EXPLORING TECHNOLOGY INTEGRATION APPROACHES AND PRACTICES OF PRESERVICE AND IN-SERVICE ENGLISH LANGUAGE TEACHERS

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ABSTRACT

EXPLORING TECHNOLOGY INTEGRATION APPROACHES AND ATTITUDES OF PRESERVICE AND IN-SERVICE ENGLISH LANGUAGE TEACHERS

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In this study, three aspects of technology integration in English Language Teaching within the context of private universities in Ankara, Turkey were investigated. Firstly, preservice and in-service teachers' computer usage frequencies/types, computer competence levels, perceived barriers to technology integration and attitudes toward computers were explored. Then, factors (age, gender, work experience, institutional factors being preservice or in-service) that might potentially affect the findings of the first research question were examined. Finally, the educational value preservice and in-service teachers assigned to technology usage in their language teaching practices and their ideas on effective technology integration were scrutinized.

In order to reach aforementioned goals, both qualitative and quantitative data were collected with the help of a questionnaire and semi-structured face-to-face interviews. The institutions sampled in this study were all private universities, the infrastructure of which varied drastically. A total of 182 questionnaires collected from the teachers (in-service *N*=120, preservice *N*=62), as well as eight in-service and four preservice teachers were interviewed.

The findings indicated that teachers used computers at their schools at limited frequency. It was also found that they indicated high levels of instructional computer usage outside the school and technology competence. It was also seen that age, gender and the institutions the teachers worked at affected their technology usage and competence levels. As for the

educational value assigned to technology usage in their language teaching, the teachers indicated that technology would help make their lessons more student centered. However, the teachers mainly mentioned using technology as teacher tools rather student tools which help foster higher order thinking skills and learner autonomy.

Keeping the usage statistics in mind, it was concluded that the schools, even though all of them were private, lacked computer infrastructure to the point that the teachers had difficulty even to use computers for their personal purposes. It was also concluded that the schools in Turkey were still at the stage of fighting with first-order barriers, even at private institutions, indicating that a vision towards technology integration lacks. As for the educational value assigned to computer usage in ELT, it was concluded that institutional barriers were more of a concern for the teachers as they did not have a chance to delve into actual instructional usage and the ICT courses at college were not preparing the teachers for effective technology integration due to lack of proper training activities.

Key words: Technology integration in ELT, preservice and in-service ELT teacher's computer attitudes, Pedagogical Value of ICT in ELT, Barriers to technology integration

ÖZ

HİZMET ÖNCESİ VE HİZMET İÇİ İNGİLİZCE ÖĞRETMENLERİNİN TEKNOLOJİ BÜTÜNLEŞMESİNE YAKLAŞIMLARI VE TUTUMLARI

Akcaoğlu, Mete

Yüksek Lisans, İngiliz Dili Öğretimi Bölümü

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Bu çalışmada Ankara, Türkiye' deki özel okullardaki teknoloji bütünleşmesi İngiliz Dili Öğretimi açısından üç boyutta incelendi. İlk olarak, hizmet-içi ve hizmet-öncesi öğretmenlerin bilgisayar kullanım sıklıkları/çeşitleri, bilgisayar yeterlilik düzeyleri, teknoloji kullanımına engel olarak düşündükleri unsurlar ve bilgisayarlara karşı olan tutumları incelendi. Sonra, bu unsurlar yaş, cinsiyet, iş tecrübesi, kurumsal faktörler ve hizmet içi/ öncesi olma gibi teknoloji kullanımı etkileyen öğeler açısından incelendi. Son olarak, öğretmenlerin dil öğretiminde teknoloji kullanımına verdikleri eğitimsel değer ve etkili teknoloji bütünleşmesi üzerindeki düşünceleri irdelendi.

Bahsedilen hedeflere ulaşmak için anket ve yüz yüze mülakatlar yardımıyla hem nicel hem de nitel türde veri toplandı. Bu çalışmada örneklem alınan kurumlar teknik altyapıları birbirlerinde farklılıklar gösteren özel üniversitelerdi. Öğretmenlerden toplam 182 adet anket toplandı, bunlardan 120'si hizmet içi 62'si hizmet öncesi öğretmenlerden toplandı. Bunun yanında 8 hizmet içi ve 4 hizmet öncesi öğretmenle yüz yüze mülakat yapıldı.

Bulgular öğretmenlerin okuldaki bilgisayar kullanımları sınırlı seviyede olduğunu gösterdi. Bunun yanında, öğretmenlerin bilgisayarları dersle ilgili sebeplerden okul dışında fazla kullandıkları ve teknoloji yeterliliklerinin yüksek seviyede olduğu görüldü. Ayrıca, yaş, cinsiyet ve öğretmenlerin çalıştıkları kurumların öğretmenlerin teknoloji kullanım miktarlarını ve

yeterliliklerini etkiledikleri görüldü. Teknoloji kullanımın eğitimsel değeri konusunda öğretmenler bu tarz uygulamaların onların derslerini daha öğrenci merkezli yapabileceği konusunda hemfikir oldular. Bununla beraber, temelde öğretmenler sadece teknolojiyi "öğretmen-araçları" olarak kullanmaktan bahsedip öğrencileri kendi başlarına çalışmaya ve yüksek düşünme aktivitelerine iten "öğrenci-araçları" olarak kullanımlarından habersiz göründüler.

Bu kullanım istatistikleri göz önüne alındığında, özel olmalarına rağmen örneklem alınan üniversitelerdeki teknoloji altyapısının öğretmenlerin kişisel ihtiyaçlarını dahi karşılamaya yetmeyecek derecede yetersiz olduğu sonucuna varıldı. Ayrıca, Türkiye'deki okulların, özel dahi olsalar, hala birinci düzey engellerle savaştığı görüldü ve bu eksikliğin teknoloji bütünleşimine yönelik görüş eksikliğinden kaynaklanabileceği düşünüldü. İngiliz Dili Öğretimi'nde teknoloji kullanımına verilen eğitimsel değere gelince, öğretmenleri teknik yetersizliklerle daha fazla düşündürdüğü ve bu sebeplerden gerçek anlamda derste teknoloji kullanımı konusunda düşünmedikleri görüldü. Bunun yanında, lisans eğitimi boyunca sunulan bilgisayar derslerinin doğru eğitim aktivitelerinin eksikliğinden dolayı öğretmenleri sınıfta etkili teknoloji kullanımı konusunda eğitmedikleri sonucuna varıldı.

Anahtar Kelimeler: İngiliz Dili Eğitiminde teknoloji bütünleşimi, Hizmet öncesi ve hizmet içi İngilizce öğretmenlerinin teknolojiye karşı tutumları, Teknoloji bütünleşiminin İngiliz Dili Öğretimi açısından eğtimsel değeri, Teknoloji bütünleşimine engeller

To My Beloved Family

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I know nothing except the fact of my ignorance.

Socrates

At last this day has come! The day to write this page! The very last day of my thesis! It is not hard to say that this has been a long journey for me, during which I learned a lot, and especially I learned the fact that with every bit of knowledge I gained I realized the insufficiency of my own.

This journey could not have been a successful one without the help and support of my family, and my teachers. Firstly, I would like to thank the teachers that participated in this study, as due to their sincere participation I both enjoyed my thesis project and gained genuine first-hand information on technology integration within the context of this study. Second, I would like to thank my committee for all of their support and advice. I would like to thank Assist. Prof. Dr. Betil Eröz for all her expertise in the field, her encouragement, advice, mentoring, and for providing me with numerous opportunities to grow as a scholar. I would also like to express my sincere appreciation to the examination committee members, Prof. Dr. Hüsnü Enginarlar and Assist. Prof. Dr. Feyza Tantekin-Erden, for their comments and suggestions.

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CHAPTER 1

INTRODUCTION

You cannot step into the same river twice.

