

Barriers	M	SD
Lack of hardware (computer, printer etc.)	4.14	.99
Lack of appropriate software and materials for instruction	4.06	.85
Lack of computer access for students' out-of-class	4.00	1.18
Lack of technical support	3.99	1.03
Lack of in-service training about ICT	3.95	.95
Inadequate repertoire of knowledge and skills on the integration of ICT in instruction	3.95	.97
Lack of basic knowledge and skills about ICT	3.94	1.01
The constraints related to hardware	3.77	1.11
Lack of physical environment for integrating ICT in classroom	3.53	1.11
Inappropriate course content and instructional programs	3.40	1.08
Lack of time for integrating ICT in classroom	2.95	1.17
Overall mean	**3.79**	

In addition to the questionnaire findings, findings from the interviews data showed that faculty members consider the followings as ICT integration barriers:

- lack of successful models,
- inadequate support from upper position (administrative support) to the faculty member who successfully integrate ICT into her/his courses,
- lack of hardware,
- lack of in-service training about ICT,
- lack of technical support for integration ICT and preparation instructional materials,
- inadequate repertoire of knowledge and skills on the integration of ICT in instruction.

In addition to these barriers, the most important problem for one of the faculty members was students attitudes. The faculty member (Murat) indicated that:

> *"We need to change the attitude of students in order to benefit from ICT related courses". They have negative attitudes like: "What will I do it? Where will I use it? Why will I use it?" We should change these attitudes. This is the most important problem for me".*

4.7.1.3. According to Prospective Teachers:

The results of interviews with prospective teachers and the findings from the open-ended questions in the prospective teachers' questionnaire complement each other. The major problems indicated by prospective teachers are:

- lack of hardware,
- lack of basic knowledge and skills of faculty members about ICT,
- inadequate knowledge and skills of faculty members for the integration of ICT in their classes,
- need for a good role model,
- lack of computer access in laboratories for students out of the class,
- crowded classrooms,
- lack of computer and other equipments in class for presentation,
- negative attitudes of faculty members towards using ICT in their classes,
- inadequate number of ICT related courses.

The barriers are grouped in two main themes as "what they do not have" and "what they have" as Ertmer (1999) suggested. Under the first theme, the barriers indicated by prospective teachers are "lack of hardware", "lack of computer laboratories for free (out of lecture) time", and "lack of computer and other equipment in class for presentation". In regards to the first group barriers, one of the prospective teachers (Mustafa) said:

> *"One month ago, I prepared my homework in CD format, but I could not show it to my teacher in class because we don't have any computers in class. I want to present my homework through computer by using flash animations and using some pictures. So we have to prepare it in traditional methods. I think, at least one computer should be placed in each classroom."*

Prospective teachers want to have computer laboratories to use in leisure time; one of the prospective teachers (Ayşe) commented that:

> *"We do not have any computer laboratories for using after the lesson. Sometimes, I have to go my home for only checking my e-*

mail. Every time, there is lesson in computer laboratories has a session in class or closed. We could not use it after the lessons".

The second theme of perceived barriers (what they have) were related to "lack of basic knowledge and skills of faculty members about ICT", "inadequate knowledge and skills of faculty members for the integration of ICT in their classes", "need for a good role model", and "negative attitudes of faculty members towards using ICT in their classes". Ayşe, regarding faculty members' attitudes, mentioned, "*they don't have any positive attitude towards computer. If they had, they might be able to learn it. They could not become a good model for use of technology*".

4.7.2. Possible Enablers:

In this section, possible enablers offered by different groups of participants were examined. The following categories have been created for this purpose.

4.7.2.1. According to Deans:

Means and standard deviations of possible enablers for the deans are provided in Table 4.45. Majority of the deans strongly agreed with the following statements as possible enablers: "technology plans for implementing ICT in STE and universities should be prepared" (M=4.42), "the in-service training about ICT should be improved in quantity and quality" (M=4.34), "more budgets should be allocated to ICT" (M=4.34), which are all above the overall mean (M=4.25). The following items that majority of the deans agreed with and below the overall mean are "specific units and personnel should be allocated for peer support and public use of ICT tools and materials to the use of ICT in instruction" (M=4.24), 'the faculty members who integrate ICT in their courses should be supported" (M=4.24), "the course load of the faculty members should be decreased" (M=4.14), and the lowest mean score was observed for "the course content should be redesigned to acquire more benefit from ICT" (M=4.08).

Table 4.45: Possible Enablers to Current ICT Integration Barriers in Teacher Education Programs According to Deans

Enablers	M	SD
Technology plans for implementing ICT in STE and universities should be prepared	4.42	.76
The in-service training about ICT should be improved in quantity and quality	4.34	.69
More budget should be allocated to ICT	4.34	.94
Specific units and personnel should be allocated for peer support and public use of ICT tools and materials to the use of ICT in instruction	4.24	.85
The faculty members who integrate ICT in their courses should be supported (such as incentive payment)	4.24	1.02
The course load of the faculty members should be decreased.	4.14	.96
The course content should be redesigned to acquire more benefit from ICT	4.08	.78
Overall mean	**4.25**	

According to the results of open-ended responses from the deans' questionnaire, there were some possible enablers. The major enablers indicated by deans are:

- in-service training about ICT should be improved in quantity and quality,
- more budget should be allocated to ICT,
- course load of the faculty members should be decreased,
- specific personnel (technical and academic) should be allocated for peer support to the use of ICT in instruction,
- more hardware should be allocated.

One of the deans noted of the enablers:

> *"More faculty member and technical support personnel need to be recruited in an adequate level. Current stuff must be taken into in-service training program by the experts in the field. More competent STE should lead the less competent ones and transfer their experiences".*

4.7.2.2. According to Faculty Members:

Means and standard deviations of possible enablers for the faculty members are provided in Table 4.46. Of the data explored, the enablers most strongly agreed by majority of the faculty members were "technology plans for implementing ICT in STE and universities should be prepared" (M=4.54), "specific units and personnel should be allocated for peer support and public use of ICT tools and materials to the use of ICT in instruction" (M=4.53), "more budget should be allocated to ICT" (M=4.50), "the faculty members who integrate ICT in their courses should be supported" (M=4.49), "the in-service training about ICT should be improved in quantity and quality" (M=4.44), which are all above the overall mean (M=4.39). The items below the overall mean and agreed by majority of the faculty members were "the course content should be redesigned to acquire more benefit from ICT" (M=4.17) and "the course load of the faculty members should be decreased" (M=4.10).

Table 4.46: Possible Enablers to Current ICT Integration Barriers in Teacher Education Programs According to Faculty Members

Enablers	M	SD
Technology plans for implementing ICT in STE and universities should be prepared	4.54	.64
Specific units and personnel should be allocated for peer support and public use of ICT tools and materials to the use of ICT in instruction	4.53	.62
More budget should be allocated to ICT	4.50	.62
The faculty members who integrate ICT in their courses should be supported (such as incentive payment)	4.49	.65
The in-service training about ICT should be improved in quantity and quality	4.44	.62
The course content should be redesigned to acquire more benefit from ICT	4.17	.89
The course load of the faculty members should be decreased	4.10	.96
Overall mean	**4.39**	

The interview results were in line with the questionnaire results. In addition to the themes stated in the questionnaire, a faculty member suggests that the prospective

teachers' motivation should been enhanced. He further offers suggestions for new ICT related courses for the STE. According to him, two technology courses are not providing for needs. Also one of the faculty members (Murat) commented:

> *"Technology integration courses should be integrated to school experience courses. I think, this model would enhance efficiency of integration. Using ICT is important but integration ICT in your class is more important. Also we have to offer to our students a new ICT related course which has to include both ICT and field of study (math, language, chemistry) after the ITMD courses".*

4.7.2.3. According to Prospective Teachers:

There are also strong agreements between the open-ended questions and interview results of prospective teachers about possible enablers to current ICT integration problems. The prospective teachers indicated enablers by stating the following:

- courses should be supported by an appropriate web page,
- faculty members should be given in-service training for the integration of ICT,
- course content should be improved for today's needs,
- more hardware should be allocated,
- our teacher should be a role model to us as using ICT in their courses,
- more technology courses should be offered,
- every classroom should have at least one computer,
- every STE should have a free laboratory,
- every ICT related courses should be based on application.

One prospective teacher remarked on solutions to overcome current problems: *"instructors should be provided with in-service training for the integration of ICT".* On the other hand, another interviewee suggested a proficiency exam on ICT for the faculty members. If a faculty member takes this exam, then he/she should be motivated (i.e., incentive payment).

4.8. THE MAIN BARRIERS AND POSSIBLE ENABLERS FOR INTEGRATING ICT INTO K-12 SCHOOLS (RESEARCH QUESTION 7)

The seventh research question for this study investigated the main barriers and possible enablers for integrating ICT into K-12 schools. To accomplish this, K-12 teachers were asked the issues they encounter with regard to the use of ICT in their teaching and possible enablers to the barriers they reported. The data were collected from them with five-point Likert-type scales and interviews. For the Likert-type scales, participants rated their level of agreement on the five-point scale (5 indicating "Strongly Agree", 4 indicating "Agree", 3 indicating "Neutral", 2 indicating "Disagree", and 1 indicating "Strongly Disagree").

4.8.1. Main Barriers:

The results showed that majority of the K-12 teachers agreed with the all statements as barriers "lack of in-service 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 all above the overall mean (M=3.93), "lack of physical environment for integrating ICT in classroom" (M=3.88), "inappropriate course content and instructional programs" (M=3.81), and "the constraints related to hardware" (3.64), "inadequate support from upper positions" (3.58) except the statements "lack of time for integrating ICT in classroom" about which they were undecided (neutral).

Table 4.47: Barriers Faced in Integrating ICT into K-12 Schools According to their Teachers

Barriers	M	SD
Lack of in-service 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

Table 4.47 (Continued)

Barriers	M	SD
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**	

Both questionnaire and interview results show "Lack of in-service training about ICT" was the main barrier in the K-12 schools. Analyses of interview results also indicate there are significant similarities between the questionnaire and interview results of K-12 teachers about the main ICT integration barriers in their schools. In addition to these results, the following barriers from interviews revealed two main themes as:

(1) What they do not have:

- short term in-service training,
- lack of an environment (portal) which can be utilized as communication platform teachers as well as IT specialist,
- lack of technology plans for implementing ICT,
- absence of standards which focus on defining the skills and perceptions of teachers for applying ICT in their classrooms.

(2) What they have:

- crowded classrooms,
- overloaded curriculum,
- low quality of preservice education,
- low quality of in-service training.

As in the above barriers, one participant noted the low quality of in-service training about ICT integration by saying:

"During the in-service training we were only accustomed with basic computers skills rather than how the integrate ICT into our

curriculum. I think in-service training should be specialized in our subjects".

4.8.2. Possible Enablers:

The findings revealed that majority of the K-12 teachers strongly agreed with the statements as enablers "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 prospective 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), "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) except the last statements "the course load of the teachers should be decreased" (M=4.06) which they agreed with.

Table 4.48: Possible Enablers of K-12 Teachers to Overcome Current ICT Integration Problems in their Schools

Enablers	M	SD
More budget should be allocated to ICT	4.64	.56
The in-service teacher training about ICT should be improved in quantity and quality	4.61	.59
The prospective 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**	

Moreover, analyses of qualitative responses indicate that there are common enablers between the questionnaire and interview results for barriers of integration of ICT into K-12 schools. One teacher stated one important solution related to the budget and infra-structure by saying:

> *"Right know I don't even have any electrical sockets in my classroom. I cannot even use simple radio or cassette-tape. In my opinion, all of the classrooms infra-structure should be renovated based on today's needs. For instances, they should include phone cables, TV receivers, and the Internet sockets. Of course, all the classrooms should be equipped with necessary hardware".*

Another original solution discussed organizing a competition on the integration of ICT between the teachers by saying:

> *"Annually, a competition on the integration of ICT into the classroom environments should be organized by Ministry of Education. Also there should be requirement for every school district to send at least one competitor".*

In addition to aforementioned results, the following enablers from interviews were also revealed:

- every classroom should be installed (have) at least a computer with Internet access, LCD projector and sound system,
- the course books should be redesigned to acquire more benefit from ICT,
- the time period (one hour a week) of "Computer" courses should be increased and these courses should be held in a computer laboratories rather than traditional classroom environment,
- the usage of ICT should be encouraged by incentive payments to the ICT capable teachers,
- schools administrator should be (convinced) informed about the usefulness of ICT.

4.9. THE EFFECT OF DEMOGRAPHIC CHARACTERISTICS ON K-12 TEACHERS' PERCEIVED ICT COMPETENCIES SCORES (RESEARCH QUESTION 8)

The last research question for this study investigated the significant differences between K-12 teachers' demographic characteristics-their gender, computer ownership, taken ICT related courses, and taken in-service training about ICT (IVs)- and K-12 teachers' perceived ICT competencies scores (DV). Before presenting the results of significant differences, it is better to clarify whether there was any significant relationship between DV and IVs or not. For these purposes, correlation analysis, higher-way ANOVA, and Post-Hoc tests were conducted.

Table 4.49 indicates the results of correlation analysis between independent and dependent variables. Three of variables gender, taken ICTRC, and computer ownership are related significantly to perceived ICT competencies scores. But gender and computer ownership variables have negative correlation with perceived ICT competencies scores.

Table 4.49: Correlation Matrix: Independent Variables and Perceived ICT Competencies

Variable	1	2	3	4	5
1. Gender		.061*	.023	-.017	-.094**
2. Taken ICTRC	.061*		.066*	-.020	.162**
3. Taken in-service training about ICT	.023	.066*		.045	-.039
4. Computer ownership	-.017	-.020	.045		-.212**
5. Perceived ICT competencies	-.094**	.162**	-.039	-.212**	

* $p < 0.05$ (2-tailed)
** $p < 0.01$ (2-tailed)
N= 1429

The higher-way ANOVA results were shown in Table 4.50. There were main significant effects of gender, taken ICTRC, computer ownership, and taken ICTRC-

taken in-service training about ICT (ICTRC * TIT). The other main effects were non-significant.

Table 4.50: Analysis of Variance Results of Main Effects and Interaction Effects of Independent Variables on Perceived ICT Competencies Scores

Source	*df*	*F*	Sig.	Partial η2
Gender (G)	1	14.529**	.000	.012
Taken ICTRC (ICTRC)	3	9.408**	.000	.023
Taken in-service training about ICT (TIT)	1	.451	.502	.000
Computer ownership (CO)	1	41.986**	.000	.034
G * ICTRC	3	.422	.737	.001
G * TIT	1	2.616	.106	.002
ICTRC * TIT	3	2.963*	.031	.007
G * ICTRC * TIT	3	.109	.955	.000
G * CO	1	.001	.981	.000
ICTRC * CO	3	.856	.463	.002
G * ICTRC * CO	3	1.006	.389	.003
TIT * CO	1	.062	.803	.000
G * TIT * CO	1	.015	.903	.000
ICTRC * TIT * CO	3	.978	.402	.002
G * ICTRC * TIT * CO	3	.535	.659	.001
S within-group error	1187			

* $p < .05$
** $p < .001$.

4.9.1. Gender

The ANOVA results (see Table 4.50) indicated that there was a significant effect of gender on perceived ICT competencies scores, F (1.1187) = 14.529, p=.000. 1.2% of the variance in perceived ICT competencies scores was accounted for by gender. Moreover, means and standard deviations for gender were reported in Table 4.51. Mean score of males were higher than that of females. It could be stated that males perceived themselves more competent technology users than females did. This is a consistent result with correlation analysis. During the correlation analysis, males were coded as 1 and females as 2. That is, while gender is increasing, perceived ICT competencies scores is decreasing (see Table 4.49). In consequence of this, negative

correlation between gender and perceived ICT competencies scores means that males feel more competent than females.

Table 4.51: Means and Standard Deviations of Participants in Accordance with Gender

Gender	N	Factor 1 (basic ICT competencies)		Factor 2 (advanced ICT competencies)		Overall Mean	
		M	SD	M	SD	M	SD
Male	875	3.34	1.06	3.06	1.09	3.18	1.04
Female	554	3.12	1.09	2.84	1.10	2.97	1.05

4.9.2. Taken ICT Related Courses

The ANOVA results (see Table 4.50) indicated that there was a significant effect of taken ICT related courses on perceived ICT competencies scores, F (3.1187) = 9.408, p=.000. 2.3% of the variance in perceived ICT competencies scores was accounted for by taken ICT related courses. Follow-up test (Post-Hoc) was performed to the main effect of four groups and the follow-up tests consisted of all pair wise comparisons. The result of these tests, as well as means and standard deviations taken ICT related courses groups were presented in Table 4.52. As indicated in the table, there were significant differences among groups. The K-12 teachers who had taken both courses and the K-12 teachers who had taken "Computer" courses perceived ICT competencies were higher than that of K-12 teachers who had not taken any ICT related courses. It could be interpreted that K-12 teachers who had taken "Computer" or both courses in his/her preservice teacher education study perceived themselves more competent ICT users than the K-12 teachers who had not taken "Computer" or both courses.

Table 4.52. Tukey HSD Test Results: Differences among Groups in accordance with of taken ICT related courses

Groups	N	M	SD	1	2	3	4
1. No Taken ICT Related Courses	508	2.90	1.08	–	*		*
2. Taken "Computer" Courses	301	3.19	1.02		–		*
3. Taken "ITMD" Courses	257	3.05	1.04			–	*
4. Taken both Courses	263	3.43	.94				

Note: (*) = significance using the Tukey HSD procedure.

4.9.3. Taken Inservice Training about ICT

The ANOVA results (see Table 4.53) indicated that there was not a significant effect of taken in-service training about ICT on perceived ICT competencies scores, F (1,1187) = 0,451, p=.502. However, means and standard deviations for taken in-service training about ICT were reported in Table 4.53. There is little difference among groups. So, it might be stated that there is not a significant difference between perceived ICT competencies of K-12 teachers who had participated and who had not participated in ICT in-service training.

Table 4.53: Means and Standard Deviations of Participants in Accordance with Taken Inservice Training about ICT

	N	Factor 1 (basic ICT competencies)		Factor 2 (advanced ICT competencies)		Overall Mean	
		M	SD	M	SD	M	SD
Have Inservice Training	477	3.33	1.04	3.07	1.06	3.19	1.01
Do Not Have	846	3.26	1.07	2.97	1.11	3.10	1.05

4.9.4. Computer Ownership

The ANOVA results (see Table 4.50) indicated that there was a significant effect of computer ownership on perceived ICT competencies scores, F (1.1187) = 41.986, p=.000. 3.4% of the variance in perceived ICT competencies scores was

accounted for by computer ownership. Furthermore, means and standard deviations for computer ownership were reported in Table 4.54. Mean scores of K-12 teachers who own computer were higher than the ones who do not. It could be stated that K-12 teachers who own computer perceived themselves more competent ICT users. This is a consistent result with correlation analysis.

Table 4.54: Means and Standard Deviations of Participants in Accordance with Computer Ownership

	N	Factor 1 (basic ICT competencies)		Factor 2 (advanced ICT competencies)		Overall Mean	
		M	SD	M	SD	M	SD
Have Own Computer	584	3.45	1.02	3.15	1.07	3.28	1.01
Do Not Have	556	2.96	1.08	2.70	1.08	2.82	1.04

4. 10. SUMMARY OF THE CHAPTER

In this chapter, the data collected from different groups of participants have been analyzed and the results obtained out of the analysis process have been provided. Results discussed above show that, most of the participants expressed positive perceptions about the integration of ICT into teacher education and K-12 schools. Generally, faculty members perceived themselves as competent overall, nevertheless, prospective and K-12 teachers did not perceive themselves as competent overall, and they were neutral on ICT competencies. The results indicated that faculty members and prospective teachers perceived ICT related courses beneficial and effective in ICT integration into education. On the other hand, K-12 teachers showed a degree of overall unsure (neutral) with their ICT related courses and felt well prepared for professional life.