Heraclitus

1.1 Overview of the Chapter

In this chapter, the overall purpose, significance and research questions of this study arw explained. Throughout the study, technology integration is considered as the latest form of educational change and therefore the reasons for conducting this study are evolved around explaining the need for this change and ways of attaining a successful one.

1.2 The Latest Educational Change Movement: Technology Integration

Technology integration in education could be considered as the latest educational change movement, and as it was seen during the previous reforms (agricultural revolution and industrial revolution) the change movement of the schools are closely linked with the society's needs and demands (Keating, 2005). During this educational change process (technology integration), schools, as the focal points, have tended to find that this innovation adoption process was hard to achieve as technology integration requires significant changes to the curriculum, pedagogical practices, and resource distribution (Zhao & Frank, 2003). It was also believed that teachers' strong resistance to change might be one of the reasons why schools have been slow to embrace technology as an innovation (Ottenbreit-Leftwich, 2007).

It could be maintained that the main reasons for educational change, or technology integration, are firstly the demands of the society as to how to produce desired outcomes that can function well in the changing work life, and the desire to keep up-to-date with the constant innovations that shape human life (Irving, 2003). Within the context of English Language Teaching (ELT) it is believed that technology integration brings about innovations that make language learning both more authentic and meaningful (Warschauer & Kern, 2000; Warschauer & Meskill, 2000; Young, 2003).

Education history is filled with "revolutions" and not always do they get to the point where they originally intended to be. One of the paradoxes created by our societies is that we tend to lose faith in education in that it is going to change our lives. However, with every attempt toward change, we manifest that we covertly believe in that power, namely the power of education to change our lives (Cuban, 2001); and, although slow, the schools tend to adapt themselves to the changing needs of the day.

As the last educational change wave, technology integration is believed to carry a fruitful potential, the effective practices are rare to find even in the countries where computer availability in classrooms is at high levels. Being a developing country, Turkey differs drastically from those of the developed countries in terms of computer availability and usage level statistics. To portray a clearer picture of the case, within the context of this study, computer usage/competence and attitude levels of preservice and in-service ELT teachers in Ankara, Turkey will be defined. Moreover, baseline data will be provided in terms of teachers' computer competence, perceived barriers to integration, factors affecting computer competence/usage and the educational value the teachers assign to using computers in ELT, which will eventually help portray the current technology integration levels in private universities in Ankara, Turkey.

1.3 Background of the Problem

As mentioned before, in order to meet the changing needs of the society and make education more effective, educational tools have always been developed to help achieve aforementioned goals. The belief that tools could bring about educational change in fact dates back to earlier times, even to ancient times, when the teachers tried to enhance their lessons by writing in the sand (Cambre & Hawkes, 2004). Hew and Brush (2007) summarize the path of educational reforms with these words: "From the birth of the motion picture in 1922, to the advent of the computer in the mid-1970s, educators have been intrigued with the potential of technology to help transform education and improve student learning" (p. 224). New technology has generally been seen as a solution for the problems education systems face (McKendrick, 2001). Therefore, starting from the early days of technological advancements, educators have thought of finding ways to integrate innovations into education for the betterment of it.

Given this context, it could be claimed that perhaps the most important and promising advancement in the last decade may be the integration of computers and the Internet into education. The integration of computers into education was given a great amount of importance since the 1980s. It is believed that one of the reasons why the young generation should learn how to use computers comes from that fact that their future jobs will require them to do so

(Berkowitz, 2000; Cuban, 2001; Selwyn, 1997; Yıldırım, 2000). Similarly, Cuban (2001) claimed that "Ninety percent of the jobs created from this moment on will require advanced technological training" (p. 33). Therefore, a shift toward integrating technology in education is seen as a crucial part of the schools' adaptation to the society's needs.

Gerstner (1995) summarizes the interwoven relationship among education, technology and change and claims that change makes a better society, technology brings about change; therefore, technology makes a better society (cited in Glennan & Melmed, 1996, p.9). Within this general framework, it may be maintained that being considered equal to change, technology is believed to play a major role in the amelioration of the societies.

In the light of the discussion above, educational change, namely technology integration, may help increase the potential of the learning for the students, and make the teaching easy for the teachers. Specifically, in the field of ELT, the power of Information Communication Technologies (ICT) cannot be undermined as it offers solutions for the problems the ELT world has been facing for decades, such as providing authentic materials to the learners, providing grounds for authentic and meaningful communication, increased feedback and faster response time, and increased student motivation and autonomy (Braul, 2006; Kim, 2004; Salaberry, 2001; Warschauer & Meskill, 2000). With hypermedia[1], learners are provided with a more authentic learning environment as listening is combined with seeing (Braul, 2006). Besides combining sound and visual aids, the Internet also helps the learners contextualize the language they have been learning, as it helps make it virtually possible to access authentic target culture. Moeller (1997) claims that the realia accessed through the Internet help provide the students with a level of cultural awareness, which can mostly be acquired through experience abroad.

However, it should not be forgotten that computers or the Internet is just another medium to use in teaching and learning. One of the reasons for the disappointment people had after the failure to realize the potential of information technologies in language teaching is that the reformers ignored this fact. Warschauer and Meskill (2000) claim that:

> First of all, the computer is a machine, not a method. The world of online communication is a vast new medium, comparable in some ways to books, print, or libraries. To our knowledge, no one has ever attempted to conduct research on whether the book or the library is beneficial for language learning. The enterprise of seeking similar conclusions on the effects of the computer or the Internet is equally inappropriate. (p. 307)

[1] The use of text, data, graphics, audio and video as elements of an extended hypertext system in which all elements are linked so that the user can move between them at will.

Therefore, while approaching the topic of technology integration to language teaching, like other tools, the effective usage depends on the people who use them.

Despite all the promises it makes, technology integration statistics are still low in many different contexts, including developed countries like the USA (OTA, 1995), the UK (D. Reynolds, Treharne, & Tripp, 2003) and developing ones like Turkey (Özar & Askar, 1997), despite the fact that the money spent on technology is increasing day by day (OTA, 1995). According to the statistics obtained from The World Bank (2008), Turkey is showing a sharp increase in its ICT usage statistics. The number of the Internet users has nearly doubled every year since 2001 and is now over world average, with over 20% of the population using the Internet for various purposes. This number is quite optimistic when compared to the students per computer ratio of 1980s (Özar & Askar, 1997), 1089 to 1.

Despite the increasing number of computers at schools and in classrooms, the studies conducted in the US shows that the teachers report that they do not feel ready to integrate technology in their teaching, and when they do the usage is only for low level tasks, such as word processing (Abdal-Haqq, 1995; Albirini, 2004; Barton & Haydn, 2006; Ertmer, 2005; Harrison et al., 2002; Kesten, 2006; NCES, 2000; OTA, 1995; Pepper, 1999; Pope, Hare, & Howard, 2002). These low level uses of technology are considered as usage of computers as "teacher tools," which does not require student autonomy, but merely replaces old tools of presentation of more effective newer versions (Cambre & Hawkes, 2004); as opposed to "student tools" that bring about student-centered instruction, learner autonomy and skill integration in ELT (Niederhauser & Stoddart, 2001; Wang, 2002). As for the context of Turkey, previous studies on technology integration do not go beyond providing numbers, and therefore a closer look at the depth of the teachers' technology knowledge and usages cannot be mentioned within this context.

Teachers' low computer competence could be another reason for low computer usage statistics. In his study on English Language teachers at Middle East Technical University in Ankara, Turkey, Top (2003) found that only 25,9% of the prospective English teachers felt highly competent about using computers, while the rest stated their computer competence was below average. Although in other studies higher percentages were reported, it was believed that teachers high competence levels could be a sign of inclination towards more frequent computer usage.

Investigating this underuse of computers for educational purposes, many reasons have been enumerated and Ertmer (1999) classified these as first-order and second-order barriers (York, Ottenbreit-Leftwich, & Ertmer, 2005). The first-order barriers, namely extrinsic barriers,

include lack of computers, lack of time; while the second-order barriers, namely the intrinsic ones, include the attitude toward computers and the beliefs about the usefulness of computers (Christensen, 1997; Ertmer, 1999). Although in developed countries, where the ratio of students per computer showed a sharp decline over the past decade (Doering, Hughes, & Huffman, 2003; Varank, 2003; Watson, 2006), the numbers for Turkey are still at a low levels (Bayram & Seels, 1997). This might suggest that the both first and the second order barriers might still be effective in technology integration in Turkey.

As an agent of educational change that promises unprecedented innovations in ELT, technology integration has drawn attention and investments, but was not successful in many contexts due to barriers innate to both institutions and teachers. Turkey, as a developing country, had its first experience with information communication technologies in 1984 (Yedekcioglu, 1996), and since then, investments have been made toward computerization of schools. Currently, ICT courses are offered in Education Faculties in Turkish universities (Yıldırım, 2000) and the new generation grows up knowing better about using ICT.

However, although it might be projected that the preservice teachers grow up using technology and therefore have more competence and more positive attitudes toward computers, the older teachers might not have the same amount of technological competence, and data comparing preservice and in-service ELT teachers' technology competence in Turkey is not available. Moreover, the current situation of Turkish schools in terms of technical infrastructure could be a factor that significantly affect technology integration process and the teachers' knowledge of usage of computers might be only limited to using them for low level tasks and recreation, as is the case for a great majority of teachers (NCES, 2000). Again, such data on the teachers' computers usage frequency and purposes and the depth of their technology knowledge is not available. Therefore, this study was conducted to fill this gap in the literature.

1.4 Purpose of the Study

This study develops around three main purposes: definition, analysis and gaining insight. As this study is unexampled in its design within its context, the data gathered will provide baseline data for future research.

Firstly, this study aims at defining the computer usage statistics, types, competence/attitudes levels and perceived barriers to technology integration of preservice and in-service ELT teachers. Secondly, in this study, computer-related factors will be analyzed in terms of different variables, such as age, gender, work experience, institution and being preservice or in-service. Finally, this study aims at gaining an insight as to the educational value

English teachers assign to technology integration, while making it clear if teachers have a clear idea of meaningful technology usages, namely using computers as "student tools."

1.5 Significance of the Study

The significance of this study comes from several reasons. Firstly, as it is stated earlier, since a data about the situation of ELT teachers in terms of technology competence, attitude and usage is not available within the context of Turkey, the findings of this study may constitute baseline data and a basis for future research on technology integration.

Secondly, previous research on technology integration focused on either in-service teachers, disregarding the preservice aspect, or preservice teachers, ignoring the actual practices of in-service teachers (Abdal-Haqq, 1995; Albirini, 2004; Dexter & Riedel, 2003; Doering et al., 2003; Toker, 2004; Varank, 2003). However, by looking at the attitudes and competence levels of both groups simultaneously, this research aims to find common patterns, or factors that significantly differentiate the preservice and in-service teachers from each other, and thus explain the differences between new and old generation of teachers. In this respect, this study might be considered as unique.

The educational value teachers give to technology usage in language teaching will also be explored and it is going to be determined if the teachers have knowledge about meaningful uses of computers in language teaching. Therefore, this study may carry another level of significance, as during the development of ICT training activities knowing the teachers' current levels of computer integration knowledge could form a basis for the development of activities.

Unlike previous research that has mainly focused on in-service teachers who work at the K-12 level, this study focuses on in-service teachers who teach at the university level. Gathering data from private universities could be significant for two reasons. Firstly, the schools at the K-12 level in Turkey are directed by the centralized Ministry of National Education, and centralization might have an effect on the slow ICT integration in schools in Turkey (Bayram & Seels, 1997). Having more independence, the universities might show differences from K-12 schools in terms of school-level policies. Secondly, working with the university students and in preparatory schools where the main subject focus is only one course, English, might yield different results from the previous studies conducted.

As for the potential implications of the study, by looking at the competence levels, usage types and attitudes of preservice teachers, the content and delivery of college ICT courses on technology use could be reexamined. The same argument might be valid for in-service teachers, as knowing their perceptions of technology and usage levels might allow schools to design and

implement in-service training programs for teachers who may be intimidated by ICT, or have false ideas about proper use of computers for language teaching purposes. Thus, more structured environments for technology use in teaching may be created, and the young generation could be better prepared for their future occupations. Moreover, technology integration process may be better managed for both preservice and in-service teachers and their attitudes toward computers, computer competence, and usage frequency might be improved drastically.

1.6 Research Questions

To reach the aforementioned purposes, this study will address the following research questions:

1. What are the preservice and in-service English teachers' attitudes toward computers, their personal computer competency, perceived barriers to technology integration and the degree of their computer usage?
2. What factors affect preservice and in-service teachers' attitudes toward computers, their personal computer competency, perceived barriers to technology integration and the degree of their computer usage?
    a. What are the factors that affect in-service teachers' technology usage, competence, attitudes and perceived barriers?
        i. What are the effects of gender?
        ii. What are the effects of age?
        iii. What are the effects of the institutions the teachers work?
        iv. What are the effects of work experience?
        v. What are the effects of other factors?
    b. What are the factors that affect preservice teachers' technology usage, competence, attitudes and perceived barriers?
        i. What are the effects of gender?
        ii. What are the effects of other factors?
    c. Is there a significant difference between preservice and in-service teachers' use of technology, competence, attitudes and perceived barriers?
3. What pedagogical value do the teachers assign to using computer technology in language teaching?

1.7 Definition of Terms

Pedagogical value of computer usage may be considered as the value teachers assign to using computers for English teaching purposes. These usage types or the pedagogical value can be either using computers as teacher tools or student tools.

Using computers as teacher tools is the usage of computers as add-ons to traditional teaching practices. To this end, using technology as teacher tools includes using LCD projectors to present colorful, motivating lesson material or using computers to prepare worksheets or lesson plans, which does not transform the lessons' style toward student-centeredness, but eases the teachers' work and increases student motivation. Especially in language learning, this usage does not bring about skill integration and authentic communication (Cambre & Hawkes, 2004; Young, 2003).

Using computers as student tools is considered as the creative usage of computers, which transforms a lesson into a student-centered one and creates learner autonomy and integration of language skills. Specifically, in terms of language teaching, using computers as student tool help teachers become facilitators rather than authority figures and with the help of meaningful activities assigned, the students learn authentic language and have chances to communicate with others from all around the world, which are the innovations that would not have been achieved otherwise.

Attitude: Palaigeorgiou, Siozos, Konstantakis, and Tsoukalas (2005) define attitude as "a positive or negative sentiment, or mental state, that is learned and organized through experience and that exercises a discrete influence on the affective and conative responses of an individual toward some other individual, object or event." (p. 331). Moreover, as used in this study, attitudes are shaped by the environment, and consequently shape behavior, and are in turn shaped by the behaviors (Ertmer, 2005; Gardner, Dukes, & Discenza, 1993).

Attitude toward computers is herein defined as a person's general evaluation or feeling of favor or antipathy toward computer technologies and computer-related activities (Palaigeorgiou et al., 2005, p. 331).

Information and Communication Technology (ICT) refers to technologies and tools that people use to share, distribute, and gather information, and to communicate with one another through the use of computers and interconnected computer networks (Albirini, 2004). It can be broadly defined as the set of technologies that enable the collection, storage, processing, and automatic transfer of information, as well as the ability to access this information remotely by means of electronic, optical, and/or other technologies (Yurdakul & Çaglayan, 1997).

Preservice Teacher: This term refers to a student of Education Faculties, who is currently studying to become a teacher.

In-service Teacher: A teacher who earned a University degree in Education and is teaching in his/her educated subject area.