Majority of participants believe “lack of in-service training about ICT”, “lack of appropriate software and materials for instruction”, and “lack of hardware” are significant barriers for integrating ICT into preservice teacher education programs. There was an agreement also between the participants on the possible enablers

ranking “technology plans for implementing ICT in STE and universities should be prepared” as the highest among the possible enablers. For the K-12 schools, their teachers believe that “lack of in-service training about ICT”, “lack of technical support”, “lack of hardware”, and “lack of basic knowledge-skills” are major barriers for integrating ICT into K-12 schools. “More budgets should be allocated to ICT, the in-service teacher training about ICT should be improved in quantity and quality, the prospective teacher training about ICT should be improved in quantity and quality” were proposed as highly respected possible enablers by the K-12 teachers for their schools.

It could be interpreted from the results of differences that, K-12 teachers who are males perceived more competent technology users than females. In addition, have taken “Computer” or both courses and have own computer affected perceived ICT competencies scores of K-12 teachers.

CHAPTER 5

CONCLUSIONS, DISCUSSION AND IMPLICATIONS

The purpose of this study was to investigate the current status of STE in Turkey in terms of how they prepare new teachers to use ICT in their professions and the current situation of K-12 schools in terms of how teachers employ ICT in their work. The primary focus was to develop a deeper understanding about the integration of ICT into teacher education and K-12 schools by presenting the current status in terms of ICT perceptions, ICT competencies, ICT usage in classrooms, effectiveness of ICT related courses, and major barriers / enablers to integrating ICT. This chapter begins with the major findings and discussions about the current status of ICT in STE as background information. It continues with the discussions of the major findings of this investigation related to the research questions and implications for practice and further research.

5.1. THE MAJOR FINDINGS AND DISCUSSION ABOUT BACKGROUND INFORMATION

By evaluating the responses of STE deans about the available ICT resources and methods of their usage, it is obvious that despite the differences among the schools (see Appendix J), the resources are not adequate, in general, corroborated by AÜ (2005). It also supported the notion that not only faculty members but also

prospective teachers do not have adequate access to ICT resources. There are only one or two laboratories in throughout the majority of STE. If it is considered that all the related courses are offered in these laboratories, this is not an adequate number at all. In addition, the laboratories are used during working hours for lessons, which means that students face the restriction of using laboratories after working hours. According to the number of computers allocated for students to use in laboratories, there are less than 41 computers in 27 STE, which fulfills less than an average class size. Furthermore, 46 students per computer is a dramatic fact that all schools of teacher education would encounter. According to the findings of the study, the quantity and variety of software are more inadequate than the hardware in the STE. Keeping open laboratories more than present period (e.g. between 13-16 hours a day) would answer many of the students' serious complaints about the limited time of using laboratories after working hours. Locating ICT in every physical environment (classes, canteen, and corridors) in order to integrate it into the instructional process entirely could be a more efficient strategy instead of placing ICT only in specific centers (laboratories) (AÜ, 2005; Cuban, Kirkpatrick & Peck, 2001). As Patrikas and Newton (1999) stated, it is crucial to allocate finite ICT funds cost effectively and to positively exploit those expenditures through careful targeting of identified needs. Thus, this strategy may help students improve their ICT competencies in a practical way.

According to Rogers (2005), the most important element of effectively integrating ICT into curriculum is formulating a comprehensive technology plan. This research indicated that deans of STE think, "Preparing technology plans for STE" is the best solution to overcome the significant barriers parallel to Rogers (2005). However, the results of this study indicated that a majority of the STE do not have technology plans. In order to create effective technology plans, new temporary units can be constructed to function as consultancy branches for universities and STE, that are under the roof of HEC. These units may also provide support and guidance for exchanging ideas and sharing knowledge and experiences between the STE and universities via Internet. Integration of ICT into STE effectively can be possible if future goals and strategies are set and implemented in a planned manner (Yiğit, Zayim & Yıldırım, 2002). As Maurer and Davidson (1998) stated, technology

without an effective and detailed plan is not a solution but a source of new problems as well. In order to create technology plans appropriate for the goals, ICT standards showing the minimum technological infrastructure for prospective teachers are required to be determined. Additionally, technology plans can be shaped in accordance with the ICT standards for prospective teachers. During this process, until these departments are responsible, experts from CEIT departments may be requested to help in terms of setting ICT related goals and strategies.

A majority of deans felt there was sufficient use of Internet for instructional purposes. In addition, they answered "yes" to whether they offer any online courses, which is one of the most important ways of supporting instructional stands on the Internet. The deans also felt there was sufficient "Internet access for academic staff" in terms of physical and human resources in schools. They were undecided on most of the other statements. "Limited number of people who does technical support" and "available software" are the statements that deans felt were the most insufficient as far as difficulties faced. Those points are stressed persistently in both scales. Necessary policies may be set with the other institutions (HEC, Ministry of Finance etc.) in order to fulfill the needs of human resources, like technicians in the field of IT (Yiğit, Zayim & Yıldırım, 2002).

The findings show no relationship between the perceived ICT competencies scores and ICT perception scores of prospective teachers and basic information of the STE related with ICT (number of prospective teachers, number of laboratories, number of laboratories open hours per day, number of computers, and number of prospective teachers per one computer) among groups (see Table 5.1). Probably, the difference among groups in terms of perceived ICT competencies scores and ICT perception scores might be affected by the other factors such as instructor, teaching methods, effective ICT integration into schools, and access to ICT at other places.

Table 5.1: Summary of the Findings in Regard to Current Status of ICT in STE

#	Universities and STE	Collected Data From Deans of STE					Collected Data From Prospective Teachers of STE				
		# of prospective teachers	# of laboratories	# of laboratories open hours per day	# of computers	# of prospective teachers per one computer	N	ICT Perceptions		ICT Competencies	
								M	SD	M	SD
1	METU - STE	2,128	6	5-8	131	16.2	52	4.44	.51	3.62	55
2	İstanbul Univ. – HAY STE	2,202	1	5-8	21	104.9	24	3.90	.44	3.39	.86
3	Pamukkale Univ. – STE	3,658	2	13-16	42	87.1	137	4.04	.55	3.27	.74
4	Abant İzzet Baysal Univ. – STE	4,870	3	5-8	75	64.9	111	4.11	.47	3.25	.74
5	Balıkesir Univ. – Necatibey STE	NR	NR	NR	NR	NR	103	4.09	.53	3.22	.67
6	Çanakkale 18 Mart Univ. – STE	4,315	4	13-16	100	43.2	40	4.04	.36	3.22	.80
7	Anadolu Univ. – STE	NR	NR	NR	NR	NR	59	4.26	.67	3.20	.87
8	Gazi Univ. – Gazi STE	11,500	8	13-16	245	46.9	42	4.00	.65	3.20	.78
9	Kırıkkale Univ. – STE	1,108	1	5-8	15	73.9	43	4.20	.55	3.15	.84
10	Ondokuz Mayıs Un. - Amasya STE	4,000	1	5-8	40	100.0	125	4.07	.60	3.14	.75
11	Cumhuriyet Univ. STE	2,473	5	9-12	160	15.5	69	4.22	.39	3.09	.95
12	Ondokuz Mayıs Univ. STE	6,209	3	9-12	60	103.5	47	3.98	.37	3.06	.80
13	Gaziantep Univ. – Adıyaman STE	1,050	1	5-8	30	35.0	56	3.97	.77	3.06	.85
14	Yüzüncü Yıl Univ. – STE	2,987	2	9-12	40	74.7	24	4.04	.49	3.01	.95
15	Atatürk Univ. – KK STE	10,470	7	13-16	218	48.0	164	3.93	.63	2.97	.78
16	Karadeniz Tech. Univ. – Fatih STE	NR	NR	NR	NR	NR	76	3.95	.49	2.94	.82
17	Gazi Univ. – Kastomonu STE	3,345	2	13-16	40	83.6	48	4.01	.71	2.92	.67
18	Çukurova Univ. STE	NR	NR	NR	NR	NR	30	4.00	.52	2.88	.65
19	Dokuz Eylul Univ. – Buca STE	NR	NR	NR	NR	NR	80	4.13	.42	2.83	.75

5.2. THE MAJOR FINDINGS AND DISCUSSION ABOUT RESEARCH QUESTIONS

Perceptions of the deans, faculty members, prospective teachers, and K-12 teachers about ICT integration into teacher education programs: Overall, the results indicated that most of the participants expressed positive perceptions about the integration of ICT into teacher education programs. This is crucially important for the process of integration. Ropp (1999, p. 403) clarified this importance as: *"If prospective or in-service teachers demonstrate proficiency integrating technology into their teaching but do not believe that technology has a use in the classroom, they will probably not teach with technology despite their proficiency"*. Thus, through analysis of interview results and open-ended responses, it is not incorrect to conclude that the participants were enthusiastic and aware of the opportunities about ICT integration into teacher education programs. According to the open-ended responses and the interview findings from all participants, the main reasons for positive perceptions revealed that ICT can:

(1) increase the quality of instruction,
(2) be very supportive and effective for instructors and students,
(3) support today's expectations,
(4) help people succeed in an information society,
(5) enhance instructors' performance in their instruction,
(6) increase the quality and ease the process of instructing,
(7) provide skills gaining importance for today's instructors,
(8) be an effective way to make learning better,
(9) be available anytime and anywhere,
(10) be used to prepare exam papers,
(11) keep records of students in a database,
(12) be used to search for information on the Internet.

Despite the fact that the participants overwhelmingly support the use of ICT in teaching and learning, a few participants reported negative perceptions on the issue. The main reasons expressed by those individuals for negative perceptions were basically that ICT can be:

(1) time killers,

(2) boring and useless for educational purposes if you are not effectively using it.

In addition to aforementioned positive perceptions of qualitative results, perceptions of prospective teachers from the questionnaire indicated they believe in the importance of ICT in the teaching/learning process. The questionnaire results indicated that a majority of the prospective teachers have positive perceptions in "belief of the positive effect of technology in education" as indicated by the "strongly agree" level. This might imply that ICT integration would provide a lot of advantages corroborated in the study by Tınmaz (2004).

The results found in this study indicate there are considerable similarities in the positive perceptions of participants about the integration of ICT into the teacher education program as studies found in the literature (Asan, 2002; Çiğdem, 2005; Çınar, 2002, Loveless, 2003; Tınmaz, 2004; Watson & Prestridge, 2001). On the other hand, the data were contradictory to the findings of Altun (2003). He found that prospective teachers were undecided (neutral level) about the integration of ICT. This difference can be attributed to participant characteristics. The participants in his study were selected from freshman, sophomore, and junior levels. It is believed that since the senior prospective teachers are taught more ICT related courses, they have more interaction and availability of ICT, which reveal more positive perceptions and attitudes toward ICT in this study.

Perceptions of the prospective teachers and K-12 teachers about ICT integration into K-12 schools: The findings provided some evidence that there are positive perceptions about the integration of ICT into K-12 schools. According to Sugar (2002), positive perceptions of teachers toward ICT integration into the classroom is the most important motivation. By changing teachers' perceptions toward the use of ICT in schools, they could potentially remove several barriers to effective ICT integration. From the findings of this study it might be implied that prospective and K-12 teachers believed ICT integration would provide a lot of advantages to K-12 schools. Open-ended responses and interview findings showed that prospective teachers and K-12 teachers have positive perceptions. These can be categorized under three major themes as: (1) the capabilities of ICT integration

into K-12 schools, (2) advantages of ICT for students, and (3) advantages of ICT for teachers.

The first issue the participants put forward was the capabilities of ICT integration into K-12 schools. They believed that ICT integration can increase the learning quality in the courses by improving learning effectiveness and efficiency. Most participants remarked that ICT can enrich the learning environment by supporting audio-visual features together, incorporating multiple senses into learning, and enhancing real-world experiences. In addition to these, they argued that ICT can make instruction more enjoyable and increase concentration for the content of the course. They also noted that ICT can provide people with access to a variety of ICT opportunities.

The second issue the participants mentioned was about the advantages of ICT for students. The most important advantage they pointed out was about helping students for individual development and to be digital citizens. They believed ICT can improve students' critical thinking skills, problem solving skills, and analysis-synthesis skills. They supported the idea that ICT helps students be active learners in a student-centered learning environment. The major reason behind this relies on the belief that ICT helps students concretize abstract concepts and enhance knowledge permanence.

The last issue the participants revealed was about the advantages of ICT for teachers. The initial concern that they mentioned was keeping up with the pace of today's world and improving individual development. They believed ICT can help teachers in this process by enhancing teaching skills. They also believed ICT can help teachers be highly motivated in their courses parallel to their students' increased motivation. During instruction, ICT can help teachers to have better time management skills. Since incorporating different learning materials into a classroom environment is a difficult process for teachers, ICT can enable them to reach more concrete learning materials.

The initial results are corroborated by Askar and Umay (2001), Brush et al. (2003), Çelik and Bindak (2005), Deniz (2005), Erkan (2004), Evans and Gunter (2004), SOEID (1998), and Williams et al. (1998). They stated summarily that K-12

teachers and prospective teachers have positive perceptions about ICT integration into K-12 schools. ICT is also seen as a motivator to learning in the K-12 schools.

Prospective teachers and K-12 teachers also have some negative perceptions. The main reasons for negative perceptions were that ICT:

(1) keeps students away from socialization,

(2) would hinder socialization, and result in individualization,

(3) transfers a lot of foreign terminology into Turkish.

The results for prospective and K-12 teachers are in line with Roblyer and Edwards (2000), Kraut, Patterson, Lundmark, Kiesler, Mukhopadhyay and Scherlis (1998), Nie and Erbring (2000). The authors stated respectively that computers, especially with the Internet, has led to decreased levels of socialization, increased levels of depression, and increased levels of isolation. They considered ICT harmful to the development of relationships and social skills of children. On the other hand, this study indicated contradictory results with Wellman, Quan-Haase, Witte, and Hampton (2001) and LaRose, Eastin, and Gregg's (2001) studies. The authors found dramatically different results such that computers, especially with the Internet, led to decreased levels of depression and isolation.

It can be concluded that ICT has different effects on different users in different cases. Therefore, in the integration process of ICT, related stakeholders (parents, K-12 teachers, prospective teachers, etc.) should be aware of those different effects and behave accordingly in different cases.

ICT competencies of the faculty members, prospective teachers, and K-12 teachers: The findings of the questionnaire show that the general ICT competency of the faculty members was "completely sufficient". However, prospective and K-12 teachers did not perceive themselves as competent overall, and they were neutral on ICT competencies.

When comparing each overall mean to the other, it was revealed that the faculty members have gained their mastery of ICT skills in a variety of ways. There were also large differences among the faculty members, prospective teachers, and K-12 teachers.

The results for prospective teachers are corroborated by Askar and Umay (2001), Iding, Crosby, and Speitel (2002), Tınmaz (2004), Toker (2004), Smith and Kubasko (2006), and Watson and Prestridge (2001). They point out that prospective teachers had around an average level of ICT competencies. This might imply prospective teachers were graduated with average or a less than average level of competency. There may be variety of reasons for this result. Initially, the quality and quantity of ICT related courses may be inadequate for prospective teachers, or the ICT related education programs may be inadequate in overall. Another reason can be stated as the lack of standards-criteria on regulations for teacher competencies on the issue, which in turn may reveal no need for prospective teachers to be competent in ICT. Other than these, the need for appropriate conditions for prospective teachers to be competent may not be met, like lack of adequate ICT resources (infrastructure) in STE, lack of ICT planning, and lack of good role models for prospective teachers to observe appropriate modeling throughout their undergraduate process.

Nevertheless, the findings of this study had differing results than Akkoyunlu and Orhan (2003) and Snider (2003), who both found that prospective teachers were proficient with ICT competencies. Probably, the difference of Akkoyunlu and Orhan (2003) results can be due to features of participant groups; they had collected data on prospective teachers of "Computer Education and Instructional Technology".

The results for faculty members are different from Turkmen (2006) and Odabasi (2000). The first showed *"the Turkish faculty members have low mean scores in current knowledge, indicating they may not be prepared with skills necessary to succeed in the 21st century"* (p. 9). The latter stated that the faculty members are not familiar with current technology resources. However, this study's results indicated that faculty members felt themselves as competent overall and that they are prepared. This most likely occurred due to differences among characteristics of participant groups. Turkmen and Odabasi had collected data from all faculty members, whereas this study used faculty members who were currently teaching "Computer" or "ITMD" courses.

In addition, a majority of prospective teachers said they felt "completely sufficient" or "sufficient" with receiving and sending e-mail. Iding, Crosby, and Speitel (2002), Nanasy (2001), Toker (2004), Tınmaz (2004), and Watson and

Prestridge (2001) also found that most prospective teachers felt competent using e-mail. Also, this study's scores about e-mail are higher than most of the above studies. This probably reflects the enormous growth and availability of the Internet over the past few years. In contrast, prospective teachers felt least competent in using LMSs.

On the other hand, a majority of the K-12 teachers said they felt "completely sufficient" or "sufficient" with the use of operating systems; much smaller proportions felt at least competent with the use of hypermedia and multimedia tools to support instruction. Second scale for K-12 teachers indicated they felt "completely sufficient" or "sufficient" with the use of word processors, similar to the faculty members; much smaller proportions felt at least competent with the use of LMSs like prospective teachers and authoring languages. Even though almost all participants perceived themselves as competent in the "use of word processors", in contrast, K-12 teachers and prospective teachers' overall levels were perceived as the lowest competency in "use of LMSs". The common lowest competency for both faculty members and K-12 teachers was "use of ICT in analysis process of a course".

The findings from interviews show that almost all interviewed participants considered themselves proficient in word processing and MS PowerPoint usage. In addition, most of the interviewed participants of prospective teachers and K-12 teachers wanted to develop their knowledge and skills in using MS Excel and the Internet. They wanted to use the Internet and MS Excel effectively in their courses and daily life. Another interesting finding was "use of hypermedia and multimedia tools to support instruction" had the lowest mean for the K-12 teachers' ICT competencies.

There is also considerable evidence for faculty members', and particularly K-12 teachers', concerns about the use of general application software and concerns about lack of specialized ICT skills. Although, the majority of them perceive themselves as more competent with "basic ICT competencies", which include general basic software usage, versus "advanced ICT competencies", which consist of generally mastered skills of ICT integration. Yildirim (2001) stated similar opinions in his study; they are still trained on "basic ICT applications", rather than "teaching with technology" or "advanced ICT applications".

The faculty members, prospective teachers, and K-12 teachers' perceptions of the effectiveness of ICT related courses in teacher education programs: Evidence indicated that the two groups, faculty members and prospective teachers, perceived ICT related courses beneficial and effective in ICT integration into education. K-12 teachers showed a degree of overall unsure (neutral) with their ICT related courses in terms of feeling well prepared for professional life. However, a majority of K-12 teachers, with a starting year to the STE as 1998 or later, indicated agreement with the statement, "ICT related courses are effective in providing prospective teachers with the necessary knowledge and skills in ICT". Thus, the present research results parallel the literature (Tınmaz, 2004) and lend support to HEC's (1998) reform in terms of reconstructed curriculum to train prospective teachers with abilities and skills to use ICT effectively in their subject areas. On the other hand, according to Evans and Gunter (2004), prospective teachers did not feel or were uncertain as to whether or not their ICT preparation was "sufficient" to equip them with the skills they need to integrate ICT into their future classroom.