Technology integration: Technology integration is the infusion of technological tools and services, such as computer systems and the Internet, into the educational environment within various subjects areas (McDonald, 2002) including changes made to the curriculum as well as to educational facilities (Maninger, 2003; Pawloski, 2003, cited in Hatipoğlu, 2006).

CHAPTER 2

REVIEW OF RELATED LITERATURE

2.1 Overview of the Chapter

In this chapter, literature on technology integration is reviewed and linked to the current study. Firstly, the reasons for using technology in education, language teaching and specifically for ELT are explicated. Then, the reasons for low usage of technology in ELT are discussed and statistics from the world and Turkey are provided to depict a clear picture of the case. Finally, the research methodology and theoretical framework of this study are explained.

2.2 Teaching with technology

As it has done in every aspect of our lives, technology has also found its way into education through the improvements and innovations it has promised to manifest. In the Office of Technology Association's (OTA) Report (1995), the views of a teacher summarize the importance we give to the implementation of technology into education: "You wouldn't want a doctor to remove your gall bladder without the latest technology and the skill to use that technology, would you? It's the same with teaching. [Teachers need tools, skills]…it's a profession" (p. 8). Therefore, it could be claimed that being able to use technology in teaching carriers importance and gives advantage to the teachers who could effectively use them. Given the fact that a large amount of money has been invested into technology integration in education (Albirini, 2004; Kay, 2006b; Varank, 2003; Zhao & Cziko, 2001), it may be maintained that during the last two decades technology has been seen as the cure for the illnesses of the education systems all over the world (Albirini, 2004) and successful cases of integration have been reported as the fruits of effective implementation.

The relationship of education and innovation has a long history, and teachers have always looked to improve the effectiveness of their teaching with the tools offered to them. The OTA Report summarizes these attempts with these sentences:

> … Throughout history, teachers have taken up the tools at hand to help them teach—whether marking on clay with a stylus, or writing on a blackboard with chalk. As new technologies have emerged—photography, filmstrips, radio, television— teachers have used them to extend the range of what they could teach, illustrate ideas in different ways, bring new materials to students, and motivate learners. (p. 6)

Therefore, whether with chalk, television, or Information Communication Technologies and the Internet, the promise of change has always been alluring for the world of education. With this regard, during the last decade a great amount of money has been spent on buying computers (the technological innovations of this decade) and connecting those to the Internet, which offers a new era for classroom teaching (Kiridis, Drossos, & Tsakiridou, 2006).

However, what effect does ICT integration have on the stakeholders in education: teachers, students and parents? Pelgrum, ten Brummelhuis, Collis, Plomp, and Janssen (1997, cited in Pelgrum, 2001, p. 164) comprehensively summarize the potential benefits of integration of ICT in schools (Table 1):

Table 1. Expected changes from education in an industrial society to education in an information Society

Actor	**Education in the Industrial Society**	**Education in the Information Society**
School	• Isolated from society • Most information on school functioning confidential	• Integrated in society • Information openly available
Teacher	• Initiator of instruction • Whole class teaching • Evaluates student • Place low emphasis on communication skills	• Helps students find appropriate instructional path • Guides students' independent learning • Helps student to evaluate own progress • Places high emphasis on communication skills
Student	• Mostly passive • Learns mostly at school • Hardly any teamwork • Takes questions from books or teachers • Learns answer to questions • Low interest in learning	• More active • Learns at school and outside school • Much teamwork • Asks questions • Finds answers to questions • High interest in learning
Parent	• Hardly actively involved in learning process • No steering of instruction • No life-long learning model	• Very active in learning process • Co-steering • Parents provide model

Source : (Pelgrum et al., 1997)

As it can be seen from the table, with the help of technology integration the schools, teachers, students and parents are projected to go through drastic changes. Schools become more integrated in the society and become platforms for "asking questions" rather than platforms where the students "learn to answer questions." Teachers become facilitators rather than initiators of instruction. Students collaboratively and actively work to get knowledge instead of passively waiting for the knowledge presented to them. Finally, parents become more active in shaping their children's learning processes rather than passively following the paths drawn by the curriculum of the schools.

One drastic change in recent decades in the way teachers conduct lessons is that "the teacher changes from 'sage on the stage to guide on the side' which changes the fundamental notion of teaching" (Brickner, 1995, p. 44). That is to say, the culture of classrooms has moved toward a more student-centered atmosphere (Dexter & Riedel, 2003; Kesten, 2006; McGrail, 2005). Therefore, it may be argued that one other motivation for the investments made in technology integration could be moving the classrooms from dominance of teachers to autonomy of the students.

However, every type of computer usage may not necessarily trigger the aforementioned changes in the teaching process, as the usage of computers can be categorized into using computers as "teacher tools" and "student tools" (Cambre & Hawkes, 2004). Therefore, it needs to be reminded that the usage of computers as student tools that require learners to be active parts of the learning process should be considered as the ideal and effective technology integration. Although using computers as teacher tools is also an effective way of implementing them into education, this type of usage does not go beyond helping the teachers make their presences as the leaders of classroom get more easy and effective.

Undeniably, technology integration has a promising potential for a drastic change in education. As an established area of education field, language teaching was also aware of this innovation movement and followed the trends closely. As it was also one of the purposes of this study, the educational value of using technology for ELT is one of the key components of effective integration. The teachers' knowledge as to how to use technology effectively in ELT depends on the depth of their knowledge on the benefits and right usages of technology.

In the next part, the benefits of using technology in ELT will be explained.

2.3 Language Teaching and Information Communication Technologies (ICT)

2.3.1 Brief History of Computer Assisted Language Learning (CALL)

From their first appearance in English Language classrooms, the use of computers for language teaching purposes has taken many forms. In fact, the path of computer assisted language learning is quite similar to what language teaching itself has followed to the present day. The researchers divided the history of CALL into three phases: behavioral, communicative and integrative CALL (Al-Shehri, 2004; Braul, 2006; Lee, 2000; Warschauer & Kern, 2000).

Drill and practice software was what was mainly available at the time of Behavioral CALL or Structural CALL, which mainly followed computer-as-tutor model and provided the learners merely with worksheets on computer screens rather than on paper (Warschauer & Kern, 2000). Then followed an era of communication and communicative software, Communicative CALL, in which content was the focus and grammar was believed to be taught implicitly. Currently, the Integrative or Sociocognitive CALL, which aims at teaching language skills in an integrated fashion and shifting the dynamic from learners' interaction with computers to interaction with humans via the computer, is the accepted form of computer use for language teaching purposes (Figure 1).

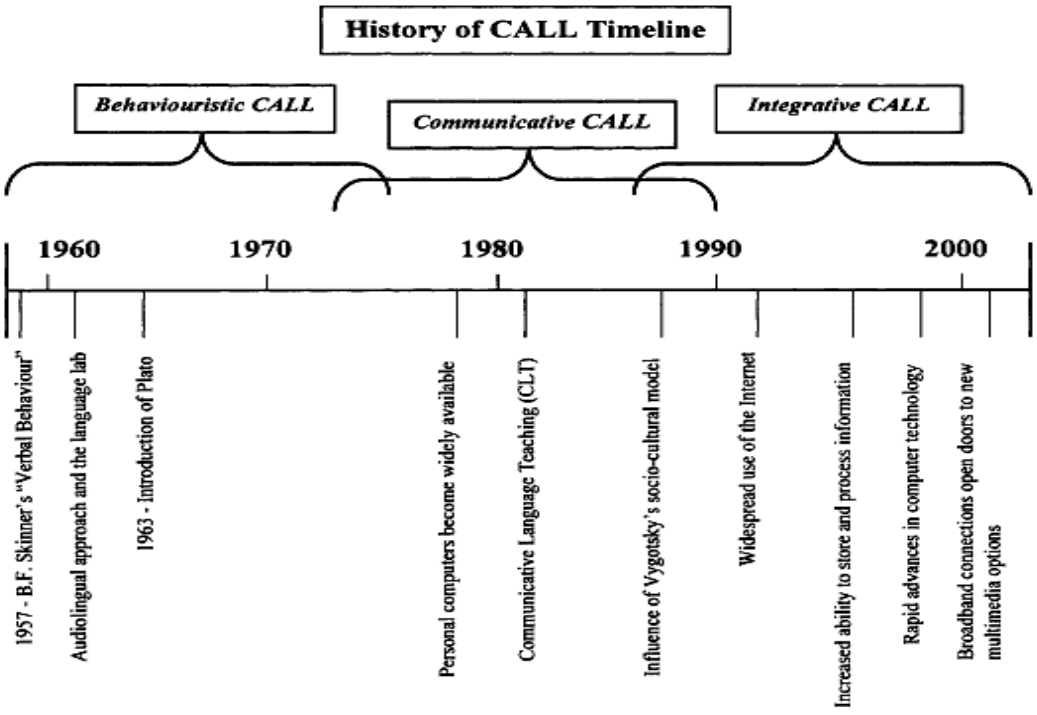


Figure 1 The History of CALL Timeline (Braul, 2006, p. 25)

In accordance with the linear change of CALL, it can be claimed that, in Kim's terms (2004), the first wave of computer use, namely the wave of drill and kill type activities, which were given this name due to their repetitious and boring structure, were nothing more than the replacement of grammar worksheets with computer-based worksheets. The students often felt as unmotivated to use the computers as they did to do grammar exercises. Salaberry (2001) claims that during this *wave* "most of the software programs were drill-practice and tutorial in nature, amounting to little more than electronic textbooks" (p. 45). Then, the second wave of computer use has gained power with the help of World Wide Web. The Internet made a vast amount of information available and students found themselves engaged in more meaningful tasks (Kim, 2004). The Internet also provided opportunities that were never achievable before, such as the opportunity to find authentic materials and native speakers with the click of a mouse.

2.3.2 Benefits of using ICT in ELT

As for potential benefits of technology integration in teaching English as a foreign language, the research conducted on the benefits of CALL on ELT has acknowledged that using technology was beneficial in many aspects. It was maintained that successful implementation of technology could bring about innovative changes such as the opportunity for authentic communication, increased student motivation and autonomy, and increased attendance by shy and disaffected students as the students felt more confident to communicate through a medium and had more time to think during communication (Lee, 2000; Young, 2003).

First of all, with the help of the Internet-based tools, learners are able to gain autonomy and feel more responsible for their own learning (Liu, Moore, Graham, & Lee, 2002; Yang, 2001; Young, 2003) and thus they feel more motivated to learn (Lee, 2000). The charm of the virtual environment might be one of the main reasons for the observed increase in motivation by students (Young, 2003). Young also adds, "…the integration of *communication technology on the Internet* [italics added] with English facilitated the creation of a virtual environment that transformed learning from a traditional passive experience to one of discovery, exploration, and excitement in a less stressful setting" (p. 447). Therefore, the new outlook or dimension the usage of computers provided takes ELT to a newer level, where interaction and communication could be integrated easily in teaching.

Secondly, one of the key elements in successful language learning, which has long been a barrier for language teachers, is overcome with the innovations the Internet brings: the opportunity for authentic communication with native speakers (Liu et al., 2002). Giving the learners the chance for authentic and meaningful communication helps foster the language skills

of the learners and the Internet serves as an ideal platform for such practices (Lee, 2000). To this end, Yang (2001) points out that:

> The tools and resources available on the world-wide web (conferencing, email:, whiteboard, streaming and 'plug-in' technologies, etc.) offer prime opportunities for cultivating the five Cs, communication, cultures, connections, comparisons, and communities (ACTFL, 1999), through multimodal channels (listening, speaking, writing, reading and communicating). The web provides an effective forum for dialogue on issues that enhance or challenge the community. With a huge, amazing, world-wide system of voluntarily interconnected networks with literally millions of documents, resources, databases and a variety of mechanisms for communicating, Internet technology serves as an intrinsically motivating device and a natural platform for the development of the five Cs. (pp. 85,86)

The networking of computers provides a vast amount of opportunity for the language learners of today in terms of communication, which is considered to be a key element in successful language learning and was not available to learners before the opportunities the Internet provided.

Finally, the opportunities online learning environments provide go beyond just being a source of motivation through their colorful atmosphere, to helping learners to learn vocabulary better with the support of visual media, increasing their reading ability by providing a vast source of authentic texts, and helping them improve their writing skills by providing chances for authentic written communication (Liu et al., 2002). What is more, while learning the language, when guided properly, the Internet and computers help the learners explore the target culture, and get a chance to learn the language in its original context (Lee, 2000). In addition, multimedia features of the computers and the internet improves its alluring potential day by day, which help increase the motivation of the students toward learning.

2.3.2.1 Multimedia and ELT

When fostered with audio and visual materials, learning a language becomes a more appealing and meaningful task for the learners. According to Brett (1998) "Multimedia combines a wide range of communication elements, such as text, sound, graphics, pictures, photographs, animation and moving video and is powerful because informational, communicative and publishing tools are easily accessible via one source, the computer" (p. 81). Conforming to the fact that with the integrative CALL an era where skill integration has gained importance, one may argue that the multimedia aspect of ICT is useful in language teaching.

Warschauer (1996b, cited in Braul 2006) claims that with the help of hypermedia (e.g. World Wide Web), multimedia becomes a more powerful tool for language learning. He maintains that the one of the advantages of using hypermedia for language teaching is that it

provides learners with a more authentic learning environment, as, for example, listening can be combined with seeing. He asserts that skills are easily combined with the help of hypermedia, as the diversity of media makes it natural to mix reading, writing, speaking and listening into a single activity. As the learners can find vast amount of language resources on the internet the teachers can easily direct their students toward meaningful tasks that both improve the students' critical thinking abilities and language skills. Thus, while using hypermedia students have more control over their own learning while learning at their own pace; and a principal focus on content is facilitated without totally undermining a secondary focus on language form or learning strategies.

Moreover, instead of dealing with the trouble of using cassette players, or even CD-players that have replaced them, the availability of online audio content presents itself as a vast resource available for language teachers and learners who seek authentic input. On this issue, Braul (2006) claims that "audio and video clips accessed through a CALL program allow students to listen and watch native speakers in realistic, meaningful, natural and culturally appropriate situations" (p. 28). Therefore, it may be argued that the use of multimedia has great value in terms of providing students with authentic language input and integrating language skills.

2.3.2.2 The Internet and Authenticity

Providing learners with authentic materials and meaningful tasks has always been one of the biggest challenges of the ELT profession. Living through the days when a piece of *Newsweek Magazine* was a treasure, it is relieving and astounding to know that with the help of a personal computer, language learners can now not only reach a plethora of authentic materials, but the teachers can also easily create tasks that are meaningful for the students.

Furthermore, with the help of files available on the Internet (authentic texts, sounds, videos, or pictures), language learners can find documents which appeal to their interests (Braul, 2006; Warschauer, 1996b). One of the biggest advantages of these authentic documents is that

> …[*the authentic documents*] immerse students in discourses that extend well beyond the classroom, their immediate communities, and their language textbook. This is particularly critical for foreign language students who otherwise see the target culture only through their instructor and select curricula. (Warschauer & Meskill, 2000, p. 307)

According to Warschauer and Meskill (2000) students can easily access authentic materials about the target culture and this prepares them for the kinds of international cross-cultural communication that will be required by the students' academic, vocational and personal lives. Moreover, on the issue of accessing authentic target culture, Moeller (1997) claims that these up-

to-date realia help provide students with a level of cultural awareness, which can otherwise be acquired only through experience abroad. According to Moeller (1997) another advantage of these authentic and culturally rich realia is that "once the students start reading a text dealing with contemporary issues in the target culture, they become motivated to read more and investigate a topic further. As they read for content, they improve their reading skills and strategies" (p. 11). In other words, the authentic opportunities the Internet provides language learners with not only supply them with culturally rich materials, but also increase their motivation toward learning activities due to their authenticity.