The majority of the faculty members strongly agreed with the statement, "ICT related courses are effective in providing prospective teachers with the necessary knowledge and skills in ICT"; more than the prospective teachers and K-12 teachers. The results of the study also indicated a majority of the prospective teachers and K-12 teachers perceived the "ITMD" course to be more effective than the "Computer" course. On the contrary, faculty members believed the "Computer" course was more effective than the "ITMD" course to meet the required needs of prospective teachers in ICT training.

Even though they feel that ICT related courses are beneficial and effective, their perceived ICT competencies are not high enough. This shows that these courses may not be enough in regard to quantity and quality. All participants recommended that ICT related courses need to be revised to be more efficient and effective. For the "Computer" course, the faculty members believed it could enhance their effectiveness and efficiency, if the course offered a computer laboratory based on applications and course content redesigned based on today's needs. They supported the questionnaire results with open-ended responses and interviews results

such as: *"all of the examples and applications in the course should be related to future professional life of the prospective teachers and related to their subjects*" and "*Computer course should be given in the first year"* in order for prospective teachers to use ICT beginning in their first undergraduate courses. On the other hand, prospective teachers agreed with the faculty members that theoretical parts of the course were unnecessary. In addition the faculty members, prospective teachers, and K-12 teachers believed the "Computer" course exam could be conducted based via the computer rather than paper and pencil-based.

For the "ITMD" course, faculty members also thought it could improve their effectiveness and efficiency, if the course were implemented in the method courses and more electronic classrooms and computer laboratories could have been allocated to the course. In response to questionnaire results, they believed the "ITMD" course can be offered in the second year, after the "Computer" course. Also, course content of this course can include some problem and project-based learning activities in order to teach how prospective teachers integrate ICT into their fields during an ill-structured process (Ertmer, 2003; SITE, 2002). They supposed the majority of class activities, assignments, and projects provided more computers and other technological devices rather than posters and 3-D models. K-12 teachers agreed with faculty member recommendation in terms of exploring ill-structured problems and including more assignments and projects related to ICT. Some of the faculty members and K-12 teachers had strong arguments about both courses, felt instructors were knowledgeable about instructional technology, and that instructors should be chosen from the field of instructional technology. Toker (2004) stated similar opinions in his study; schools of education should choose teaching staff for technology courses from the field of instructional technology.

The use of ICT: "To what extent faculty members and K-12 teachers use ICT in their courses": It can be concluded from results that although a limited number of faculty members offer online courses, the majority of them use the Internet as a support tool and as a communication tool (e-mail) for their courses. More than half of the faculty members have used web pages to support their courses. Most of the time faculty members use both computer laboratories and electronic classrooms in their courses. While the faculty members use a

computer and LCD projector most of the time as hardware, they use word processing and presentation software more than other software. The results of SEIRTEC (1998) support the list of software; their report indicated that the highest use made of software by faculty is word processing.

Even though the results of this study cannot be generalized, these results are promising; indicating to some extent faculty members are integrating ICT into their courses. Use of forum and chat was ranked as the least used Internet tools by the faculty members. In the schools of education, most of the courses are offered in face-to-face instructional environments, and both students and the instructor have opportunities for face-to-face discourse. They might not be in need of online communication tools.

The results show that at least one-fourth of the K-12 teachers used computer laboratories and integrated ICT into their courses. The remaining teachers either do not integrate ICT into their courses or they lack of sufficient ICT facilities. The findings of the study are parallel to the literature (Scottish Executive, 2002; Schiller, 2003; SEIRTEC, 1998; SEIRTEC, 1999; USDE, 2000); the majority use computer and computer related hardware, as well as word processing, Web browsing, and communication software. On the other hand, the findings of the study had different results than Williams et al. (1998), who found the use of Internet and e-mail to be very low. This can be explained by the difference in data collection date, which had certain impacts in light of the increased availability of ICT in schools and homes.

The majority uses the Internet to support their courses, and they use some Web sites, search engines, and e-mail for this purpose. This might imply that the high degree of using Web sites, search engines, and e-mail is not surprising as these are being used by most sectors of society, corroborated by Schiller (2003). According to a survey, the majority of teachers in more than 50% of public K-12 schools in the USA used the Internet for instructional purposes, which are similar to the results of this study (Lai, 2002).

Even though one needs to be cautious in generalizing these results, it is interesting that while teachers rated the Learning Management System (LMS) as the

least used application, 22% of the teachers use Web pages to support their lessons. This result can be promising for diffusion of ICT into education. It can be argued that with appropriate infrastructure, guidance, leadership, and commitment, they may both increase their level of ICT competencies and may integrate ICT into education. According to Cuban (2001), technological devices and programs can be useful when teachers sufficiently understand the technology themselves, and believe it will enhance learning. This result may indicate that the teachers did not have access to LMSs which relate to them not understanding how or believing LMSs to be integrated into their courses. If such a system is provided by Ministry of Education, they may use and integrate it into their courses. The results showed almost ¼ of teachers were using Web pages to support their courses. Rather than expecting all activities related with ICT integration to come from the teachers, MoNE may form an online support system that includes a variety of instructional/learning activities and materials. Teachers may download these activities, modify, and use them in their courses. They may also upload their own activities for other teachers' use. MoNE started such a project, but the richness of the resources is not enough. Another act that needs to be performed by MoNE is that all schools should be provided with appropriate facilities so that ICT related resources can be accessed by the teachers.

The barriers and enablers for integrating ICT into preservice teacher education: This study identified that a majority of all stakeholders believe "lack of in-service training about ICT", "lack of appropriate software and materials for instruction", and "lack of hardware" are significant barriers for integrating ICT into preservice teacher education programs. There was also agreement among the stakeholders on the possible enablers ranking "technology plans for implementing ICT in STE and universities should be prepared" as the highest among the possible enablers.

These barriers are consistent with findings from Baron and Goldman (1994), Ertmer (1999), Ertmer, Addison, Lane, Ross, and Woods, (1999), Ertmer, Ottenbreit-Leftwich, and York (2005), Glazewski, Brush, Ku, and Igoe (2001), SchoolNetAfrica (2004), and Topp, Mortensen, and Grandgenett (1995) have made. According to Baron and Goldman (1994) and Topp, Mortensen, and Grandgenett (1995) barriers for integrating ICT into preservice teacher education are: (1) limited

availability of equipment; (2) lack of faculty training; (3) no clear expectation that faculty will incorporate technology in academic activities; (4) lack of funds; (5) lack of time to develop facility in using equipment and software; (6) doubt about the pedagogical validity; (7) lack of technical support; (8) lack of appropriate materials; and (9) absence of clear programmatic goals for the teacher education program as a whole.

Similar to the above barriers from literature and this study, the report of SchoolNetAfrica (2004) identified the following barriers: (1) lack of ICT experience and skills among teacher educators; (2) lack of access to ICT in STE; (3) lack of access to ICT training content; and (4) lack of access to good quality research (including content examples) from institutions that are already integrating ICT into preservice training.

In a similar study, Glazewski, Brush, Ku, and Igoe (2001) also studied barriers. While findings of that study stated similar barriers; they proposed *"prospective teachers did not perceive potential problems such as preparation time and implementation as major barriers to effective integration"*, but "*lack of or limited access to computers in schools",* "*not enough software available in schools*", and "*lack of knowledge about technology*". On the other hand, "*faculty indicated that lack of preparation time and implementation time were major reasons why technology was not being effectively integrated in many instructional settings*" (p. 4).

This study also indicated contradictory results to the literature (OTA, 1995; USDE, 2000) in that: "inappropriate course content and instructional programs", "lack of time for integrating ICT in classroom-lessons", and "inadequate support from upper positions" were below the mean, and the majority of deans, faculty members, and prospective teachers identified these statements as not representing barriers.

In addition to the aforementioned barriers, open-ended responses and interview findings showed: "need for a good role model for prospective teachers, lack of technology plans, lack of successful models for STE, crowded classrooms, negative attitudes and lack of motivation of faculty members, and inadequate number

of technology integration courses" are important barriers, which were not identified in the questionnaire.

The literature parallels the study's results; in addition to ICT related courses, good role models were recommended for prospective teachers to observe appropriate modeling throughout their undergraduate process (Huang, 1994; Kariuki, Franklin, & Duran, 2001; Novak and Berger, 1991; O'Bannon, Matthew, & Thomas 1998; SITE, 2002; Strudler, 1991; Yildirim, 1999; Yildirim, 2000).

In addition to what literature said about the barriers in other countries, Turkey faces more challenges which reveals as educational barriers in regard to ICT integration process. These challenges can be listed as huge numbers of people to educate, great land area, a very large educational system, poor economic situation, inadequate ICT infrastructures, inadequate cooperation among related institutions, and mass numbers of students and teachers (Göktas, 2003). These challenges may hinder the integration of ICT into education.

There was general agreement between the deans and faculty members' questionnaire results on possible enablers for these barriers to integrate ICT into preservice teacher education programs. There was also agreement among the two stakeholders on the possible enablers, ranking "technology plans for implementing ICT in STE and universities should be prepared" as the most strongly agreed possible enablers for both. On the other hand, prospective teachers' enablers generally were similar to what faculty members stated.

Research studies indicate that the implementation levels of technology into teaching and learning remain low (Cuban, 2001; Cuban, Kirkpatrick, & Peck, 2001; Ertmer, 1999). Previous literatures (Anderson, Varnhagen, & Campbell, 1998; Boe, 1989; Caverly, Peterson, & Mandeville, 1997; Cuban, Kirkpatrick, & Peck, 2001; Vaughan, 2002, Schoep, 2004), as well as the results of this study, demonstrate that providing access to ICT is not enough; faculty members or teachers need leadership and require training in methods for integrating ICT into their classroom. The first possible enabler is to develop a technology integration plan for the STE.

According to Willis (2001), "enablers" are local, not universal; however, the findings of this study for possible enablers are also similar to the literature. Becker

(1994), Ertmer (1999), Ertmer, Addison, Lane, Ross, and Woods (1999), Ertmer, Ottenbreit-Leftwich, and York (2005), Glazewski, Brush, Ku, and Igoe (2001), Fabry and Higgs (1997), Hadley and Sheingold (1993), OTA (1995), Scrimshaw (2004), Topp, Mortensen, and Grandgenett (1995), Japonite (2001), Pricewaterhousecoopers (2001), Ronnkvist, Dexter, and Anderson (2000), Willis (1993), UNESCO (2002). Scrimshaw (2004) stated two factors for possible enablers of ICT usage and ICT integration into education. One of them is individual factors such as the availability of high quality resources, high level of technical support, full access to software and hardware at all times, and availability of good quality training. The second is school-level enabling factors which include a staff program of ICT training, effective timetabling of rooms and equipment, access to resources, on-site technical support, and whole-school policies on using ICT across the curriculum.

The following items might also be enablers to help overcome the significant barriers in the literature: provide adequate equipment and resources (Becker, 1994; Fabry & Higgs, 1997; Hadley & Sheingold, 1993; OTA, 1995; Topp, Mortensen, & Grandgenett, 1995); allocate specific units or personnel for peer support and to help reduce the teacher workload (Becker, 1994; Japonite, 2001; OTA, 1995; Pricewaterhousecoopers, 2001; Ronnkvist, Dexter, & Anderson, 2000; Sandholtz, 2004); staff development (Odabasi, 2000; OTA, 1995; Willis, 1993); and preparation of technology plans for implementing ICT in STE and universities (UNESCO, 2002).

The barriers and enablers for integrating ICT into K-12 schools: For K-12 schools, the present research results indicated that a majority of K-12 teachers agreed with all statements as barriers except “lack of time for integrating ICT in classroom”. They believed that “lack of in-service training about ICT”, “lack of technical support”, “lack of hardware”, and “lack of basic knowledge-skills” are major barriers for integrating ICT into K-12 schools. The barriers from this study are corroborated by the Çağıltay, Çakıroğlu, Çağıltay, and Çakıroğlu (2001) study which stated similar barriers about Turkish teachers' views of using computers in education. As with the current study, Akkoyunlu and Orhan (2001), Saglik and Ozturk (2001), Scottish Executive (2002), Turkmen (2006), and Usun

(2003), stated that the most common reasons given for the low level of computer use in schools are limited access to equipment and lack of training.

These barriers were supported by K-12 teachers' responses to the open-ended questions and interview. As well as the barriers mentioned above, K-12 teachers also described the following as barriers: (1) lack of an environment (portal) which can be utilized as a communication platform for teachers as well as IT specialists, (2) lack of technology plans for implementing ICT in schools, (3) absence of standards that focus on defining the skills and attitudes of teachers for applying ICT in their classrooms, (4) crowded classrooms, (5) overloaded curriculum, and (6) low quality of preservice and in-service education.

K-12 teachers need to know what is expected of them with regards to technology standards. According to Schoep (2004), as well as the results of this study, both curriculum integration and technology standards are essential components of a successful ICT integration. This was supported by teachers' responses to the open-ended survey question in which they described another important barrier as being their strong perception of the low quality of in-service training about ICT integration, parallel to the Gürsoy and Alyaz (2002) and Fullerton (1998) studies. Therefore, adequate in-service training is needed if ICT is to help schools improve learning.

The majority of the K-12 teachers strongly agreed with all statements as a solution to the barriers except "the course load of the teachers should be decreased". In order for the K-12 teachers to use ICT effectively in their classrooms, the following statements were proposed as highly respected possible enablers: "more budgets should be allocated to ICT, the in-service teacher training about ICT should be improved in quantity and quality, and the prospective teacher training about ICT should be improved in quantity and quality".

Similar to the study by Cuban, Kirkpatrick, and Peck (2001) and SITE's (2002) recommendations, distribution of computers should not only be in laboratories or media centers but also every classroom should have at least one computer with Internet access, LCD projector, and sound system. This study is also

similar to the study by Cuban, Kirkpatrick, and Peck (2001) in terms of the findings that technical staff should be available to maintain computers and easy accessibility to high speed Internet access. In addition to questionnaire and interview results, the following enablers from interviews were also offered:

(1) some competition can be organized to reveal successful examples of integration of ICT between the teachers;

(2) course books can be redesigned to acquire increased benefits from ICT;

(3) the time for "Computer" courses might be increased and these courses should be held in computer laboratories rather than traditional classrooms;

(4) the usage of ICT might be encouraged through incentive payments to the ICT capable teachers;

(5) school administrators can be (convinced) informed about the usefulness of ICT.

In their study, Ertmer, Ottenbreit-Leftwich, and York (2005), concluded that K-12 teachers preferred to participate in workshops/seminars for professional growth opportunities. The results of this study are parallel to their conclusion that K-12 teachers want short-term service training opportunities like workshops or seminars. The idea was also suggested to prospective teachers and faculty members by Bashman, Palla, and Pianfetti (2005) and Collier, Weinburgh and Rivera (2004). They believed that some key strategies regarding ICT integration with specific teaching activities can be learned using short term in-service training, workshops, and seminars. These strategies can be used instead of a single technology course, and could save time.

Difference between K-12 teachers' perceived ICT competencies in regard to gender, computer ownership, ICT related courses taken, and in-service training taken about ICT:

Gender: The ANOVA results indicated there was a significant effect of gender on perceived ICT competencies scores. Mean score of males were higher than that of females. It could be stated that males perceived themselves more competent ICT users than females did. There are both consistent (Lynch, 2001; Toker, 2004; Torkzadeh, Pflughoeft & Hall, 1999; Watson, 1997) and inconsistent (Chao, 2001;

Hornung, 2002; Haderlie, 2001; Nanasy, 2001; Snider, 2003) results in the literature concerning gender and ICT.

This result can be due to the social roles of males and females in the society. While males were expected to perform more on technical tasks, females were expected to perform more on domestic tasks. Another reason can be due to the limited economic conditions. People who do not own computer use public environments such as Internet cafes to access to ICT. Cultural features of Turkish society enhance males to make use of these environments more than females do as indicated by Yalcinalp and Yildirim (2006). Thus, cultural structure may be one of the reasons for the difference (Odabasi, 2003; Toker, 2004).

Taken ICT Related Courses: The ANOVA results indicated there was a significant effect of taken ICT related courses on perceived ICT competencies scores. According to the results of follow-up tests, there were significant differences among groups. Taken both courses and taken "Computer" course group's perceived ICT competencies were higher than other groups. It could be interpreted that K-12 teachers who had taken "Computer" or both courses in his/her undergraduate years are more competent ICT users than the K-12 teachers who had not taken "Computer" or both courses.

This can be regarded as an expected result, since one of the major aims of these courses is already to improve the level of ICT competencies of prospective teachers. In his study, Altun (2003) found a parallel result, which revealed there was a significant difference between those who have taken a "Computer" course and those who have not. These courses have been compulsory in teacher education curriculum since 1998. Parallel to this regulation, there has been an increase in access to ICT in the society and an enormous growth and availability of the Internet. Together with the ICT courses, access to and availability to of ICT in schools and homes might also cause this result.

Taken In-service Training about ICT: The ANOVA results indicated there was not a significant effect of taken in-service training about ICT on perceived ICT competencies scores. Means scores were almost the same. So, it might be stated that there is not a significant difference between perceived ICT competencies of K-12

teachers who had participated and who had not participated in ICT in-service training. These in-service training activities have been organized generally at local level and teachers have been trained in the use of ICT. It is clear that in-service trainings of K-12 teachers about ICT have some limitations, as K-12 teachers did not deem them as effective. It may be argued that, in-service trainings need to be revised to be more efficient and effective. When planning in-service teacher training about ICT, personal, reinforcing and enabling factors must be taken into consideration. For instance, training programs can be designed according to the K-12 teachers' subject area needs and based on "teaching with ICT" rather than "basic ICT applications" for short terms and as workshops, or seminars. In-service trainings may be concentrated on the pedagogical use rather than the technical skills or background knowledge of ICT. According to McCarney (2004), in-service trainings based on technical skills or background knowledge of ICT were unsatisfactory in terms of impact on teachers' use of ICT in the classroom. It is important that the pedagogy of ICT becomes the main focus of in-service trainings, and this have to be built upon in a constructive manner in order to allow teachers to accomplish more benefits from ICT in the classrooms (McCarney, 2004; Wu, Chen, Lee, Ho, & Chiou, 2004).

Computer Ownership: The ANOVA results indicated there was a significant effect of computer ownership on perceived ICT competencies scores. Mean scores of K-12 teachers who have their own computer were higher than the others. It could be stated that K-12 teachers who have their own computer perceived themselves more competent ICT users than the K-12 teachers who do not have their own computer. In the literature, there are consistent results concerning computer ownership and perceived ICT competencies such as Novick (2003), Toker (2004), Chao (2001), and Askar and Umay (2001), Çınar (2002).

It is believed that owning a computer increases the practical use of ICT, so it allows the owner to gain more experiences. Therefore it is not surprising that it has positive effects on perceived ICT competencies scores. It clears from the results that computers should be made available and accessible for teachers to use at schools. With in this mind, in the last years, MoNE started a campaign for purchasing PC or notebook for a low-cost for K-12 teachers. However, more studies should be done in order to reveal results of this campaign.

5.3. IMPLICATIONS AND SUGGESTIONS FOR PRACTICE

Based on the findings and discussions, the following recommendations are offered for practitioners in Turkey.

Suggestions for HEC:

For effective ICT integration into preservice teacher education programs, national policies, strategies, plans, and ICT standards might be developed or adopted. Existing policies, strategies, plans, and standards with respect to this issue need to be updated, developed, and spread to all stakeholders. Since HEC is responsible for the planning, coordination, and supervision of higher education, it can enhance policies for all stakeholders (prospective teachers, faculty members etc.) in STE. The sets of policies and standards which are mentioned in the following paragraphs can provide STE with the foundation on which the integration of ICT in their programs can be built.

ICT related courses for prospective teachers might be redesigned to help them gain competency of "teaching with ICT" or "advanced ICT competencies". They also need more oppurtunities to integrate ICT into their subject-matter, so these courses, particularly ITMD courses, might be redesigned in accordance with the prospective teachers' subject-matter area needs.