Apart from the fact that the learners can reach authentic and culturally loaded materials, the Internet is also a platform for another unique opportunity: authentic communication with native speakers of English with the help of synchronous and asynchronous communication channels (Braul, 2006; Warschauer, 1996a, 1996b; Warschauer & Meskill, 2000). Emphasizing that ICT in language teaching can offer a sociocognitive approach, Warschauer & Meskill (2000) claim that online communication opportunities can help provide learners with socialization into discourse communities, enabling them to engage in authentic communication and get the necessary comprehensible input they require to learn the language, thus simultaneously helping them to learn both the content and the language. Moreover, the authors claim that the communication skills the learners acquire through these online tasks may function as a practice for the real-life tasks the learners will face later (Braul, 2006).

Providing myriads of authentic opportunities to communicate, the Internet allows language learners to practice their communication skills on a global level (Braul, 2006). Especially in foreign language learning contexts, where the target language is not spoken as the official language in the teaching context, the Internet "allows students the opportunity for target language practice in situations where such practice might otherwise be difficult. This is especially important in foreign language classrooms, where students might have little other access to authentic language use" (Warschauer & Meskill, 2000, p. 307). Therefore, the communication opportunities provided by the Internet may be considered as second to none, as the Internet gives the learners a chance that they can only achieve through travelling to the target culture.

Online communication may not be considered as a substitute for real-life, face-to-face communication; however, it offers some advantages over face-to-face classroom communication activities (Warschauer & Meskill, 2000). Firstly, online communication acts more democratically, in that the learners have an equal chance for participation, while the teacher's dominance in the classroom is kept to a minimum. Secondly, due to its asynchronous nature,

online communication gives the learners a chance to analyze and pay attention to input from their peers, as in asynchronous communication, for example emails, the learners can take their time and think thoroughly before responding to their peers. Thirdly, again mainly due to its asynchronous nature, learners are provided more time with less stress to plan and think through their answers, as again the learners can take their time to compose an answer to a question directed to them, instead of having to reply it on the spot. Finally, the learners get a chance to practice communication outside the classroom context, and chat tools provide an opportunity to practice their writing skills (Warschauer & Meskill, 2000).

In a similar vein, Kim (2004) claims that online opportunities promotes higher order thinking skills, a sense of an authentic audience for reading and writing, literacy for authentic purposes, literacy within social context, the fostering of computer skills, and often results in incidental learning. Therefore, the usage of computers and the internet for these reasons could be considered as using computers as student tools, as they give the learners to use language meaningfully and authentically, as well as they let learners work at their own peace and interests.

2.3.2.3 Individualized Instruction and Learner Autonomy

It is a well-known fact that when learners take responsibility for their own learning, the quality of their learning improves. Although within the normal context of a classroom teachers may not find opportunities to truly provide learner autonomy, with the help of ICT this practice becomes more natural and easy to implement (Liu et al., 2002). Moreover, as it is also stated by Braul (2006) "…students bring to the learning environment different learning strategies and styles, different levels of motivation, and different language competencies" (p. 26). Thus, with the help of ICT, instruction could be made more individualized (Braul, 2006; Kim, 2004; Moeller, 1997), and therefore the different needs of the students could be more easily met.

Moreover, as computers can repeat instruction as many times as a learner wants, the learners may enjoy the freedom of going at their own pace without feeling under pressure by the teacher and the rest of the class, which is claimed to have an anxiety-reducing effect (Braul, 2006).

Besides working at their own pace, one other advantage of learning a language with the help of computers is that the learners gain an important skill: critical thinking (Hopson, Simms, & Knezek, 2001; Kim, 2004). In CALL classrooms, generally, the role of the teacher switches from a knowledge provider to a facilitator (Kim, 2004). Working on their own without external help, while getting the proper guidance from their teachers, learners develop the habit of critical thinking (McGrail, 2005). Kim (2004) claims that

> [Instructional technology] promotes critical thinking by changing the students from being passive learners to active participants in the creation of knowledge and meaning (Gaer, 1999), and allowing them to become proactive in their learning process while letting the teacher become a facilitator in that process rather than the one who possesses and imparts all the knowledge and information the students need to learn. (p. 15)

In other words, proper use of ICT in language learning may lead to improved thinking and analysis skills in students, as being the facilitators of knowledge the teachers only direct their students toward resources and expect them to work autonomously. Working on their own, and getting the proper guidance, learners feel more motivated to learn as this self-paced experience forces the learners to take responsibility for their own learning (Kim, 2004).

As stated throughout the section, usage of computers could bring about innovations that were never promised before. The innovations also look promising in that they could be a panacea for the seemingly insoluble matter of authentic communication, as the effective usage of computers and the Internet could bring millions of students together in one chat room with a click of mouse.

The investments made on technology integration in schools might show that the policy makers all over the world are aware of these potential of using computers. However, despite the money spent, only few cases of successful technology integration are cited, even in the countries with high levels of technical infrastructure. As in this study the context of Turkey and ELT will be scrutinized, knowing the examples in the world and Turkey would provide one with better understanding of the process of technology integration thus far.

In the next section, the conflict between the investments and successful technology integration will be explicated.

2.4 Investment – Usage Conflict

Starting from the first appearance of the computers in the classrooms, the ratio of computers to students has shown a sharp increase (Gardner et al., 1993; Glennan & Melmed, 1996; Watson, 2006; Wozney, Venkatesh, & Abrami, 2006; Zhao & Cziko, 2001), although the teachers' use of computers in classroom remain low (Cuban, 2001; Zhao, Pugh, Sheldon, & Byers, 2002). According to statistics from the National Center for Education Statistics (2000), in the United States in 1994, only 35% of public schools had access to the Internet; but by 1999, 99% of schools had access. Internet access in individual classrooms rose from 3% in 1994 to 87% in 2001. The ratio of students to school computers with Internet access improved from 12.1 to 1 in 1998 to 5.4 to 1 in 2001.

However, though a great deal of investment has been made, perhaps the most important element of integration has been ignored: the teachers. In accordance with Clark and Peterson's (1986) warning, "Teachers' belief systems can be ignored only at the innovator's peril" (p. 291, cited in Ertmer, 2005). A plethora of research show that the large amount of money spent on hardware and software has not necessarily translated into high levels of usage (Cuban, 2001; Li, 2007; York et al., 2005; Zhao et al., 2002). On the contrary, these investments might even be considered wasted (Berkowitz, 2000), as the teachers who would eventually be the ones using the computers did not feel ready to use them. 60% of teachers were making little or no use of computers in their teaching according to the results of the The ImpaCT 2 Report (Harrison et al., 2002). These statistics reported on the underutilization of technology by teachers supports the statement that investments should now be aimed at preparing teachers to use the available technology properly.

Apart from the low computer usage, it has also been found that use of computers by teachers has not gone beyond low-level tasks or using computers as teacher tools, such as preparing worksheets using word processors, using computers for drill-practice type activities, administrative purposes (e.g., grading students), and communication (e.g., communication with colleagues), which unlike using computers as student tools, does not necessitate learner autonomy and thus student-centered instruction (Abdal-Haqq, 1995; Albirini, 2004; Cambre & Hawkes, 2004; Ertmer, 2005; Kesten, 2006; NCES, 2000; Pepper, 1999; Pope et al., 2002; Wang, 2002). Similarly, Abdal-Haqq (1995) summarizes the nature of teachers computer usage claims that

> … (1) relatively few teachers routinely use computer-based technologies for instructional purposes (Hunt & Bohlin, 1995); (2) when computers are used, they are generally used for low-level tasks such as drills and word processing (Office of Technology Assessment, 1995b); and (3) computers are not sufficiently integrated across the K-12 curriculum (Office of Technology Assessment, 1995b). (p. 2)

Therefore, it may be summarized that teachers tend to use computers sporadically and when they do, they prefer low-level tasks.

Computerization is occurring quickly and every year countries are spending billions of dollars on ICT (Albirini, 2004; Barton & Haydn, 2006; Christensen, 2002; Ertmer, 1999; Hew & Brush, 2007; Hogarty, Lang, & Kromrey, 2003; Varank, 2003). However, one of the most important questions is awaiting an answer: With the increase in availability, why are teachers not using these tools in their teaching more frequently?

2.5 Barriers to Technology integration

The rapid movement of computerization has made policy makers all around the world believe buying as many computers as possible would improve learning and teaching drastically. With this motivation, there has been a boom in the number of computers the schools have, and soon in developed countries the ratio of computers per student showed a sharp increase (Albirini, 2004; Christensen, 2002; Ertmer, 2005; Kay, 2006b; OTA, 1995; Watson, 2006).

Through thorough investigation of the possible reasons for the failure of ICT integration in education, researchers have found that two sets of barriers are in play: first-order barriers and second-order barriers (Brickner, 1995; Earle, 2002; Ertmer, 1999). As Brickner puts it (1995)

> First-order barriers to computer implementation, extrinsic in nature, include access to computers, software availability and quality, planning time, and technical support..... In contrast, second order barriers to computer usage are typically intrinsic in nature. Second-order barriers include beliefs about teaching, instructional models, beliefs about technology, and openness to change. Teacher-perceived barriers to computer implementation are more difficult to overcome due to their intrinsic nature. (pp. 38, 41)

In other words, the first-order barriers mainly include the hardware related barriers, which are beyond the teacher's control, while the second-order barriers include obstacles that are created by the personal reasons of the teachers, such as their competence, attitudes and beliefs.

After the categorization of the barriers, it was seen that with the help of rapid investments the effects of first order barriers were diminishing, but ICT integration was still at low levels (OTA, 1995). Hence, researchers agreed that the second order barriers might have been in play in those contexts where ICT integration remained at low levels, and they concluded that the effect of second-order barriers were more persistent (Ertmer, 1999). Ertmer claimed that "while many first-order barriers may be eliminated by securing additional resources and providing computer-skills training, confronting second-order barriers requires challenging one's belief systems and the institutionalized routines of one's practice" (p. 48). As the reason for the difficulty of changing these institutionalized routines, Ertmer (1999) claims that as the second-order barriers are less tangible than first-order barriers and they are more personal and more deeply ingrained, it is harder to change them. As for the failure of ICT integration, she asserted that although the first-order barriers can be important obstacles to technology integration, the relative strength of second-order barriers may reduce or magnify their effects (Ertmer, Addison, Lane, Ross, & Woods, 1999). Similarly, Zhao et al.(2002) put forward that factors associated with the innovator (the teacher) play a more significant role than the others do. Therefore, researchers concluded that when the teacher's computer skills were strong, the projects seemed to have a better chance of succeeding.

2.5.1 The First-order Barriers

Hadley and Sheingold (1993, cited in Brickner, 1995) found that some of the first order barriers included inadequate administrative support, day-to-day problems with time, space, supervision, operations, and access; lack of good, adaptable, uncomplicated software and information about software; limitations of hardware or inadequate numbers of computers or peripherals, and lack of maintenance, support, advice, upkeep, and so on.

Starting with the assumption that once adequate resources were obtained, integration would follow; overcoming the first-order barriers was at the center of attention during early integration attempts (Ertmer, 1999). Being more tangible in nature, these barriers are easy to measure and relatively easy to eliminate, once money is allocated. As stated earlier, statistics show clear evidence of the success of steps taken toward overcoming first-order barriers. According to National Center for Education Statistics (2000), in the US in 1994, only 35% of public schools had access to the Internet, by 1999 it was 99%. Internet access in individual classrooms rose from 3% in 1994 to 87% in 2001. The ratio of students to school computers with Internet access has improved from 12.1 to 1 in 1998 to 5.4 to 1 in 2001 (Kay, 2006b).

As a result of huge investments, hardware and software availability has sharply increased (Zhao & Cziko, 2001). However, despite the increasing computer availability, the number of teachers who make use of computers in their teaching has not shown similar growth (Barton & Haydn, 2006). According to various studies, teachers' use of computers is still low (Barton & Haydn, 2006; Ertmer, 2005; Goedde, 2006; Schrum, 1999; Varank, 2003).

In a similar vein, the studies conducted show that the teachers' use of computers was generally for low level tasks (Pope et al., 2002). Ertmer's (2005, p. 26) comment on the issue summarizes the overall situation of teacher computer use:

> …technology use has increased in classrooms across the nation, undoubtedly because of these increased levels of access and skill, as well as the current favorable policy environment. However, although many teachers are using technology for numerous low-level tasks (word processing, Internet research), higher level uses are still very much in the minority. In general, low-level technology uses tend to be associated with teacher-centered practices while high-level uses tend to be associated with student-centered, or constructivist, practices (H. Becker, 1994; H. J. Becker & Riel, 1999).

Hence, ideal teaching practices using technology make up only a small percentage of teacher computer use in the studies mentioned above, and apparently just overcoming first-order barriers is not the solution for the problem of integration, as the effective technology integration fundamentally includes creating student-centered and constructivist practices with the help of computers and the Internet.

2.5.2 Second-order Barriers

As is stated earlier, second-order barriers to technology integration, namely the intrinsic barriers, include beliefs about teaching, instructional models, beliefs about technology, and openness to change, difficulties integrating computers with "the system", teacher's doubts, lack of interest or knowledge about computers (Braul, 2006; Brickner, 1995; Ertmer, 1999; Hadley & Sheingold, 1993; Snoeyink & Ertmer, 2001). Due to their intrinsic, intangible nature, these barriers are more difficult to overcome (Brickner, 1995). According to Ertmer (1999), overcoming second-order barriers poses a greater difficulty as "they are less tangible than first-order barriers but also because they are more personal and more deeply ingrained" (p. 51).

One of the biggest challenges the teachers face in terms of integrating technology into their classrooms is that they seem to have a hard time finding the pedagogical fit of ICT in their teaching (Ertmer, 2005). On the issue of pedagogical fit, Ertmer et al (1999) argues that in order for the teachers to assign a high value to computer use in the classroom, the computers and the teachers should be on the same page. In other words, the teachers should be happy with the opportunities the computers offer, and the computers should be able to produce the necessary activities that are not otherwise possible. In the case that teachers appreciate the innovations the computer brings in the classroom, they will assign higher value to their use.

In another study conducted by Strudler and Wetzel (1999), the researchers found that although all the teachers in a department mentioned regular use of a computer at home or in other contexts, less than one third reported using computers in their teaching. Confirming the necessity of a pedagogical fit, the authors concluded, "…professors must see the fit between their philosophies of teaching and learning and technology applications" (p. 73). That is to say, teachers' beliefs in the usability of the computers for their subjects constitute an important aspect of technology integration.