"Computer" courses might be provided to prospective teachers in their first year. "ITMD" courses might be given in the second year after the "Computer" course. In addition to these courses, a third ICT related course which includes integration of ICT into the field of studies (i.e. math, language, and chemistry) may be offered. Thus, the prospective teachers can use ICT throughout their undergraduate years. As a result of this, at the time of becoming a teacher, the prospective teachers can integrate ICT into their job more easily.

Preservice teacher education programs should provide ICT training for prospective teachers that satisfy their specific needs in the schools at which they work. Therefore, cooperation between HEC and MoNE is needed in designing ICT training curriculum to meet teachers' specific technology needs.

A majority of STE do not have a written technology plan. To support STE in their planning process, temporary units can be constructed which can function as consultancy branches that are under the roof of HEC.

As for ICT issues, necessary policies can be constructed by cooperating with other institutions in order to supply the need for human resources such as technicians. They can provide just-in-time training and arrange peer collaboration. Peer support and technical support might be chosen as in-service training methods.

With the aim of increasing software, centered adjudication conducted by HEC can be useful in providing software. Pioneered by HEC or universities that are completely ready for this issue, portals which functions as reusable learning objects can be formed. Projects or objects can be developed and uploaded to enhance a discussion environment. For this process, graduate CEIT students may provide necessary support as they can work as professional instructional technologists. K-12 teachers can be participants of these portals, too. This can enhance the cooperation between all those institutions on behalf of successful ICT integration.

The above mentioned cooperation may also be supported by promoting best examples/experiences of STE, faculty members, and prospective teachers, and publishing them. In addition to the portal, these examples/experiences may be published in written documents such as brochures or books.

Suggestions for Universities and Schools of Teacher Education:

ICT resources and infrastructures in STE are limited. They are to be enriched via required strategies so that future teachers will be well-prepared for an information society. They should invest in larger budgets for purchasing new, updating, and upgrading hardware and software. Specifically, it is the task of the government. Therefore, the government should provide schools of education with larger technology budgets.

Rather than limiting ICT within some centers (laboratories) and within some courses (ICT related courses), they can be spread to the whole physical environment of STE such as canteens, corridors, and particularly classrooms and whole courses from introductory courses to student school experience courses. This can enable more authentic environment and involve students in more practice. Moreover,

laboratories can be kept open for the use of students not only during lesson hours but also after the lessons by employing student assistants with the aim of making use of the existent resources.

The process of integrating ICT in education requires not only physical but also human resources. If an academic staff wants to integrate ICT into his/her instruction, s/he must spend extra time and resources. However, this extra effort is currently not encouraged or rewarded. As Picciano (2001) pointed out, faculty members may be supported and encouraged in the form of rewards, equipment, and a decrease in the workload. In the short term, decreasing the workload of the faculty members may not be possible when their insufficient numbers are considered.

When physical constraints are diminished, ICT related courses may be offered in computer laboratories rather than in traditional classrooms and they may be based on applications rather than theoretical information. Faculty members of these courses also may be chosen from departments of CEIT.

STE can organize appropriate in-service trainings for more successful ICT integration in their courses. About the ICT integration into STE, deans noted that "lack of in-service training about ICT within STE" is the most vital problem. Instructional Technology Centers (ITC) may be founded in universities to lead the departments to use ICT tools effectively and integrate them into an educational environment, and to offer in-service trainings. Moreover, Instructional Technology Sources Centers (ITSC) may be founded to organize and decide which information technology resources will be purchased and how available resources could be used in the most effective and efficient way. These centers may be also allocated for peer support to the faculty members and public use of existing ICT resources.

Integrating ICT into STE effectively can be possible if future goals and strategies are set and implemented in a planned manner. The lack of technology plans in STE was mentioned in the previous section. In this sense, every STE can prepare a technology plan and they can employ a technology support task force for both technical and instructional purposes.

In order to encourage a widened use of the Internet, so-called "blackboard of the future" in 90s, appropriate LMSs or web sites are needed to support all courses.

For this reason, universities or STE may provide LMSs and web sites. In addition to this, prospective teachers may be provided with project-based and collaborative works, and share their products via the Internet with other STE students.

Suggestions for Faculty Members:

It is important that faculty members of STE be sustainable role models for prospective teachers by using ICT. They can demonstrate their competency and willingness to use ICT in teaching. They might be role models for prospective teachers in integrating ICT into classroom. Other than basic ICT applications (MS Office), they need to be aware of other appropriate software (i.e. tutorials, simulations, web applications, etc.) and use them to enrich their courses in an ICT integration process.

Faculty members might be aware that ICT related courses may be more beneficial when they are practice oriented and students can link what they have learned in these courses with real classroom settings. Therefore, faculty members can design their courses based on how prospective teachers can use the knowledge and skills they gained in these courses within their subjects and future classes. They can also support students' active participation in a learner-centered learning environment in their lectures. Problem or project-based learning methods, performance tests, and homework project-based assessments methods might be used in order to teach how prospective teachers integrate ICT into their fields.

All of the examples and applications in the ICT related courses are to be related to the future professional life of the prospective teachers and their subject. In these courses, cooperation with the K-12 schools may be supported. What students produce in those courses can be linked to K-12 schools, and the prospective teachers can have the chance of linking theoretical knowledge with practice in authentic environments. This process may be supported in the school experience and teaching practice courses. These courses might also emphasize the classroom management of learning, and using ICT and provide subject-specific guidance for prospective teachers.

Prospective teachers should be encouraged to join and plan activities in students clubs, competitions, projects, etc. in which they may use their knowledge

and skills gained in ICT related courses, and be aware of the necessary skills and knowledge to perform his/her profession in information society.

Suggestions for MoNE and K-12 Schools:

For successful ICT integration into K-12 schools, Turkey should develop or adopt its own national policies, technology plans, and ICT standards for all stakeholders in K-12 schools. Existing policies, plans, and standards with respect to this issue need to be updated, developed, and spread.

It is essential that ICT resources (hardware, software, and fast Internet access) are provided in every school. It can be argued that without adequate software the other resources are of little use. Therefore, the multimedia and Web-based content for instructional use in national language is needed crucially in K-12 schools. It may require government pump-priming to stimulate market activity and it is sensible to encourage commercial developers. In this context, it can be suggested that at least one computer with Internet access and LCD projector be provided in every classroom.

In addition to the supply of resources, K-12 schools and teachers need technical support to use them. For this purpose, some new divisions (instructional technology centers, school technical support centers, etc.) may be organized to provide the necessary technical support for teachers.

The availability of ICT resources in schools does not mean that ICT will be integrated effectively into education. However, before making ICT investments, K-12 teachers might be trained on ICT integration into their classrooms. In Turkey, in-service trainings about ICT integration into K-12 schools have some limitations, as K-12 teachers did not deem them as effective. Necessary in-service trainings might be provided after serial revisions. Professional development can be provided using other methods such as short term in-service training, workshops, or seminars. These trainings can be designed according to the K-12 teachers' subject area needs and based on "teaching with ICT" rather than "basic ICT applications".

It may be suggested that necessary conditions be provided for teachers to own a personal computer; rather than training by "master teachers" and "innovators and

early adapters" be encouraged/promoted to help other teachers in ICT usage. The researchers believed that encouraging and supporting K-12 teachers to purchase and use their own computer will increase overall classroom use and their ICT competencies.

The time period (one hour a week) of "Computer" courses may be increased so that K-12 students could be able to interact with ICT environments more and increase their ICT competencies level. With ICT competent students, other subject area teachers can integrate ICT into their courses more easily. Furthermore, these courses may be held in computer laboratories rather than traditional classroom environments.

Some competitions and exhibitions among K-12 and prospective teachers can be organized about effective ICT integration. MoNE may promote related activities for this purpose.

Other than basic ICT applications (MS Office), K-12 teachers need to be aware of other appropriate software (i.e. tutorials, simulations, web applications, etc.) and use them to enrich their courses in an ICT integration process.

5.4. IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

The present research results lend support to the reform in 1998 by the HEC in terms of reconstructed curriculum to train prospective teachers with abilities and skills to use ICT effectively in their subject areas. However, more studies should be done in order to make ICT related courses more effective and efficient in preservice teacher education programs.

This study aimed to shed light on the situation, hopefully provide an impetus for future research on the current status of schools of teacher education in Turkey in terms of how they prepare future teachers to use ICT in their professions, and the current situation of K-12 schools in terms of how teachers employ. In addition to the implications and suggestions made for practice, the following are offered for further research.

In this study, convenience with representative methodologies was used for prospective teachers, faculty members, and K-12 teachers. Thus, it can be stated

that the results of the study were limited as to participants. Regarding this issue, new studies can be replicated using random sampling methodologies.

In future studies, more qualitative research methods such as observation and document analysis might be used to investigate the status of ICT integration into STE and K-12 schools in-depth.

Other studies might be conducted to investigate the most effective models for how STE and K-12 schools integrate ICT into classroom practice.

With respect to this current study, similar research studies can be conducted to compare science teachers' and social studies teachers' perceptions about use of ICT in their classroom practices. Also, the integration of ICT into educational systems can be investigated in terms of their pedagogical philosophies and comparison studies can be conducted in this regard.

K-12 students' perceptions about their teachers' use of ICT in classroom can be investigated in order to reveal data about current picture of ICT integration in K-12 schools indepth. For this context, additional data can be collected from administrators of K-12 schools to investigate organizational and administrative aspects of ICT.

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APPENDIX A

THE QUESTIONNARIE FOR DEANS OF STE

BİLİŞİM TEKNOLOJİLERİ VE HİZMET ÖNCESİ ÖĞRETMEN EĞİTİMİ EĞİTİM FAKÜLTESİ DEKANLARI ANKET FORMU

Sayın Dekanım,

Bu anket, bilişim teknolojilerinin hizmet öncesi öğretmen eğitimiyle bütünleştirilmesi sürecini incelemek ve bu süreçle ilgili durumu saptamak amacıyla hazırlanmıştır. Vereceğiniz bilgiler sadece araştırma amaçlı kullanılacaktır. Bu çalışma sonucunda oluşturulacak belgelerde isminiz doğrudan veya dolaylı olarak kullanılmayacaktır. Araştırma tamamlandıktan sonra eğer isterseniz fakültenizle ilgili bulgu ve önerilerimizi sizlerle paylaşmaktan mutluluk duyacağız.

Anketi doldurduktan sonra aşağıdaki faks numarasına ya da üzerinde dönüş adresi yazılı pullu zarfa koyarak göndermeniz yeterli olacaktır. Araştırmamıza zaman ayırmanızdan ve katkıda bulunmanızdan dolayı şimdiden teşekkür ederiz.

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Yrd. Doç. Dr. Zahide Yıldırım
Doç. Dr. Soner Yıldırım

Ek: 1 adet anket ve pullu zarf

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1. Kişisel ve Kurumsal Bilgileriniz:

a. E.posta adresiniz:.....b.Tel:……..…….....…

c. Üniversiteniz:……d.İl:……..……..…….....

e. Bu fakültede kaç yıldır çalışıyorsunuz? ☐ 1-4 ☐ 5-8 ☐ 9-12 ☐ 13-16 ☐ 17-X

f. Fakültenizdeki bölüm sayısı:.....g.Öğrenci sayısı (lisans):…….……

2. Fakültenizin Bilişim Teknolojileri Kaynakları:

a. Fakültenizde öğrencilerin kullanımına sunulmuş bilgisayar laboratuvarı var mı? ☐ Evet ☐ Hayır

b. Bir önceki soruya cevabınız "evet" ise; a) Laboratuvar sayısı:…….……b) Bilgisayar sayısı:…....

c. Bu laboratuvarlar günde yaklaşık kaç saat açık bulunduruluyor?

☐ 1-4 ☐ 5-8 ☐ 9-12 ☐ 13-16 ☐ 17-24

d. Bu laboratuvarlar öğrencilerin ders dışı zamanlarındaki (mesai saatleri içinde ve dışında) kullanımları için açık bulunduruluyor mu? (a.mesai saatleri içinde) ☐ Evet ☐ Hayır

(b.mesai saatleri dışında) ☐ Evet ☐ Hayır

e. Bu bilgisayarların hepsinde İnternet bağlantısı var mı? ☐ Evet ☐ Kısmen ☐ Hayır

f. Fakültenizdeki toplam;

Öğretim Elemanı (Prof., Doç., Yrd. Doç., Ögr. Gör., Okutman, Aras. Gör., Uzman) Sayısı:.....

Onlara tahsis edilmiş olan bilgisayar sayısı:.....ve bunlardan İnternet bağlantısı olanların sayısı:.....

g. Akademik personelinize bilişim teknolojileri konusunda hizmet içi eğitim veriliyor mu?

☐ Evet ☐ Hayır

h. Üniversitenizin tümünü kapsayan bir teknoloji planı var mı? (Üniversitenizin eğitim ve öğretim gereksinimlerine dair önümüzdeki 3-5 yıl için öngörülen teknolojik yatırım raporu)

☐ Evet ☐ Hayır ☐ Çalışmalar var

i. Fakültenizin bir teknoloji planı var mı? ☐ Evet ☐ Hayır ☐ Çalışmalar var

j. Üniversitenizde bilişim teknolojilerini öğretim süreçleriyle bütünleştirmeye çalışan birim/ler var mı? (Eğitim/Öğretim Teknolojileri Merkezi, Teknolojik Kaynaklar Merkezi vb.)

☐ Evet ☐ Hayır

k. Bir önceki soruya cevabınız "evet" ise bu birimlerin isimleri:….....

3. Bilişim Teknolojilerinin Öğretimde Kullanılması:

a. Fakültenizdeki derslerde bilişim teknolojilerinin yeterli düzeyde kullanıldığını düşünüyor musunuz?

☐ Evet ☐ Kısmen ☐ Hayır

b. Fakültenizde çevrimiçi (online) dersleriniz var mı? ☐ Evet ☐ Hayır

c. Bir önceki soruya cevabınız "evet" ise bir dönemde ortalama kaç çevrimiçi dersiniz var?.....

d. Fakültenizde İnternet'in öğretimi desteklemek amacıyla yeterli düzeyde kullanıldığını düşünüyor musunuz? ☐ Evet ☐ Hayır

e. “Bilgisayar” dersi için fakültenizde sağlanan eğitim ortamı hangisi/leridir?

☐ Bilgisayar laboratuvarı

☐ Elektronik sınıf

☐ Normal sınıf

☐ Diğer

(açıklayınız)……

f. “Öğretim Teknolojileri ve Materyal Geliştirme” dersi için fakültenizde sağlanan eğitim ortamı hangisi/leridir?

☐ Bilgisayar laboratuvarı

☐ Elektronik sınıf

☐ Normal sınıf

☐ Diğer

(açıklayınız)…….

4. Aşağıda bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesi sürecinde **karşılaşılabilecek bazı zorluklar** sıralanmıştır. Bu zorluklarla ilgili algılarınızı aşağıdaki ölçekte belirtiniz.

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
a. Donanım (bilgisayar, projeksiyon cihazı vb.) yetersizliği					
b. Öğretmen eğitiminde kullanılabilecek uygun yazılım ve diğer öğretim materyallerinin yetersizliği					
c. Akademik personelin bilişim teknolojileri hakkındaki temel bilgi ve becerisinin düzeyi					
d. Akademik personelin bilişim teknolojilerini derslerinde nasıl kullanacağına dair bilgi ve becerisinin düzeyi					
e. Bilişim teknolojileriyle ilgili hizmet içi eğitim yetersizliği					
f. Uygun olmayan ders içeriği					
g. Teknik destek yetersizliği					
h. Bilişim teknolojilerini kullanmak için yeterli zamanın olmaması					
i. Üst makamların (rektör, YÖK vb.) desteğinin yetersiz olması					

Diğer (belirtiniz):.....…….

……

5. Aşağıda bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesi sürecinde karşılaşılan zorluklara yönelik **çözum önerileri** yer almaktadır. Bunlarla ilgili algılarınızı aşağıdaki ölçekte belirtiniz.

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
a. Bilişim teknolojileri için daha fazla ekonomik kaynak ayrılmalı					
b. Bilişim teknolojileri konusunda akademik personele yönelik hizmet içi eğitimin nitelik ve niceliği artırılmalı					
c. Ders içerikleri bilişim teknolojilerinden daha fazla yararlanılacak şekilde yeniden düzenlenmeli					
d. Üniversiteler/fakülteler bünyesinde akademik personele konuyla ilgili destek olabilecek birim ve/veya elemanlar tahsis edilmeli (teknik destek elemanı, eğitim teknoloğu vb.)					
e. Bilişim teknolojileri ile ilgili fakülte ve üniversite boyutunda planlar yapılmalı					
f. Akademik personelin ders/iş yükü azaltılmalı					
g. Bilişim teknolojilerini bilen, derslerinde başarılı bir şekilde kullanan akademik personel desteklenmeli (ek kaynak , eğitim vb.)					

Diğer (belirtiniz):…….....……
……..……

6. Aşağıdaki ölçekte fakültenizin bilişim teknolojileriyle ilgili **fiziksel ve insan gücü yeterlilikleri**ni belirtiniz.

	Kesinlikle Yeterli	Yeterli	Kararsızım	Yetersiz	Kesinlikle Yetersiz
a. Öğrencilerin kullanabileceği donanımların (bilgisayar, projeksiyon cihazı, yazıcı, tarayıcı vb.) sayısı					
b. Öğrencilerin kullanabileceği donanımların (bilgisayar, projeksiyon cihazı, yazıcı, tarayıcı vb.) *çeşidi*					
c. Akademik personelin kullanabileceği donanımların *sayısı*					
d. Akademik personelin kullanabileceği donanımların *çeşidi*					
e. Öğrencilerin kullanabileceği öğretim yazılımlarının *sayısı*					
f. Öğrencilerin kullanabileceği öğretim yazılımlarının *çeşidi*					
g. Akademik personelin kullanabileceği öğretim yazılımlarının *sayısı*					
h. Akademik personelin kullanabileceği öğretim yazılımlarının *çeşidi*					

	Kesinlikle Yeterli	Yeterli	Kararsızım	Yetersiz	Kesinlikle Yetersiz
i. Öğrencilerin kullanması için İnternet erişimi					
j. Akademik personelin kullanması için İnternet erişimi					
k. Bilgisayar laboratuvarı (fiziksel) *sayısı*					
l. Teknik destek eleman *sayısı*					
m. Akademik personelin bilişim teknolojileri ile ilgili temel bilgi ve becerisi					
n. Akademik personelin bilişim teknolojileriyle öğretime yönelik olarak isteklendirmesi (motivasyonu)					
o. Akademik personelin bilişim teknolojilerini dersleri ile bütünleştirmeye yönelik yeni yetenek ve kaynakları öğrenmeleri, bunları geliştirmeleri					

7. Yorumlar ve Öneriler:

a. Bilişim teknolojileri ve bu teknolojilerin hizmet öncesi öğretmen eğitimine bütünleştirilmesi konusunda ne düşünüyorsunuz?

..……...…

…….....……...

b. Genel olarak fakültenizdeki bilişim teknolojilerinin öğretimle bütünleştirilmesi çalışmalarını ne derece etkili buluyorsunuz?

……

...…….....……...

c. Konuyla ilgili eklemek istedikleriniz varsa lütfen yazınız:

……

...…….....……..

Anket bitmiştir. Zaman ayırdığınız için teşekkür ederiz.

APPENDIX B

THE QUESTIONNARIE FOR FACULTY MEMBERS

BİLİŞİM TEKNOLOJİLERİ VE HİZMET ÖNCESİ ÖĞRETMEN EĞİTİMİ EĞİTİM FAKÜLTESİ ÖĞRETİM ELEMANLARI ANKET FORMU

Sayın Meslektaşım,

Bu anket, bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesiyle ilgili düşüncelerinizi öğrenmek amacıyla hazırlanmıştır. Vereceğiniz bilgiler sadece bilimsel araştırma amaçlı kullanılacaktır. Bu çalışma sonucunda oluşturulacak belgelerde isminiz doğrudan veya dolaylı olarak kullanılmayacaktır. Araştırma tamamlandıktan sonra fakültenizle ilgili bulgu ve önerilerimizi eğer isterseniz sizlerle paylaşmaktan mutluluk duyacağız. Katkılarınız için teşekkür ederiz.

Posta Adresi:

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Araş. Gör. Yüksel Göktaş
Yrd. Doç. Dr. Zahide Yıldırım
Doç. Dr. Soner Yıldırım

1. Kişisel Bilgileriniz:

a. Unvanınız:..... **b.** Üniversiteniz:……...**c.** İl :.....

d. Fakülteniz:……..…….……...**e**. E.posta adresiniz:.....

f. Aşağıdaki derslerden hangilerinin öğretim elemanısınız?

☐ Bilgisayar (Eğitimde Bilgi Teknolojileri) ☐ Öğretim Teknolojileri ve Materyal Geliştirme

g. Mezun olduğunuz üniversite (Lisans):……..…Bölüm:……

(Y. lisans):…..…….....…….Bölüm:……

(Doktora):…….……Bölüm:…….……

h. Bilişim teknolojileri hakkında hizmet içi eğitim aldınız mı? ☐ Evet ☐ Hayır

i. Bilişim teknolojileri ile ilgili örgün ve hizmet içi eğitimin dışında bir eğitim aldınız mı?

☐ Evet ☐ Hayır

j. Eğer bir önceki soruya cevabınız evet ise bunların isimlerini ve yıllarını yazınız?.....

……..

k. Kurumunuzda kişisel kullanımınıza verilmiş bilgisayar var mı? ☐ Evet ☐ Hayır

l. Eğer bir önceki soruya "evet" cevabı verdiyseniz, bu bilgisayarın İnternet bağlantısı var mı?

☐ Evet ☐ Hayır

m. Evinizde kendinize ait bilgisayarınız var mı? ☐ Evet ☐ Hayır

n. Eğer bir önceki soruya "evet" cevabı verdiyseniz, bu bilgisayarın İnternet bağlantısı var mı?

☐ Evet ☐ Hayır

o. Kişisel web sayfanız var mı? ☐ Evet (www…….……..……) ☐ Hayır

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Bilişim Teknolojilerinin Öğretimde Kullanılması

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2. Fakültenizde bilişim teknolojilerinin müfredatla bütünleştirildiğine inanıyor musunuz?

☐ Evet ☐ Kısmen ☐ Hayır

Konuyla İlgili Görüşleriniz: ……..

……

3. Derslerinizde bilişim teknolojilerinden yararlanıyor musunuz? ☐ Evet ☐ Kısmen ☐ Hayır

4. Çevrimiçi (online) ders veriyor musunuz? ☐ Evet ☐ Hayır

5. Derslerinize destek amacıyla İnternet'ten yararlanıyor musunuz? ☐ Evet ☐ Kısmen ☐ Hayır

6. Eğer bir önceki soruya "evet" ya da "kısmen" cevabı verdiyseniz İnternet'ten nasıl yararlanıyorsunuz? (Söz konusu soruya "hayır" cevabı verdiyseniz bu soruyu geçiniz / Birden fazla seçenek işaretleyebilirsiniz).

☐ a.Derslerime destek amaçlı web sayfası var

☐ b.E.posta kullanıyorum

☐ c.Sohbet odası (Chat) kullanıyorum

☐ d.Tartışma grubu (Forum) kullanıyorum

☐ e.Arama motorlarını kullanıyorum

☐ f.Diğer……..

7. "Bilgisayar" dersini veriyorsanız dersi nerede işliyorsunuz? (Söz konusu dersi vermiyorsanız bu soruyu geçiniz. / Birden fazla seçenek işaretleyebilirsiniz).

☐ a.Bilgisayar lâboratuvarında

☐ b.Elektronik sınıfta

☐ c.Normal sınıfta

☐ d.Diğer (açıklayınız)……...

8. "Öğretim Teknolojileri ve Materyal Geliştirme" dersini veriyorsanız dersi nerede işliyorsunuz? (Söz konusu dersi vermiyorsanız bu soruyu geçiniz. / Birden fazla seçenek işaretleyebilirsiniz).

☐ a.Bilgisayar lâboratuvarında

☐ b.Elektronik sınıfta

☐ c.Normal sınıfta

☐ d.Diğer (açıklayınız)……...

9. Öğretmen adaylarının "Bilgisayar" ve "Öğretim Teknolojileri ve Materyal Geliştirme" derslerindeki başarılarının değerlendirilmesinde sizce aşağıdaki ölçme yollarından hangisi uygundur? (Birden fazla seçenek işaretleyebilirsiniz)

a. Bilgisayar (Eğitimde Bilgi Teknolojileri)	b.Öğretim Teknolojileri ve Materyal Geliştirme
☐ 1.Yazılı yoklama	☐ 1.Yazılı yoklama
☐ 2.Performans testi (uygulama)	☐ 2.Performans testi (uygulama)
☐ 3.Ödev ve proje çalışması	☐ 3.Ödev ve proje çalışması
☐ 4.Her ünite sonunda yapılacak test	☐ 4.Her ünite sonunda yapılacak test
☐ 5.Diğer……	☐ 5.Diğer……

10. "Bilgisayar" dersini veriyorsanız derslerinizde aşağıdaki donanımlardan hangisini ne sıklıkta kullanıyorsunuz? (Söz konusu dersi vermiyorsanız 12. soruya geçiniz)

	Donanım	**Kullanım Sıklığı**				
		Sürekli	**Sıklıkla**	**Bazen**	**Hiç**	**Fikrim Yok**
a	Bilgisayar					
b	Yazıcı					
c	Tarayıcı					
d	Projeksiyon Cihazı					
e	Tepegöz					
f	Kamera					
	Diğer……...					

11. "Bilgisayar" dersini veriyorsanız derslerinizde aşağıdaki yazılımlardan hangisini ne sıklıkta kullanıyorsunuz?

Yazılım	**Kullanım Sıklığı**				
	Sürekli	**Sıklıkla**	**Bazen**	**Hiç**	**Fikrim Yok**
a. Kelime İşlemci (Örn. Word)					
b. Elektronik Tablolama (Orn. Excel)					
c. Sunum Yazılımı (Örn. Power Point)					
d. Veritabanı (Örn. Access)					
e. İnternet Göz Gezdirici (Örn. Internet Explorer)					
f. Elektronik Posta (E-mail)					
g. Sohbet Odası (Chat)					
h. Tartışma Grubu (Forum)					
i. Video Konferans					
j. İnternet Yayıncılığı (Örn. Frontpage)					
k. Öğretim Yönetim Sistemi (Örn. WEB CT)					
l. Çizim (Paint) ve Grafik Programları (Photoshop)					

Yazılım	Kullanım Sıklığı				
	Sürekli	Sıklıkla	Bazen	Hiç	Fikrim Yok
m. Animasyon Programları (Örn. Flash)					
n. İnternet Programcılığı (Örn. HTML, Java)					
o. İşletim Sistemleri (Örn. Windows, Linux)					
p. Masaüstü Yayıncılık (Örn. Corel Draw)					
q. Referans Yazılımları (Örn. Sözlük)					
Diğer……					

12. "Öğretim Teknolojileri ve Materyal Geliştirme" dersini veriyorsanız derslerinizde aşağıdaki donanımlardan hangisini ne sıklıkta kullanıyorsunuz? (Söz konusu dersi vermiyorsanız 14. soruya geçiniz).

	Donanım	Kullanım Sıklığı				
		Sürekli	Sıklıkla	Bazen	Hiç	Fikrim Yok
a	Bilgisayar					
b	Yazıcı					
c	Tarayıcı					
d	Projeksiyon Cihazı					
e	Tepegöz					
f	Video					
g	Kamera					
h	Televizyon					
	Diğer……...					

13. "Öğretim Teknolojileri ve Materyal Geliştirme" dersini veriyorsanız derslerinizde aşağıdaki yazılımlardan hangisini ne sıklıkta kullanıyorsunuz?

Yazılım	Kullanım Sıklığı				
	Sürekli	Sıklıkla	Bazen	Hiç	Fikrim Yok
a.Kelime İşlemci (Örn. Word)					
b.Elektronik Tablolama (Örn. Excel)					
c.Sunum Yazılımı (Örn. Power Point)					
d.Veritabanı (Örn. Access)					
e.İnternet Göz Gezdirici (Örn. Internet Explorer)					
f.Elektronik Posta (E-mail)					
g.Sohbet Odası (Chat)					
h.Tartışma Grubu (Forum)					
i.Video Konferans					
j.İnternet Yayıncılığı (Örn. Frontpage)					
k.Eğitsel Oyunlar					
l.Benzetim (Simülasyon) Programları					
m.Öğretim Yazılımları (Tutorials, Drill-practice)					
n.Öğretim Yönetim Sistemi (Örn. WEB CT)					
o.Yazarlık Dilleri (Örn. Authorware)					
p.Çizim (Paint) ve Grafik Programları (Photoshop)					
q.Animasyon Programları (Örn. Flash)					
r.İnternet Programcılığı (Örn. HTML, Java)					
s.İşletim Sistemleri (Örn. Windows, Linux)					
t.Masaüstü Yayıncılık (Örn. Corel Draw)					
u.Referans Yazılımları (Örn. Ansiklopedi, Sözlük)					
Diğer……					

14. "Bilgisayar" dersini veriyorsanız; bu dersin bilişim teknolojilerini gelecekteki mesleklerinde nasıl kullanacakları konusunda öğretmen adaylarına bilgi ve beceri kazandırdığını düşünüyor musunuz? (Söz konusu dersi vermiyorsanız 16. soruya geçiniz). ☐ Evet ☐ Kısmen ☐ Hayır

15. Cevabınız "Kısmen" ya da "Hayır" ise sizce daha iyi nasıl tasarlanabilir? (Birden fazla seçenek işaretleyebilirsiniz)

☐ a.Dersin içeriği güncelleştirilmeli

☐ b.Dersin tamamı bilgisayar lâboratuvarında ve uygulamalı olarak verilmeli

☐ c.Dersi veren öğretim elemanlarına hizmet içi eğitim verilmeli

☐ d.Ders için gerekli alt yapı sağlanmalı

☐ e.Diğer……..……..……

16. "Öğretim Teknolojileri ve Materyal Geliştirme" dersini veriyorsanız; bu dersin bilişim teknolojilerini gelecekteki mesleklerinde nasıl kullanacakları konusunda öğretmen adaylarına bilgi ve beceri kazandırdığını düşünüyor musunuz? (Söz konusu dersi vermiyorsanız 18. soruya geçiniz).

☐ Evet ☐ Kısmen ☐ Hayır

17. Cevabınız "Kısmen" ya da "Hayır" ise sizce daha iyi nasıl tasarlanabilir? (Birden fazla seçenek işaretleyebilirsiniz)

☐ a.Dersin içeriği güncelleştirilmeli

☐ b.Ders için daha fazla elektronik sınıf ve bilgisayar lâboratuvarı sağlanmalı

☐ c.Dersi veren öğretim elemanlarına hizmet içi eğitim verilmeli

☐ d.Öğretmenlik meslek bilgisi dersleri içinde uygulaması yapılmalı

☐ e.Diğer……..……

18. Aşağıda bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesi sürecinde **karşılaşılabilecek bazı zorluklar** sıralanmıştır. Bu zorluklarla ilgili algılarınızı aşağıdaki ölçekte belirtiniz.

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
a. Donanımların (bilgisayar, yazıcı vb.) sayıca yetersizliği					
b. Donanımların kısıtlamaları (Örn. Mevcut yazılımlarla uyumsuz, bellek yetersiz)					
c. Öğretmen eğitiminde kullanılabilecek uygun yazılım ve diğer öğretim materyallerinin yetersizliği					
d. Akademik personelin bilişim teknolojileri hakkındaki temel bilgi ve becerisinin düzeyi					
e. Akademik personelin bilişim teknolojilerini derslerinde nasıl kullanacağına dair bilgi ve becerisinin düzeyi					
f. Bilişim teknolojileriyle ilgili hizmet içi eğitim yetersizliği					

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
g. Uygun olmayan ders içeriği					
h. Teknik destek yetersizliği					
i. Bilişim teknolojilerini kullanmak için yeterli zamanın olmaması					
j. Bilişim teknolojilerini uygun biçimde yerleştirecek yeterli fiziksel ortamların olmaması					
k. Öğrencilerin (ders dışı zamanlarındaki) bilgisayar erişimlerinin sınırlı olması					

Diğer (belirtiniz):.....……

……

19. Aşağıda bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile daha iyi bütünleştirilebilmesi için **<u>yapılması gerekenlere</u>** ilişkin ifadeler yer almaktadır. Bunlarla ilgili algılarınızı aşağıdaki ölçekte belirtiniz.

	Kesinlikle Katılıyorum	**Katılıyorum**	**Kararsızım**	**Katılmıyorum**	**Kesinlikle Katılmıyorum**
a. Bilişim teknolojileri için daha fazla ekonomik kaynak ayrılmalı					
b. Bilişim teknolojileri konusunda akademik personele yönelik *hizmet içi* eğitimin nitelik ve niceliği artırılmalı					
c. Ders içerikleri bilişim teknolojilerinden daha fazla yararlanılacak şekilde yeniden düzenlenmeli					
d. Fakülteler bünyesinde akademik personele konuyla ilgili destek olabilecek elemanlar (teknik destek elemanı, eğitim teknoloğu vb.) tahsis edilmeli ve ilgili araç-gereçlerin daha verimli kullanımını ve paylaşımını sağlayacak (Örn. Teknolojik Kaynaklar Merkezi) birim ya da ortamlar oluşturulmalı					
e. Bilişim teknolojileri ile ilgili fakülte ve üniversite boyutunda planlar yapılmalı (eğitim ve öğretim gereksinimlerine ilişkin gelecek 3-5 yıl için öngörülen teknolojik yatırımlarla ilgili)					
f. Akademik personelin ders/iş yükü azaltılmalı					
g. Bilişim teknolojilerini bilen, derslerinde başarılı bir şekilde kullanan akademik personel desteklenmeli (ek kaynak , eğitim vb.)					

Diğer (belirtiniz):…….....…….

……..……

20. Aşağıda öğretim elemanlarıyla ilgili bazı **teknolojik yeterlilikler** sıralanmıştır. Bunları inceleyerek, her biri için yeterlilik düzeyinizi belirtiniz.

	Tamamen Yeterli	Kısmen Yeterli	Kararsızım	Kısmen Yetersiz	Tamamen Yetersiz
a. Genel bir bilgisayar sisteminde bulunan işletim sistemini kullanabilme (Windows gibi)					
b. Bilişim teknolojilerini sınıf içinde öğretime destek amacıyla kullanabilme					
c. Bilişim teknolojilerini sınıf dışında öğretime destek amacıyla kullanabilme					
d. Bilişim teknolojilerini bir dersin *analiz* sürecinde kullanabilme					
e. Bilişim teknolojilerini bir dersin *tasarım* sürecinde kullanabilme					
f. Bilişim teknolojilerini bir dersin *geliştirme* sürecinde kullanabilme					
g. Bilişim teknolojilerini bir dersin *uygulama* sürecinde kullanabilme					
h. Bilişim teknolojilerini bir dersin *değerlendirme* sürecinde kullanabilme					
i. Bilgisayar destekli öğretim materyallerini kullanabilme					
j. Bilgisayar destekli öğretim materyallerini değerlendirebilme					
k. Bilişim teknolojilerini mesleki gelişimi artırıcı bilgilere erişimde kullanabilme					
l. Bilişim teknolojilerini seçme ve değerlendirme					
m. Bilişim teknolojilerini müfredatla bütünleştirebilme					
n. Öğretime destek amacıyla çoklu ortam (multimedia, hypermedia) uygulamalarını kullanabilme					
o. Öğretime destek amacıyla iletişim araçlarını kullanabilme					
p. Bilgisayarları *problem çözme* amacıyla kullanabilme					
q. Bilgisayarları *veri toplama* amacıyla kullanabilme					
r. Bilgisayarları *bilgi yönetimi* amacıyla kullanabilme					
s. Bilgisayarları *iletişim kurma* amacıyla kullanabilme					
t. Bilgisayarları *karar verme* amacıyla kullanabilme					
u. Kurumsal ve kişisel amaçlar için *kelime işlemci* (Word gibi) araçları kullanabilme					
v. Kurumsal ve kişisel amaçlar için *elektronik tablolama* (Excel gibi) araçları kullanabilme					
w. Kurumsal ve kişisel amaçlar için *sunum yazılımı* (Power Point gibi) araçları kullanabilme					
x. Bilişim teknolojilerini etik ve yasal çerçevede toplum yararına kullanılması gerektiğini bilebilme					

21. Bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesi konusunda ne düşünüyorsunuz? .....
.....

22. Genel olarak fakültenizdeki bilişim teknolojilerinin öğretimle bütünleştirilmesi çalışmalarının etkinliğini nasıl değerlendiriyorsunuz?.....
.....

23. "Bilgisayar (Eğitimde Bilgi Teknolojileri)" ve "Öğretim Teknolojileri ve Materyal Geliştirme" derslerinin bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesindeki etkinliği konusundaki görüşleriniz nelerdir?

Bilgisayar:.....
.....

Öğretim Teknolojileri ve Materyal Geliştirme:…….....
.....

24. Konuyla ilgili eklemek istedikleriniz varsa lütfen yazınız..…….
……

Anket bitmiştir. Zaman ayırdığınız için teşekkür ederiz.

APPENDIX C

THE QUESTIONNARIE FOR PROSPECTIVE TEACHERS

BİLİŞİM TEKNOLOJİLERİ VE HİZMET ÖNCESİ ÖĞRETMEN EĞİTİMİ EĞİTİM FAKÜLTESİ 4. SINIF ÖĞRENCİLERİ ANKET FORMU

Bu anket, bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesi konusundaki düşüncelerinizi öğrenmek amacıyla hazırlanmıştır. Vereceğiniz bilgiler sadece bilimsel araştırma amaçlı kullanılacaktır. Bu çalışma sonucunda oluşturulacak belgelerde isminiz doğrudan veya dolaylı olarak kullanılmayacaktır. Araştırma tamamlandıktan sonra fakültenizle ilgili bulgu ve önerilerimizi eğer isterseniz sizlerle paylaşmaktan mutluluk duyacağız. Katkılarınız için teşekkür ederiz.

Araş. Gör. Yüksel Göktaş
Yrd. Doç. Dr. Zahide Yıldırım
Doç. Dr. Soner Yıldırım
ODTÜ / BÖTE

Kişisel Bilgileriniz:

(1) Cinsiyetiniz: ☐ Bay ☐ Bayan

(2) Üniversiteniz:……(3) Fakülteniz:……(4) Sınıfınız:……(5) İl:……

(6) Bölümünüz:

☐ 1. Almanca	☐ 8. Fransızca	☐ 15. Müzik	☐ 22. Türk Dili ve Edebiyat
☐ 2. Beden Eğitimi	☐ 9. Görme Engelliler	☐ 16. Okul Öncesi	☐ 23. Türkçe
☐ 3. Biyoloji	☐ 10. İlköğretim Matematik	☐ 17. Rehberlik	☐ 24. Zihinsel Engelliler
☐ 4. Coğrafya	☐ 11. İngilizce	☐ 18. Resim-İş	☐ 25. Diğer……..
☐ 5. Felsefe Grubu	☐ 12. İşitme Engelliler	☐ 19. Sınıf Öğretmenliği	☐
☐ 6. Fen Bilgisi	☐ 13. Kimya	☐ 20. Sosyal Bilgiler	☐
☐ 7. Fizik	☐ 14. Matematik	☐ 21. Tarih	☐

(7) Kendinize ait bilgisayarınız var mı? ☐ Evet ☐ Hayır

(8) Eğer 7. soruya "evet" cevabı verdiyseniz, bilgisayarınız İnternet'e bağlı mı? ☐ Evet ☐ Hayır

(9) Fakültenizde ders dışı zamanlarda kullanabileceğiniz bir bilgisayar var mı? ☐ Evet ☐ Hayır

(10) Eğer 9. soruya "evet" cevabı verdiyseniz, bu bilgisayarın İnternet bağlantısı var mı ? ☐ Evet ☐ Hayır

(11) Gelecekteki mesleğinizde kullanmak üzere, aşağıda verilen **bilgisayar ile ilgili bilgi ve becerilere ilişkin yeterlilik düzeylerinizi** size en uygun seçeneği işaretleyerek belirtiniz:

	Tamamen Yeterli	Kısmen Yeterli	Kararsızım	Kısmen Yetersiz	Tamamen Yetersiz
a. Bilgisayarla ilgili temel kavramlar	( )	( )	( )	( )	( )
b. Bilgisayarın fiziksel parçaları (donanım)	( )	( )	( )	( )	( )
c. İşletim sistemi (Örn. Windows)	( )	( )	( )	( )	( )
d. Kelime işlemci programlar (Örn. Word)	( )	( )	( )	( )	( )
e. Hesaplama tablosu programları (Örn. Excel)	( )	( )	( )	( )	( )
f. Sunum programları (Örn. Powerpoint)	( )	( )	( )	( )	( )
g. Veritabanı programları (Örn. Access)	( )	( )	( )	( )	( )
h. İnternet yayıncılığı (Örn. Frontpage, Dreamweaver)	( )	( )	( )	( )	( )
i. İnternet - World Wide Web (WWW) kullanımı	( )	( )	( )	( )	( )
j. E.posta (E-mail) kullanımı	( )	( )	( )	( )	( )
k. Sohbet odası (Chat)	( )	( )	( )	( )	( )
l. Tartışma grupları (Forum)	( )	( )	( )	( )	( )
m. Çizim (Örn: Paint) ve grafik programları	( )	( )	( )	( )	( )
n. Video konferans	( )	( )	( )	( )	( )
o. Öğretim yönetim sistemi (Örn. WEB CT)	( )	( )	( )	( )	( )
p. İnternet programcılığı (Örn. HTML, Java)	( )	( )	( )	( )	( )

12. Aşağıda teknolojiye yönelik algıları içeren ifadeler bulunmaktadır. Lütfen okuduğunuz ifadelere ilişkin algı düzeylerinizi **öğretmen gözüyle değerlendirerek** ve **şu andaki teknoloji kullanımına ilişkin algı ve becerilerinizi dikkate alarak belirtiniz**. İfadeler hakkında aşağıdaki ölçeği göz önünde bulundurarak yanındaki kutucuğa 1 ile 5 arasında sizi en iyi tanımlayan değeri yazınız. 1 KESİNLİKLE KATILMADIĞINIZI ve 5 KESİNLİKLE KATILDIĞINIZI ifade etmektedir. Eğer kendinizi 1 ile 5 arasında bir yerde görüyorsanız 2, 3 ya da 4 sayılarından birini yazınız.

	1	2	3	4	5
	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle
1. [____]	Bilgisayarların eğitimde kullanılması gerekir.				
2. [____]	Eğitimde teknoloji kullanımı öğrencilerin başarısını artırır.				
3. [____]	Sınıfta teknoloji kullanımı eğitimin kalitesini artırır.				
4. [____]	Sınıfta teknoloji kullanımı öğrenme düzeyini yükseltir.				
5. [____]	Teknoloji kullanımı öğretim/öğrenme ortamını çeşitlendirir.				
6. [____]	Sınıfta teknoloji kullanımı, öğretimi öğrenci merkezli yapar.				
7. [____]	Eğitimde teknoloji kullanımı, öğretmenlere sınıf içi etkinliklerin *planlanmasında* yardımcı olur.				
8. [____]	Eğitimde teknoloji kullanımı, öğretmenlere sınıf içi etkinliklerin *uygulanmasında* yardımcı olur.				
9. [____]	Eğitimde teknoloji kullanımı, öğretmenlere sınıf içi etkinliklerin *değerlendirilmesinde* yardımcı olur.				
10. [____]	Teknoloji kullanılarak yapılan öğretim, geleneksel öğretimde olmayan fırsatlar sunar.				
11. [____]	Okulda teknoloji kullanımı, öğretim stratejilerinin yeniden gözden geçirilmesini sağlar.				
12. [____]	Eğitimde teknoloji kullanımı için ayrılan bütçe, geleceğe yapılan iyi bir yatırımdır.				
13. [____]	Okulda bulunan teknolojik araç-gerecin güncelliği, onları sınıfta kullanmamda rol oynar.				
14. [____]	Alanımda teknoloji kullanımı öğrenme/öğretim sürecini eğlenceli bir hale getirir.				

	1	2	3	4	5
	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle
15. [____]	Sınıfta teknoloji kullanımı, ders öğretim programlarını (müfredatları) zenginleştirir.				
16. [____]	Günümüz öğretmeni, öğretim etkinlikleri ile teknolojiyi bütünleştirmek zorundadır.				
17. [____]	Öğretim sırasında alanımdaki her konuyu teknoloji ile rahatlıkla bütünleştirebilirim.				
18. [____]	Günümüzün teknoloji ölçütlerine göre yetiştirilmiş bir öğretmen adayı olduğumu düşünüyorum.				
19. [____]	Aldığım teknoloji içerikli derslerin teknolojiye karşı olan tutumumu olumlu yönde değiştirdiğini düşünüyorum.				
20. [____]	Lisans eğitimim süresince öğretim elemanları tarafından teknolojinin öğrenme/öğretim ortamında kullanılması konusunda bilgilendirildiğimi düşünüyorum.				
21. [____]	Lisans eğitimim süresince teknolojinin öğretim elemanları tarafından derslerde kullanıldığını düşünüyorum.				
22. [____]	Eğitimde teknoloji kullanımının toplum üzerindeki etkileri konusunda öğretim elemanları tarafından yeterince bilgilendirildiğimi düşünüyorum.				
23. [____]	Lisans eğitimimde aldığım "Bilgisayar (Eğitimde Bilgi Teknolojileri)" dersinin öğretmenlik niteliğimi yükselteceğini düşünüyorum.				
24. [____]	Lisans eğitimimde aldığım "Öğretim Teknolojileri ve Materyal Geliştirme" dersinin öğretmenlik niteliğimi yükselteceğini düşünüyorum.				
25. [____]	Lisans eğitimi boyunca aldığım teknoloji temelli derslerin yardımıyla, teknoloji destekli öğretim yapabilirim.				

26. Bilişim teknolojilerinin ilk ve orta öğretime bütünleştirilmesi konusunda ne düşünüyorsunuz?

…..……..

27. Bilişim teknolojileri fakültenizdeki öğretim süreçleri ile daha iyi nasıl bütünleştirilebilir?

……..……..

28. Bilişim teknolojilerinin fakültenizdeki öğretim ortamlarına bütünleştirilmesiyle ilgili karşılaştığınız önemli zorlukları açıklar mısınız?

……..……..

29. Fakültenizde bilişim teknolojileriyle ilgili olumlu bulduğunuz ve diğer fakültelerde de uygulanmasının faydalı olacağını düşündüğünüz yöntem ve uygulamaları belirtir misiniz?

……

30. "Bilgisayar (Eğitimde Bilgi Teknolojileri)" ve "Öğretim Teknolojileri ve Materyal Geliştirme" derslerinin bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesindeki etkinliği konusundaki görüşleriniz nelerdir?

Bilgisayar:.....
.....
.....

Öğretim Teknolojileri ve Materyal Geliştirme:…….....
.....
.....

31. Konuyla ilgili eklemek istedikleriniz varsa lütfen yazınız..……
……
.....

Anket bitmiştir. Zaman ayırdığınız için teşekkür ederiz.

APPENDIX D

THE QUESTIONNARIE FOR K-12 TEACHERS

İLK VE ORTA ÖĞRETİM ÖĞRETMENLERİ ANKET FORMU

Bu anket, bilişim teknolojilerini eğitim/öğretim ile bütünleştirme sürecine ilişkin düşünce ve deneyimlerinizi öğrenmek amacıyla hazırlanmıştır. Vereceğiniz bilgiler sadece bilimsel araştırma amaçlı kullanılacaktır. Bu çalışma sonucunda oluşturulacak belgelerde sizin ve okulunuzun ismi doğrudan veya dolaylı olarak kullanılmayacaktır. Araştırma tamamlandıktan sonra ilgili bulgu ve önerilerimizi eğer isterseniz sizlerle paylaşmaktan mutluluk duyacağız. Katkılarınız için teşekkür ederiz.

Araş. Gör. Yüksel Göktaş
Yrd. Doç. Dr. Zahide Yıldırım
Doç. Dr. Soner Yıldırım
ODTÜ / BÖTE

Posta Adresi:

Araş. Gör. Yüksel Göktaş
Bilgisayar ve Öğretim Teknolojileri Eğitimi
Eğitim Fakültesi / Orta Doğu Teknik University
06531 – ANKARA
Faks: 0.312.210 1006 Tel: 0.312.210 3674
E.posta: ygoktas@metu.edu.tr

---

1. Kişisel Bilgileriniz: "(*) simgeli bölümleri doldurma zorunluluğu yoktur, isterseniz doldurabilirsiniz"

---

a. Adınız-Soyadınız (*):.....

b. Cinsiyetiniz: ☐ Bay ☐ Bayan **c.** Konu alanınız (Branş):……..

d. Çalıştığınız okulun türü: ☐ Devlet okulu ☐ Özel okul **e.** İl :.....

f. E.posta adresiniz (*):.....**g**.Üniversiteye/yüksek okula giriş yılınız:……...

h. Mezun olduğunuz üniversite (lisans):…..…….…....Fakülte:….....……Bölüm:……...

(varsa lisansüstü):……..……Enstitü:…….Ana Bilim Dalı:…..….

(diğer) :.....

i. Üniversite eğitiminiz süresince aşağıdaki derslerden hangilerini aldınız?

☐ Bilgisayar (Eğitimde Bilgi Teknolojileri) ☐ Öğretim Teknolojileri ve Materyal Geliştirme

j. Bilişim teknolojileri hakkında hizmet içi eğitim aldınız mı? ☐ Evet ☐ Hayır

k. Bilişim teknolojileri ile ilgili örgün ve hizmet içi eğitimin dışında bir eğitim aldınız mı?

☐ Evet ☐ Hayır

l. Eğer bir önceki soruya cevabınız evet ise bunların isimlerini ve yıllarını yazınız? .....

……

m. Okulunuzda kullanabileceğiniz bilgisayar var mı? ☐ Evet ☐ Hayır

n. Eğer bir önceki soruya "evet" cevabı verdiyseniz bu bilgisayarın İnternet bağlantısı var mı ?

☐ Evet ☐ Hayır

o. Kendinize ait bilgisayarınız var mı? ☐ Evet ☐ Hayır

p. Eğer varsa bu bilgisayarda İnternet bağlantısı var mı? ☐ Evet ☐ Hayır

q. İnternette yaklaşık olarak günde kaç saat zaman harcıyorsunuz?

☐ Hiç harcamıyorum ☐ 1 saatten az ☐ 1-4 ☐ 5-8 Diğer……

r. Kişisel web sayfanız var mı? ☐ Evet (www……) ☐ Hayır

s. Mesleğinizle ilgili en sık kullanmış olduğunuz İnternet adresi: www……..……..

t. Eğer kullanıyorsanız üye olduğunuz e.posta ya da tartışma grupları hangileridir?.....……...

……

Bilişim Teknolojilerinin Öğretimde Kullanılması

2. Okulunuzda bilgisayar lâboratuvarı "varsa" derslerinizde bu lâboratuvarlardan yararlanabiliyor musunuz? ☐ Evet ☐ Kısmen ☐ Hayır ☐ Lâboratuvar yok

3. Derslerinizde bilişim teknolojilerinden yararlanıyor musunuz? ☐ Evet ☐ Kısmen ☐ Hayır

4.Yukarıdaki soruya (3. soruya) cevabınız "evet" ise; derslerinizde aşağıdakilerden hangisini, ne sıklıkta kullanıyorsunuz? (Söz konusu soruya -3. soru- "hayır" cevabı verdiyseniz bu soruyu geçiniz).

	Donanım	**Kullanım Sıklığı**				
		Sürekli	**Sıklıkla**	**Bazen**	**Hiç**	**Fikrim Yok**
a	Bilgisayar					
b	Yazıcı					
c	Tarayıcı					
d	Projeksiyon Cihazı					
e	Tepegöz					
f	Video					
g	Kamera					
h	Televizyon					
i	Teyp kayıt cihazı					
	Diğer……...					

5. Aşağıdaki yazılımlar hakkındaki bilgi düzeyinizi ve derslerinizde hangisini ne sıklıkta kullandığınızı belirtiniz

	Bilgi Düzeyi					Kullanım Sıklığı				
	İleri Düzey	İyi	Orta	Acemi	Hiç	Sürekli	Sıklıkla	Bazen	Hiç	Fikrim Yok
a.Kelime İşlemci (Örn. Word)										
b.Elektronik Tablolama (Örn. Excel)										
c.Sunum Yazılımı (Örn. Power Point)										
d.Veritabanı (Örn. Access)										
e.İnternet Göz Gezdirici (Örn. Explorer)										
f.Elektronik Posta (E-mail)										
g.Sohbet Odası (Chat)										
h.Tartışma Grubu (Forum)										
i.Video Konferans										
j.İnternet Yayıncılığı (Örn. Frontpage)										
k.Eğitsel Oyunlar										
l.Benzetim (Simülasyon) Programları										
m.Öğretim Yazılımları (Tutorials vb.)										
n.Öğretim Yönetim Sistemi (WEB CT)										
o.Yazarlık Dilleri (Örn. Authorware)										
p.Çizim ve Grafik Programları										
q.Animasyon Programları (Örn. Flash)										
r.İnternet Programcılığı (Örn. HTML)										
s.İşletim Sistemleri (Örn. Windows)										
t.Masaüstü Yayıncılık (Örn. Corel Draw)										
u.Programlama Dilleri (Örn. Visual										
v.Referans Yazılımları (Örn. Sözlük)										
Diğer……										

6. Derslerinize destek amacıyla İnternet'ten yararlanıyor musunuz? ☐ Evet ☐ Kısmen ☐ Hayır

7. Eğer bir önceki soruya "evet" ya da "kısmen" cevabı verdiyseniz İnternet'ten nasıl yararlanıyorsunuz? (Söz konusu soruya "hayır" cevabı verdiyseniz bu soruyu geçiniz / Birden fazla seçenek işaretleyebilirsiniz).

☐ **a**.Derslerimin hazırlık aşamasında öğretmenler için hazırlanmış web sitelerinden yararlanıyorum (Örn. www.ogretmenlersitesi.com)

☐ **b**.Derslerime destek amaçlı web sayfası var

☐ **c**.E.posta kullanıyorum

☐ **d**.Sohbet odası (Chat) kullanıyorum

☐ **e**.Tartışma grubu (Forum) kullanıyorum

☐ **f.**Arama motorlarını kullanıyorum

☐ Diğer……..

8. Aşağıda bilişim teknolojilerinin eğitim ile bütünleştirilmesi sürecinde karşılaşılabilecek **bazı zorluklar** sıralanmıştır. Bu zorluklarla ilgili algılarınızı aşağıdaki ölçekte belirtiniz.

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
a. Donanımların (bilgisayar, yazıcı vb.) sayıca yetersizliği					
b. Donanımların kısıtlamaları (Örn. Mevcut yazılımlarla					
c. Öğretim amaçlarına uygun yazılım ve hazır öğretim					
d. Bilişim teknolojileriyle ilgili hizmet içi eğitim					
e. Bilişim teknolojileri konusunda temel bilgi ve beceri					
f. Bilişim teknolojilerinin derslerde nasıl kullanılacağına					
g. Teknik destek yetersizliği					
h. Uygun olmayan ders içerikleri					
i. Bilişim teknolojilerini kullanmak için yeterli zamanın					
j. Bilişim teknolojilerini uygun biçimde yerleştirecek yeterli					
k. Üst makamların (okul idaresi, müfettiş vb.) desteğinin					

Diğer (belirtiniz)……
……

9. Aşağıda bilişim teknolojilerinin eğitim ile daha iyi bütünleştirilebilmesi için **yapılması gerekenler**e ilişkin ifadeler yer almaktadır. Bunlarla ilgili algılarınızı aşağıdaki ölçekte belirtiniz.

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
a. Bilişim teknolojileri için daha fazla ekonomik kaynak ayrılmalı					
b. Bilişim teknolojileri konusunda *hizmet öncesi* eğitimin nitelik ve niceliği artırılmalı					
c. Bilişim teknolojileri konusunda öğretmenlere yönelik *hizmet içi* eğitimin nitelik ve niceliği					
d. Ders içerikleri bilişim teknolojilerinden daha fazla yararlanılacak şekilde yeniden düzenlenmeli					
e. Okullarda öğretmenlere konuyla ilgili destek olabilecek birim ve elemanlar tahsis edilmeli					
f. Bilişim teknolojileri ile ilgili okullar boyutunda planlar yapılmalı (eğitim ve öğretim gereksinimlerine ilişkin gelecek 3-5 yıl için öngörülen teknolojik yatırımlarla ilgili)					

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
g. Öğretmenlerin ders yükü azaltılmalı					
h. Bilişim teknolojilerini derslerinde başarılı bir şekilde kullanan öğretmenler desteklenmeli (ek kaynak, eğitim vb.)					
i. Bilişim teknolojileriyle ilgili araç-gereçlerin ortak kullanımı ve paylaşımını sağlamak amacıyla okullarda (Örn. Teknolojik Kaynaklar Merkezi) ve il/ilçelerde ortamlar oluşturulmalı; var olanlarda (Örn. Ders Araç-Gereçleri Merkezi) daha iyi organize edilmeli					

Diğer (belirtiniz)……

……

10. Bilişim teknolojileri konusundaki bilgi ve becerilerinizi kazanmanızda **aşağıda sıralanan etkenlerden hangilerinin size katkısı olmuştur.** Bunlarla ilgili algılarınızı ölçekte belirtiniz.

	Kesinlikle Katkısı Olmuştur	Katkısı Olmuştur	Kararsızım	Katkısı Olmamıştır	Kesinlikle Katkısı Olmamıştır
a. Üniversitede almış olduğum "Bilgisayar" dersinin (Eğer öğreniminiz sırasında bu dersi almadıysanız bu satıra "-" işareti koyunuz)					
b. Üniversitede almış olduğum "Öğretim Teknolojileri ve Materyal Geliştirme" dersinin (Eğer öğreniminiz sırasında bu dersi almadıysanız bu satıra "-" işareti koyunuz)					
c. Almış olduğum hizmet içi eğitimlerin					
d. Okul yönetiminin					
e. Almış olduğum özel derslerin					
f. Ailemin ve arkadaşlarımın					
g. Bilgisayar sahibi olmamın					
h. Çalıştığım okuldaki bilgisayar öğretmenlerinin					
i. Okulumdaki bu konuda deneyimli öğretmenlerin					
j. Konuyla ilgili formatör öğretmenlerin					
k. Kişisel merakımın					

Diğer (belirtiniz)……

……

11. Aşağıda öğretmenlerle ilgili bazı **teknolojik yeterlilikler** sıralanmıştır. Bunları inceleyerek, her biri için yeterlilik düzeyinizi belirtiniz.

	Tamamen Yeterli	Kısmen Yeterli	Kararsızım	Kısmen Yetersiz	Tamamen Yetersiz
a.Genel bir bilgisayar sisteminde bulunan Windows gibi işletim sistemleri kullanabilme					
b. Bilişim teknolojilerini sınıf içinde öğretime destek amacıyla kullanabilme					
c. Bilişim teknolojilerini sınıf dışında öğretime destek amacıyla kullanabilme					
d. Bilişim teknolojilerini bir dersin *analiz* sürecinde kullanabilme					
e. Bilişim teknolojilerini bir dersin *tasarım* sürecinde kullanabilme					
f. Bilişim teknolojilerini bir dersin *geliştirme* sürecinde kullanabilme					
g. Bilişim teknolojilerini bir dersin *uygulama* sürecinde kullanabilme					
h. Bilişim teknolojilerini bir dersin *değerlendirme* sürecinde kullanabilme					
i. Bilgisayar destekli öğretim materyallerini kullanabilme					
j. Bilgisayar destekli öğretim materyallerini değerlendirebilme					
k. Bilişim teknolojilerini kişisel gelişimi artırıcı bilgilere erişimde kullanabilme					
l. Bilişim teknolojilerini seçme ve değerlendirme					
m. Bilişim teknolojilerini müfredatla bütünleştirebilme					
n. Öğretime destek amacıyla çoklu ortam (multimedia, hypermedia) uygulamalarını kullanabilme					
o. Öğretime destek amacıyla iletişim araçlarını kullanabilme					
p. Bilgisayarları *problem çözme* amacıyla kullanabilme					
q. Bilgisayarları *veri toplama* amacıyla kullanabilme					
r. Bilgisayarları *bilgi yönetimi* amacıyla kullanabilme					
s. Bilgisayarları *iletişim kurma* amacıyla kullanabilme					
t. Bilgisayarları *karar verme* amacıyla kullanabilme					
u. Kurumsal ve kişisel amaçlar için *kelime işlemci* (Word gibi) araçları kullanabilme					
v. Kurumsal ve kişisel amaçlar için *elektronik tablolama* (Excel gibi) araçları kullanabilme					
w. Kurumsal ve kişisel amaçlar için *sunum yazılımı* (Power Point gibi) araçları kullanabilme					
x. Bilişim teknolojilerinin etik ve yasal çerçevede toplum yararına kullanılması gerektiğini bilme					

12. Hizmet öncesi öğretmen eğitiminde 1998 yılından bu yana bilişim teknolojilerini eğitim ile bütünleştirmek için aşağıdaki derslerden yararlanılmaktadır. Eğer bu dersleri öğreniminiz sırasında aldıysanız; bu derslerin etkinliğiyle ilgili düşüncelerinizi aşağıdaki ölçekte belirtiniz (Söz konusu dersleri almadıysanız bu soruyu geçiniz).

	Kesinlikle Katılıyorum	Katılıyorum	Katılmıyorum	Kesinlikle Katılmıyorum	Fikrim Yok / Dersi Almadım
a. Üniversite öğrenimim sırasında almış olduğum *"Bilgisayar"* dersinin bilişim teknolojilerini mesleğimde nasıl kullanacağım konusunda bana bilgi ve beceri kazandırdığını düşünüyorum.					
b. Üniversite öğrenimim sırasında almış olduğum *"Öğretim Teknolojileri ve Materyal Geliştirme"* dersinin bilişim teknolojilerini mesleğimde nasıl kullanacağım konusunda bana bilgi ve beceri kazandırdığını düşünüyorum.					

13. Bilişim teknolojilerinin ilk ve orta öğretime bütünleştirilmesi konusunda düşüncelerinizi açıklar mısınız? (Sizce bilişim teknolojileri eğitime katkı sağlar mı? Eğitimde bilişim teknolojilerinin geleceğini nasıl görüyorsunuz?)

.....

.....

14. Bilişim teknolojilerinin ilk ve orta öğretime daha iyi bütünleştirilebilmesi için sizce neler yapılmalıdır?

.....

.....

15. Okulunuzda bilişim teknolojileriyle ilgili olumlu bulduğunuz ve diğer okullarda da uygulanmasının faydalı olacağını düşündüğünüz yöntem ve uygulamaları belirtir misiniz?

……..……..

……..……..

16. Konuyla ilgili eklemek istedikleriniz varsa lütfen yazınız..…..……...

……..……..

……..……..

Anket bitmiştir. Zaman ayırdığınız için teşekkür ederiz.

APPENDIX E

INTERVIEW GUIDE FOR THE FACULTY MEMBERS

EĞİTİM FAKÜLTESİ ÖĞRETİM ELEMANLARI GÖRÜŞME REHBERİ

Görüşülen Kişi: ……

Görüşmeyi yapan: ……

Tarih & Saat: …..…/…...…/ 2005 & ...…:….....

Görüşme Süresi: …….....

Merhaba,

ODTÜ Bilgisayar ve Öğretim Teknolojileri Eğitimi Lisansüstü Programı'nda doktora öğrenimimi sürdürüyorum. Öncelikle "Bilişim Teknolojilerinin Türkiye'deki Eğitim Fakülteleri ile İlk ve Orta Öğretim Okullarına Bütünleştirilmesinin Bugünkü Durumu" konulu tez çalışmamda görüşlerinizi benimle paylaşmayı kabul ettiğiniz için teşekkür ediyorum. Bu konudaki kişisel deneyimleriniz, görüş ve düşünceleriniz araştırmam için büyük önem taşımaktadır.

Başlamadan önce bazı noktaları vurgulamak istiyorum. Yapacağımız görüşme sadece araştırma amaçlı kullanılacaktır. Bu çalışma sonucunda oluşturulacak dokümanlarda isminiz doğrudan ya da dolaylı olarak kullanılmayacaktır. Araştırma tamamlandıktan sonra ilgili analiz, sonuç ve tavsiyelerimizi eğer isterseniz sizlerle paylaşmaktan mutluluk duyacağız.

İzin verirseniz görüşmeyi kaydetmek istiyorum. Sizce sakıncası var mı?

Sormak istediğiniz bir soru var mı?

Size yönelteceğim sorular; eğitim-öğretim sürecinde kullandığınız teknolojilere, bilişim teknolojilerinden hizmet öncesi öğretmen eğitiminde nasıl yararlandığınıza, bu teknolojilerin sizin öğretim sürecinize etkilerine, kullanımınızı teşvik eden unsurlara ve karşılaştığınız güçlüklere, bunların üstesinden nasıl gelinebileceğine, konuyla ilgili derslerin etkinliği ve fakültenizdeki öğrencilerin bu konudaki tutumlarına yönelik olacaktır.

1. Hangi derslerin öğretim elemanısınız?

2. Bilişim teknolojilerinden derslerinizde yararlanıyor musunuz? Nasıl/Neden? Örneklerle açıklayabilir misiniz?

3. Bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesi konusunda ne düşünüyorsunuz?

4. Sizce bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesi sürecinde karşılaşılan önemli zorluklar nelerdir?

a. Kaynak
   - İnsan gücü
   - Donanım / Yazılım
   - Fiziksel

b. Ders içerikleri

c. Eğitim (hizmet içi...)

d. Politik (üst makamların desteğinin yetersizliği...)

e. Diğer

5. Bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile daha iyi bütünleştirilebilmesi için neler önerirsiniz?

a. Fiziksel

b. İnsan gücü

c. Eğitim

d. Politika

e. Diğer

6. Sizce "Bilgisayar (Eğitimde Bilgi Teknolojileri)" ve "Öğretim Teknolojileri ve Materyal Geliştirme" dersleri bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesine ne derece katkıda bulunuyor?

a. Bilgisayar

b. Öğretim Teknolojileri ve Materyal Geliştirme

7. Sizce bu dersler bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile daha iyi bütünleştirilmesi nasıl tasarlanabilir?

a. Bilgisayar
   - Amaç
   - İçerik
   - Dersin veriliş biçimi ve süreci
   - Altyapı
   - Diğer

b. Öğretim Teknolojileri ve Materyal Geliştirme

- Amaç
- İçerik
- Dersin veriliş biçimi ve süreci
- Altyapı
- Diğer

8. Bilişim teknolojilerinin fakültenizdeki eğitim/öğretim süreci ile bütünleştirilmesinde şu anki durumu nasıl değerlendiriyorsunuz?

a. Fiziksel olanaklar

b. Teknik destek

c. Öğretim elemanlarının tutumu ve hazır bulunuşluğu

d. Eğitim

e. Diğer

9. Bilişim teknolojilerinin öğretmen eğitimi ile bütünleştirilmesi konusunda öğrencilerinizin ilgileri, tutumları hakkındaki gözlemleriniz nelerdir?

10. Öğrencilerinizin bilişim teknolojilerini eğitim/öğretim süreci ile bütünleştirebilmeleri için gerek teknik bilgi ve beceri gerekse derslerindeki kullanım açısından onlara örnek (rol modeli) olmak için neler yapılmalıdır?

- **Son olarak görüşmemiz esnasında benim değinmediğim, sizin eklemek istediğiniz başka bir husus var mı?**

- Görüşme bitmiştir, zaman ayırdığınız için teşekkür ederiz.

APPENDIX F

INTERVIEW GUIDE FOR THE PROSPECTIVE TEACHERS

EĞİTİM FAKÜLTESİ ÖĞRENCİLERİ GÖRÜŞME REHBERİ

Görüşülen Kişi: ……

Görüşmeyi yapan: ……

Tarih & Saat: …..…/…...…/ 2005 & ...…:…...

Görüşme Süresi: …….....

Merhaba,

ODTÜ Bilgisayar ve Öğretim Teknolojileri Eğitimi Lisansüstü Programı'nda doktora öğrenimimi sürdürüyorum. Öncelikle "Bilişim Teknolojilerinin Türkiye'deki Eğitim Fakülteleri ile İlk ve Orta Öğretim Okullarına Bütünleştirilmesinin Bugünkü Durumu" konulu tez çalışmamda görüşlerinizi benimle paylaşmayı kabul ettiğiniz için teşekkür ediyorum. Bu konudaki kişisel deneyimleriniz, görüş ve düşünceleriniz araştırmam için büyük önem taşımaktadır.

Başlamadan önce bazı noktaları vurgulamak istiyorum. Yapacağımız görüşme sadece araştırma amaçlı kullanılacaktır. Bu çalışma sonucunda oluşturulacak dokümanlarda isminiz doğrudan ya da dolaylı olarak kullanılmayacaktır. Araştırma tamamlandıktan sonra ilgili analiz, sonuç ve tavsiyelerimizi eğer isterseniz sizlerle paylaşmaktan mutluluk duyacağız.

İzin verirseniz görüşmeyi kaydetmek istiyorum. Sizce sakıncası var mı?

Sormak istediğiniz bir soru var mı?

Size yönelteceğim sorular; bilişim teknolojilerinden derslerinizde nasıl yararlandığınıza, bu süreçte karşılaşılan önemli zorluklara, bunların üstesinden nasıl gelinebileceğine, konuyla ilgili derslerin etkinliği ve fakültenizdeki hocaların bu konudaki tutumlarına yönelik olacaktır.

1. Bilişim teknolojilerinden derslerinizde yararlanıyor musunuz? Nasıl/Neden? Örneklerle açıklayabilir misiniz?

2. Bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesi konusunda ne düşünüyorsunuz?

3. Sizce bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesi sürecinde karşılaşılan önemli zorluklar nelerdir?

a. Kaynak
   i. İnsan gücü
   ii. Donanım / Yazılım
   iii. Fiziksel
b. Ders içerikleri
c. Diğer

4. Bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile daha iyi bütünleştirilebilmesi için neler önerirsiniz?

a. Kaynak
   i. İnsan gücü
   ii. Donanım / Yazılım
   iii. Fiziksel
b. Ders içerikleri ve işlenişi
c. Diğer

5. Sizce "Bilgisayar (Eğitimde Bilgi Teknolojileri)" ve "Öğretim Teknolojileri ve Materyal Geliştirme" dersleri bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesine ne derece katkıda bulunuyor?

a. Bilgisayar
b. Öğretim Teknolojileri ve Materyal Geliştirme

6. Sizce bu dersler bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile daha iyi bütünleştirilmesi için nasıl işlenebilir?

a. Bilgisayar
   i. İçerik
   ii. Altyapı
   iii. Dersin veriliş biçimi ve süreci
   iv. Diğer

b. Öğretim Teknolojileri ve Materyal Geliştirme
   i. İçerik
   ii. Altyapı
   iii. Dersin veriliş biçimi ve süreci
   iv. Diğer

7. Bilişim teknolojilerinin fakültenizdeki eğitim/öğretim süreci ile bütünleştirilmesinde şu anki durumu nasıl değerlendiriyorsunuz?

a. Fiziksel olanaklar

b. Teknik destek

c. Öğretim elemanlarının tutumu ve hazır bulunuşluğu

d. Eğitim

e. Diğer

8. Bilişim teknolojilerinin öğretmen eğitimi ile bütünleştirilmesi konusunda bölümünüzdeki öğretim elemanlarının ilgilerini, tutumlarını, uygulamalarını nasıl değerlendiriyorsunuz**?**

9. Bilişim teknolojilerinin ilk ve orta öğretime bütünleştirilmesi konusunda ne düşünüyorsunuz?

10. Gelecekteki iş yaşamınızla (öğretmenlik) ilgili olarak, bilişim teknolojilerini eğitim/öğretim süreci ile bütünleştirmek için gerekli olan bilgi ve beceriler konusunda kendinizi nasıl hissediyorsunuz?

- Neden? / Bu konuda neler yapılabilir?

➢ **Son olarak görüşmemiz esnasında benim değinmediğim, sizin eklemek istediğiniz başka bir husus var mı?**

➢ Görüşme bitmiştir, zaman ayırdığınız için teşekkür ederiz.

APPENDIX G

INTERVIEW GUIDE FOR THE K-12 TEACHERS

İLK VE ORTA ÖĞRETİM ÖĞRETMENLERİ GÖRÜŞME REHBERİ

Görüşülen Kişi: ……

Görüşmeyi yapan: ……

Tarih & Saat: …..…/…...…/ 2005 & ...…:…...

Görüşme Süresi: …….....

Merhaba,

ODTÜ Bilgisayar ve Öğretim Teknolojileri Eğitimi Lisansüstü Programı'nda doktora öğrenimimi sürdürüyorum. Öncelikle "Bilişim Teknolojilerinin Türkiye'deki Eğitim Fakülteleri ile İlk ve Orta Öğretim Okullarına Bütünleştirilmesinin Bugünkü Durumu" konulu tez çalışmamda görüşlerinizi benimle paylaşmayı kabul ettiğiniz için teşekkür ediyorum. Bu konudaki kişisel deneyimleriniz, görüş ve düşünceleriniz araştırmam için büyük önem taşımaktadır.

Başlamadan önce bazı noktaları vurgulamak istiyorum. Yapacağımız görüşme sadece araştırma amaçlı kullanılacaktır. Bu çalışma sonucunda oluşturulacak dokümanlarda isminiz doğrudan ya da dolaylı olarak kullanılmayacaktır. Araştırma tamamlandıktan fakültenizle ilgili analiz, sonuç ve tavsiyelerimizi eğer isterseniz sizlerle paylaşmaktan mutluluk duyacağız.

İzin verirseniz görüşmeyi kaydetmek istiyorum. Sizce sakıncası var mı?

Sormak istediğiniz bir soru var mı?

Size yönelteceğim sorular; eğitim-öğretim sürecinde kullandığınız teknolojilere, bilişim teknolojilerinden hizmet öncesi öğretmen eğitiminde nasıl yararlandığınıza, bu teknolojilerin sizin öğretim sürecinize etkilerine, bu teknolojilerin ilk ve orta öğretime bütünleştirilmesine, kullanımınızı teşvik eden unsurlara ve karşılaştığınız güçlüklere, bunların üstesinden nasıl gelinebileceğine ve konuyla ilgili derslerin etkinliğine yönelik olacaktır.

1. Alanınız / branjınız nedir?

2. Bilişim teknolojilerinden derslerinizde yararlanıyor musunuz? Nasıl/Neden? Örneklerle açıklayabilir misiniz?

3. Bilişim teknolojilerinin hizmet öncesi öğretmen eğitimi ile bütünleştirilmesi konusunda ne düşünüyorsunuz?

4. Sizce "Bilgisayar (Eğitimde Bilgi Teknolojileri)" ve "Öğretim Teknolojileri ve Materyal Geliştirme" dersleri bilişim teknolojilerinin mesleki yaşamınıza ve hizmet öncesi öğretmen eğitimi ile bütünleştirilmesine ne derece katkıda bulunuyor?

a. Bilgisayar
b. Öğretim Teknolojileri ve Materyal Geliştirme

5. Sizce bu dersler bilişim teknolojilerinin mesleki yaşamınıza ve hizmet öncesi öğretmen eğitimine daha iyi bütünleştirilmesi için nasıl tasarlanabilir/işlenebilir?

a. Bilgisayar
   i. İçerik
   ii. Altyapı
   iii. Dersin veriliş biçimi ve süreci
   iv. Diğer

b. Öğretim Teknolojileri ve Materyal Geliştirme
   i. İçerik
   ii. Altyapı
   iii. Dersin veriliş biçimi ve süreci
   iv. Diğer

6. Bilişim teknolojilerinin ilk ve orta öğretime bütünleştirilmesi konusunda ne düşünüyorsunuz?

7. Sizce bilişim teknolojilerinin ilk ve orta öğretime bütünleştirilmesi sürecinde karşılaşılan önemli zorluklar nelerdir?

a. Kaynak
   - İnsan gücü
   - Donanım / Yazılım
   - Fiziksel
b. Ders içerikleri
c. Eğitim (hizmet içi...)
d. Politik (üst makamların desteğinin yetersizliği...)
e. Diğer

8. Sizce bilişim teknolojilerinin ilk ve orta öğretime daha iyi bütünleştirilebilmesi için neler yapılmalıdır?

a. Fiziksel
b. İnsan gücü
c. Eğitim

d. Politika

e. Diğer

9. Bilişim teknolojilerinin okulunuzdaki eğitim/öğretim süreci ile bütünleştirilmesinde şu anki durumu nasıl değerlendiriyorsunuz?

a. Fiziksel olanaklar

b. Teknik destek

c. Eğitim

d. Diğer

10. Bilişim teknolojilerini eğitim/öğretim süreci ile bütünleştirebilmek için gerekli olan bilgi ve beceriler konusunda kendinizi nasıl hissediyorsunuz?

- Neden ? / Bu konuda neler yapılabilir?

➢ **Son olarak görüşmemiz esnasında benim değinmediğim, sizin eklemek istediğiniz başka bir husus var mı?**

➢ Görüşme bitmiştir, zaman ayırdığınız için teşekkür ederiz.

APPENDIX H

STUDENTS QUTA OF SCHOOLS OF TEACHER EDUCATION FOR 2001 (HEC, 2001)

	1. Region				2. Region	
1	Boğazici University	255		1	Balıkesir University	930
2	İstanbul University	510		2	Çanakkale 18Mart University	910
3	Marmara University	1400		3	Trakya University	420
	Total	2165			Total	2260
	3. Region				**4. Region**	
1	Adnan Menderes University	100		1	Abant İzzet Baysal University	970
2	Afyon Kocatepe University	200		2	Anadolu University	550
3	Afyon Kocatepe University (Uşak)	600		3	Kocaeli University	250
4	Celal Bayar University	690		4	Osmangazi University	150
5	Dokuz Eylül University	1750		5	Sakarya University	520
6	Ege University	130		6	Uludağ University	760
7	Muğla University	250				
8	Pamukkale University	730				
	Total	4450			Total	3200
	5. Region				**6. Region**	
1	Ankara University	300		1	Akdeniz University	40
2	Gazi University	1995		2	Çukurova University	820
3	Hacettepe University	790		3	Mersin University	120
4	Middle East Technical University	280		4	Hatay Mustafa Kemal University	450
5	Selçuk University	1840		5	Süleyman Demirel University (Burdur)	720
6	Başkent University	140				
	Total	5345			Total	2150
	7. Region				**8. Region**	
1	Cumhuriyet University	385		1	Gazi University Kastamonu	830
2	Gazi University Kırşehir	920		2	Gaziosmanpaşa University	60
3	Kırıkkale University	200		3	Ondokuz Mayıs University (Samsun)	1060
4	Niğde University	700		4	Ondokuz Mayıs University (Sinop)	50
				5	Ondokuz Mayıs University (Amasya)	750
				6	Zonguldak Karaelmas University	280
	Total	2205			Total	3030
	9. Region				**10. Bolge**	
1	Karadeniz Teknik University (Trabzon)	1170		1	Atatürk University (KKEF)	2040
2	Karadeniz Teknik University (Rize)	120		2	Atatürk University (Ağrı)	500
3	Karadeniz Teknik University (Giresun)	420		3	Atatürk University (Erzincan)	650
				4	Kafkas University	150
	Total	1710			Total	3340
	11. Region				**12.Bolge**	
1	Fırat University	170		1	Dicle University (Ziya Gökalp)	790
2	İnönü University	910		2	Dicle University (Siirt)	560
3	Yüzüncü Yıl University	560		3	Gaziantep University (Kilis)	40
				4	Gaziantep University (Adıyaman)	150
	Total	1640			Total	1540
	TOTAL					
	Total Number of STE in 2001	55			Total Number of 1st Grade Students in 2001	33.055

APPENDIX J

UNIVERSITIES, STE, NUMBER OF STUDENTS AND COMPUTERS

#	Universities	STE	# of prospective teachers	# of computers	# of prospective teachers / # of computers
1	Abant İzzet Baysal Univ.	School of Teacher Education	4.870	75	64,9
2	Adnan Menderes University	School of Teacher Education	No Response		
3	Afyon Kocatepe University	Uşak STE	2.477	15	165,1
4	Afyon Kocatepe	School of Teacher Education	1.052	10	105,2
5	Akdeniz University	School of Teacher Education	251	0	0,0
6	Anadolu University	School of Teacher Education	No Response		
7	Ankara University	School of Educational Science	1.605	82	19,6
8	Atatürk University	Ağrı STE	2.271	85	26,7
9	Atatürk University	Bayburt STE	330	30	11,0
10	Atatürk University	Erzincan STE	2.495	40	62,4
11	Atatürk University	Kâzım Karabekir STE	10.470	218	48,0
12	Balıkesir University	Necatibey STE	No Response		
13	Boğaziçi University	School of Teacher Education	1.177	100	11,8
14	Celal Bayar University	Demirci STE	2.907	45	64,6
15	Cumhuriyet University	School of Teacher Education	2.473	160	15,5
16	Çanakkale Onsekiz Mart Univ.	School of Teacher Education	4.315	100	43,2
17	Çukurova University	School of Teacher Education	No Response		
18	Dicle University	Ziya Gökalp STE	No Response		
19	Dicle University	Siirt STE	No Response		
20	Dokuz Eylül University	Buca STE	No Response		
21	Dumlupınar University	School of Teacher Education	120	32	3,8
22	Ege University	School of Teacher Education	1.060	60	17,7
23	Erciyes University	School of Teacher Education	866	31	27,9
24	Fırat University	School of Teacher Education	No Response		
25	Fırat University	Muş STE	No Response		
26	Gazi University	Gazi STE	11.500	245	46,9
27	Gazi University	Kastamonu STE	3.345	40	83,6
28	Gazi University	Kırşehir STE	3.700	100	37,0
29	Gaziantep University	Adıyaman STE	1.050	30	35,0
30	Gaziantep University	School of Teacher Education	95	0	0,0
31	Gaziantep University	Kilis Muallim Rıfat STE	No Response		
32	Gaziosmanpaşa University	School of Teacher Education	530	19	27,9
33	Hacettepe University	School of Teacher Education	4.000	100	40,0
34	İnönü University	School of Teacher Education	5.300	30	176,7
35	İstanbul University	Hasan Ali Yücel STE	2.202	21	104,9
36	Kafkas University	School of Teacher Education	1.521	24	63,4

#	Universities	STE	# of prospective teachers	# of computers	# of prospective teachers / # of computers
37	Karadeniz Teknik University	Giresun STE	1.850	60	30,8
38	Karadeniz Teknik University	Rize STE	582	20	29,1
39	Karadeniz Teknik University	Artvin STE	110	15	7,3
40	Karadeniz Teknik University	Fatih STE	No Response		
41	Kırıkkale University	School of Teacher Education	1.108	15	73,9
42	Kocaeli University	School of Teacher Education	1.405	30	46,8
43	Marmara University	Atatürk STE	8.300	80	103,8
44	Mersin University	School of Teacher Education	1.543	20	77,2
45	Middle East Technical Univ.	School of Teacher Education	2.128	131	16,2
46	Muğla University	School of Teacher Education	2.045	0	0,0
47	Mustafa Kemal University	School of Teacher Education	2.150	60	35,8
48	Niğde University	Aksaray STE	No Response		
49	Niğde University	School of Teacher Education	No Response		
50	Ondokuz Mayıs University	Amasya STE	4.000	40	100,0
51	Ondokuz Mayıs University	School of Teacher Education	6.209	60	103,5
52	Ondokuz Mayıs University	Sinop STE	420	25	16,8
53	Osmangazi University	School of Teacher Education	600	25	24,0
54	Pamukkale University	School of Teacher Education	3.658	42	87,1
55	Sakarya University	School of Teacher Education	2.587	40	64,7
56	Selçuk University	School of Teacher Education	9.158	212	43,2
57	Süleyman Demirel University	Burdur STE	3.500	60	58,3
58	Trakya University	School of Teacher Education	2.114	50	42,3
59	Uludağ University	School of Teacher Education	4.437	70	63,4
60	Yüzüncü Yıl University	School of Teacher Education	2.987	40	74,7
61	Yüzüncü Yıl University	Hakkari STE	No Response		
62	Yıldız Teknik University	School of Teacher Education	260	30	8,7
63	Zonguldak Karaelmas Üniv.	Ereğli STE	1.580	67	23,6
Private Universities					
64	Başkent University	School of Teacher Education	719	60	12,0
65	Yeditepe University	School of Teacher Education	115	0	0,0
66	Bilkent University	School of Teacher Education	No Response		
67	Maltepe University	School of Teacher Education	No Response		
68	Ufuk University	School of Teacher Education	No Response		
69			No Response		
TOTAL			**135.547**	**2944**	**46,0**

APPENDIX K

THE JURY OF EXPERTS

#	Title, Name, and Surname of the Experts	Instruments						
		Q1	Q2	Q3	Q4	I1	I2	I3
1	Prof. Dr. Hasan Şimşek	√						
2	Prof. Dr. Meral Aksu	√						
3	Prof. Dr. Doğan Alpsan	√						
4	Prof. Dr. Ali Yıldırım					√	√	√
5	Assoc. Prof. Dr. Ercan Kiraz			√	√	√	√	√
6	Assoc. Prof. Dr. Safure Bulut		√	√				
7	Assoc. Prof. Dr. Kürşat Çağıltay	√			√	√	√	√
8	Assoc. Prof. Dr. Soner Yıldırım			√				
9	Assist. Prof. Dr. Ahmet Ok		√		√			
10	Assist. Prof. Dr. Erdinç Çakıroğlu		√		√			
11	Assist. Prof. Dr. Zeynep Sümer				√			
12	Assist. Prof. Dr. Yasemin Gülbahar			√				
13	Assist. Prof. Dr. Nergis Çağıltay				√			
14	Dr. Neşe Zayim				√	√	√	√
15	Dr. Ömer Delialioğlu		√					
		4	4	4	7	4	4	4

APPENDIX L

THE JURY OF PEER REVIEW

	Name and Surname of the Peers
1	Aslıhan Kocaman
2	Ayşegül Bakar
3	Bahar Baran
4	Bülent Emiroğlu
5	Cengiz Savaş Aşkun
6	Erman Yükseltürk
7	Erol Özçelik
8	Esra Yecan
9	Göknur Kaplan Akıllı
10	Halil Ersoy
11	Hasan Tınmaz
12	Levent Bayram
13	Levent Durdu
14	Nuray Temur Gedik
15	Recep Cakir
16	Sacip Toker
17	Yunus Şahinkayası

APPENDIX M

THE VOLUNTEERS FOR DATA COLLECTION PROCESS

Name-Surname	Their Title/Job and Instutions	Region and City	Stakeholders
Abdulhadi Coşkunlar	Computer Teacher – MoNE	Şanlı Urfa	K-12 Teachers
Abdulkadir Karacı	Instructor – Gazi University Kastamonu	Kastamonu	Faculty Members + Prospective and K-12 Teachers
Abdullah Kuzu	Assist. Prof. Dr. – Anadolu Univ.	Eskişehir	Faculty Members and Prospective Teachers
Abdulvahit Arslan	ELT – MoNE	Erzurum	K-12 Teachers
Adem Bolat	Computer Teacher – MoNE	Kahraman Maraş	K-12 Teachers
Adem Eğlence	Computer Teacher – MoNE	Samsun	K-12 Teachers
Ahmet Kabadayı	Computer Teacher – MoNE	Giresun	K-12 Teachers
Ahmet Kara	Assist. Prof. Dr. - Gazi Antep University	Adıyaman	Faculty Members and Prospective Teachers
Ali Kocaman	School Manager	Adana	K-12 Teachers
Ali Taşer	Mathematics – MoNE	Kahraman Maraş	K-12 Teachers
Ali Topaktaş	Elementary Teacher – MoNE	Kocaeli	K-12 Teachers
Arif Uysal	Computer Teacher – MoNE	Konya	K-12 Teachers
Ayhan Özbudak	ELT- MoNE	İstanbul	K-12 Teachers
Barış Sadıkoğlu	Computer Teacher – MoNE	Edirne	K-12 Teachers
Birol Atabey	School Manager	Kırşehir	K-12 Teachers
Burcu Koç	Computer Teacher – MoNE	Muğla	K-12 Teachers
Burcu Örentürk	Computer Teacher - Private School	İstanbul	K-12 Teachers
Emine Karaaslan	Assist. Prof. Dr. Kırıkkale University	Kırıkkale	Faculty Members and Prospective Teachers
Emine Tiryaki	Instruct.- Karadeniz Technical Üniversity	Trabzon	Faculty Members and Prospective Teachers
Emre Sezgin	Instructor – Çukurova University	Adana	Faculty Members and Prospective Teachers
Fatma Kanar	Resst. Asist. – OMU	Samsun	Faculty Members and Prospective Teachers
Feda Öner	Assist. Prof. Dr. - OMU Amasya	Amasya	Faculty Members and Prospective Teachers
Gülcan Çetin	Assist. Prof. Dr. – Balıkesir University	Balikesir	Faculty Members and Prospective Teachers
Hacı Duran	Prof. Dr. - Gazi Antep University	Adıyaman	Faculty Members and Prospective Teachers
Halis Çetin	Assoc. Prof. Dr. – Cumhuriyet University	Sivas	Faculty Members and Prospective Teachers
Emin Masalcı	Computer Teacher – MoNE	Aydın	K-12 Teachers
Engin Demir	Elementary Teacher – MoNE	Diyarbakır	K-12 Teachers
Gökşen Demir	Computer Teacher – MoNE	İstanbul	K-12 Teachers
Gulinaz Aktaş	ELT – MoNE	İzmir	K-12 Teachers
Hale Yılmaz	Computer Teacher – MoNE	Ankara	K-12 Teachers
Halit Demir	Computer Teacher – MoNE	Diyarbakır	K-12 Teachers
Hatice Dağlı	Computer Teacher – MoNE	Amasya	K-12 Teachers
Haydar Genç	Computer Teachers – MoNE	Elazığ	K-12 Teachers
Hilal Akdağ	TLT – MoNE	İstanbul	K-12 Teachers
Hüseyin Duran	School Manager	Antalya	K-12 Teachers
İbrahim Bilgin	Assist. Prof. Dr. Abant İzzet Baysal Univ.	Bolu	Faculty Members and Prospective Teachers
İbrahim Kirezli	Computer Teacher – MoNE	Isparta	K-12 Teachers

Name-Surname	Their Title and Instutions	Region and City	Stakeholders
İrfan Erdoğan	Assoc. Prof. Dr. – İstanbul Univ.	İstanbul	Faculty Members and Prospective Teachers
İsmail Akçay	Computer Teacher – MoNE	Samsun	K-12 Teachers
İzzet Kara	Assist. Prof. Dr. – Pamukkale Univ.	Denizli	Faculty Members and Prospective Teachers
Kemal Yaşar Can	Computer Teacher – MoNE	Istanbul	K-12 Teachers
Mahmut Kurşun	School Manager	Adıyaman	K-12 Teachers
Mehmet Karatepe	Computer Teacher – MoNE	Sivas	K-12 Teachers
Mehmet Kurşun	Elementary Teacher – MoNE	Gaziantep	K-12 Teachers
Melda Yüksel	Computer Teacher – MoNE	İzmir	K-12 Teachers
Melkaç Değer	Resst. Asist. - Çukurova University	Adana	Faculty Members and Prospective Teachers
Mutlu Tek	Computer Teacher – MoNE	Kayseri	K-12 Teachers
Nurcan Temel	TLT – MoNE	Çankırı	K-12 Teachers
Okan Bağcı	ELT – MoNE	Erzurum	K-12 Teachers
Oya Kerman	School Manager	Ankara	K-12 Teachers
Özlem Bulut	TLT – MoNE	Mardin	K-12 Teachers
Özlem Suyunç	Instructor - Canakkale 18 Mart Univ.	Çanakkale	Faculty Members and Prospective Teachers
Pınar Üresin	TLT – MoNE	Kocaeli	K-12 Teachers
Rauf Yıldız	Prof. Dr. Yüzüncü Yıl University	Van	Faculty Members and Prospective Teachers
Remziye Parlak	TLT – MoNE	Malatya	K-12 Teachers
Şakir Sezgin	Private Sector	Tekirdağ	K-12 Teachers
Selçuk Karaman	Assist. Prof. Dr. – Ataturk University	Erzurum	Faculty Members and Prospective Teachers
Selçuk Özdemir	Instructor Dr. – Gazi University	Ankara	Faculty Members and Prospective Teachers
Serçin Karataş	Instructor Dr. – Gazi University	Ankara	Faculty Members and Prospective Teachers
Serpil Tuti	Computer Teacher - Private School	Ankara	K-12 Teachers
Servet Akçay	Computer Teachers – MoNE	Trabzon	K-12 Teachers
Şetaret Öztürk	History Teacher – MoNE	İstanbul	K-12 Teachers
Seval Aydın	Computer Teachers – MoNE	Bitlis	K-12 Teachers
Sezgin Akçura	Computer Teacher – MoNE	Van	K-12 Teachers
Sezgin Bağdat	ELT – MoNE	Çankırı	K-12 Teachers
Suat Özçelik	Science Teacher – MoNE	Sakarya	K-12 Teachers
Tarık Yüce	Computer Teacher - Private School	Kayseri	K-12 Teachers
Yakup Allak	Computer Engineer	Tekirdağ	K-12 Teachers
Yasemin Gülbahar	Assist. Prof. Dr. – Başkent University	Ankara	Faculty Members
Yasemin Sayan	PhD. Student - 9 Eylul University	İzmir	Faculty Members and Prospective Teachers
Yüksel Dede	Assist. Prof. Dr. – Cumhuriyet University	Sivas	Faculty Members and Prospective Teachers
Yusuf Kağan Yılmaz	Computer Teachers – MoNE	Ankara	K-12 Teachers
Zeynep Koç	Computer Teachers – MoNE	Çorum	K-12 Teachers

APPENDIX N

INITIAL LETTER 1

İLGİLİ MAKAMA

Bilişim teknolojilerinin ülkemizdeki hizmet öncesi öğretmen eğitimi ile bütünleştirilmesini incelemek amacıyla "Türkiye'de Eğitim Fakülteleriyle İlk ve Orta Öğretimdeki Bilişim Teknolojilerinin Bugünkü Durumuna İlişkin Bir Değerlendirme: Bilişim Teknolojilerinin Kullanımı ve Bütünleştirilmesine Yönelik Engellerin Analizi" başlıklı bir çalışma yapmaktayız. Bu çalışmada bilişim teknolojilerinin hizmet öncesi öğretmen eğitimindeki kaynaklarını, bu teknolojilerden nasıl yararlanıldığını, öğretimde kullanılmasını, konuyla ilgili derslerin etkinliğini, bu süreçte karşılaşılan önemli zorlukları, bunların üstesinden nasıl gelinebileceğini, ilk ve orta öğretimdeki öğretmenlerin durumunu ortaya çıkarmak amaçlanmaktadır.

İş bu çalışmada kullanmak üzere anket çalışması yapmaktayız. Yapacağımız anketler sadece araştırma amaçlı kullanılacaktır. Bu çalışma sonucunda oluşturulacak dökümanlarda kişi ismi doğrudan ya da dolaylı olarak kullanılmayacaktır. Anket içeriğinden doğabilecek her türlü yasal problemi tarafımızın üstleneceğini beyan eder, çalışmalarımızda bize yardımcı olmanızı rica ederiz.

ADRES:
Bilgisayar ve Öğretim Teknolojileri Eğitimi
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Araştırma Görevlisi Yüksel Göktaş

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ODTÜ Bilgisayar ve Öğretim Teknolojileri Eğitimi
Bölüm Başkan Yardımcısı

Yrd. Doç. Dr. İ. Soner Yıldırım
ODTÜ Eğitim Fakültesi Dekan Yardımcısı

APPENDIX O

INITIAL LETTER 2

Merhaba Hocam:

Araştırmamda yardımcı olduğunuz için teşekkür eder, konuyla ilgili önemli noktaları tekrar vurgulamak isterim. Göndermiş olduğum anketleri;

1. İlk-orta, özel-devlet ya da branş ayrımı gözetmeden;

2. Şartlarınız ölçüsünde tam ve doğru olarak ulaşabildiğiniz öğretmenlere doldurtmanızı,

2. Topladığınız anketleri 30 mayısa kadar aşağıdaki adrese karşı taraf ödemeli olarak kargo ile göndermenizi rica ederim.

Yardımlarınız için tekrar teşekkür eder, saygılarım sunarım.

Araş. Gör. Yüksel Göktaş
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Not: Anketlerin elinize ulaştığına dair e-posta gönderir ya da telefon açarsanız mutlu olurum.

VITA

Yüksel Göktaş was born in Milas on December 15, 1975. He received high school degree in Electronic Program from Erzurum Atatürk Anatolian Technical High School. Then he has completed his B.S. degree in Department of Computer Education from Gazi University. He also received an M.S. and Ph.D. (with this thesis) in Computer Education and Instructional Technology from Middle East Technical University in Turkey. He was a visiting schoolar at Purdue University's Educational Technology Program during 2005-2006. He worked as a computer teacher at MoNE, research assistant at Atatürk University and Middle East Technical University, and computer network trainer, computer marketing expert, technical and managerial consultant in some companies. He is interested in technology integration, technology policies in education, service learning, problem based learning, and history of IT. His main contact information as: yuksel.goktas@hotmail.com, yukselgoktas@yahoo.com