Similar to the pedagogical fit, teaching style is another factor that affects ICT integration in teaching. As it is known, when used for higher order tasks, ICT applications in education tend to move the teaching from being teacher-centered to student-centered, or toward being more constructivist (Ertmer, 2005; Matzen & Edmunds, 2007). This means that a teacher who believes in the ultimate authority of the teacher in classroom, and sees himself/herself as the provider of knowledge, might have difficulty in integrating ICT into his/her teaching. As an example of the relationship between being constructivist and using computers more often, Lucas (2005) claims that "…teachers who use computers in the classroom are more constructivist than teachers who do not (Becker, 2000; Dexter et al., 1999)" (p. 37). Ottenbreit-Leftwich (2007) confirms the fact that computers have often been proposed as an agent of change to shift pedagogical practices

toward more constructivist approaches. She defines this process of moving from teacher-centered practices to student-centered ones as moving from focusing on dispensing memorized information within contained subject areas to engaging groups of students in authentic, complex problems where students actively participate to construct their own multidisciplinary knowledge. In this respect, it could be reiterated that using computers for teacher-centered activities could be considered as using them as teacher tools, whereas using them for student-centered tasks could be thought as using them as student tools.

Listed among the second-order barriers, subject culture could also be a factor that may affect ICT integration. Subject-culture refers to the fact that "each subject in the [secondary] school is a separate microcosm, a micro-world with varying values and traditions" (Goodson & Mangan, 1995, p. 615). The authors claim that the introduction of the computers in teaching may challenge some subject subcultures and introduction of computers sets off a range of culture clashes between antecedent subject cultures and the cultures of computing, which makes it difficult for some teachers to integrate computers in their classrooms (Goodson & Mangan, 1995; Hew & Brush, 2007). Moreover, in a study conducted by Becker (2001) English teachers were among the teachers who least used technology in their instruction, together with other social science classes (Figure 2).

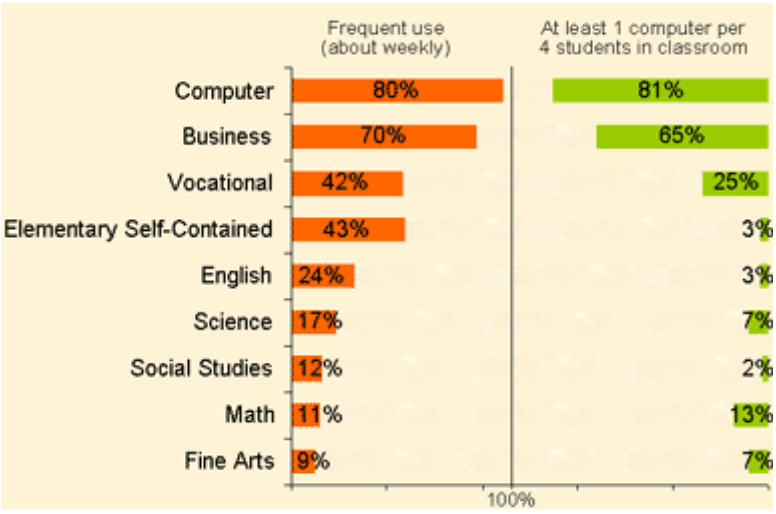


Figure 2. Computer Usage Frequency by Subject Matter (Becker, 2001)

Therefore, the fit between the subject culture and the culture of using computers might pose a potential barrier to the integration of technology in language learning.

Another second-order barrier to computer use in classroom may be that the teachers do not have enough knowledge of computers or they have limited knowledge about how to use computers for their teaching, that is to say lack of competence (Sime & Priestley, 2005;

Snoeyink & Ertmer, 2001; Varank, 2003). Lack of knowledge may have a bigger effect than thought, as fear of computers, resistance to new technology, perceived difficulty of use, not understanding the importance of technology, and lack of motivation to adopt a new technology could be caused by lower levels of competence in most cases (Lucas, 2005). In his study, Pelgrum (2001) found that lack of knowledge and skills was the second most inhibiting obstacle to teachers' use of computers in schools. Thus, to overcome this barrier it is advised that "in order for teachers to use computers in their teaching, they should first become competent and confident users of ICT; once they are confident users of ICT, they will be inclined to use it in their teaching" (Kiridis et al., 2006, p. 28). By the same token, it was claimed by Watson (2006) that training teachers to use technology increases their motivation to use these tools, and lowers their anxiety caused by lack of knowledge and skills.

Closely linked with the competence in using computers, attitudes toward computers are another factor that significantly affects an individual's practices with them (Albirini, 2004; Berkowitz, 2000; Gardner et al., 1993; McGrail, 2005; Sime & Priestley, 2005). According to Albirini (2004) "positive attitudes often encourage less technologically capable teachers to learn the skills necessary for the implementation of technology-based activities in the classroom" (p. 36). Hence, it might be suggested that in order to motivate teachers to use computers, teachers themselves should be exposed to computers with the help of meaningful activities, and this in turn might motivate a change in teachers' attitudes toward technology for the better.

Being the focal point of this study, knowing Turkey's technology investment path carries a great deal of importance. The next section will explain the steps of Turkey toward technology integration in education.

2.6 Turkey and Technology Integration

2.6.1 General ICT Usage Statistics in Turkey

Despite going through a rough economic period in the 1990s, Turkey has shown a sharp increase in its ICT usage in the last decade (Organization for Economic Co-operation and Development, 2005; The World Bank, 2008). According to Bayram and Seels (1997), establishing computer networks for education requires an infrastructure through a large investment of capital, and such funding was hard to obtain considering the economic situation of Turkey in the 1990's. In 1994, the inflation rate was at 85% and the per capita income was approximately $1,500 per year. Given these facts, it is not surprising to see that investment in technology did not have much priority until recently. Al-Shehri (2004) states that

> Economic factors, such as the standard of living and the ability of people to afford technology, affect the degree of technological access. I mean in the majority of Third World countries, technologies are considered a luxury. The personal computer is a good example. For poverty stricken or starving people, computers seem useless. Food, housing, and health care come before any technological tool, even when that tool may benefit education. (p. 2)

Therefore, it can be claimed that the low living standards in Turkey during late '90's unsurprisingly made computers a luxury item, were therefore rarely used for educational purposes, as the researchers indicate that students per computer ratio was over 1000 to 1.

However, according to statistics obtained by The World Bank (2008), Turkey is now showing a sharp increase in its ICT usage. The number of the Internet users has nearly doubled every year since 2001 and is now above the world average, although it still lags behind the developed countries like the US (Figure 3). This might lead to a conclusion that Turkey is showing a sharp increase in technology usage, at least for personal purposes.

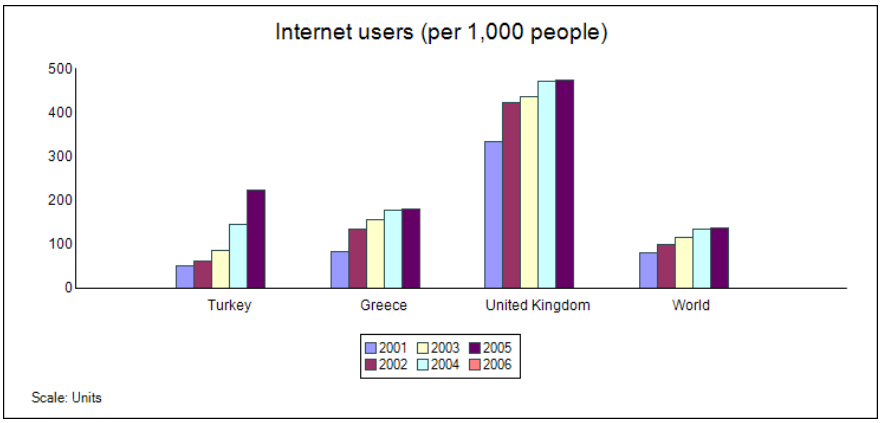


Figure 3. The Number of Internet Users in Turkey between 2001 – 2005 (The World Bank, 2008)

In the Turkish Statistic Institute's ICT Usage Survey in Households (2004), it is stated that only 9.98 % of Turkish households have a PC, 53.64 % have a mobile phone, 92.19 % have a television, and only 5.86 % have access to the Internet via a PC, while 2.08 % have access via a mobile phone. From these figures, it can be easily seen that even in 2004 the percentage of households with a PC or an the Internet connection was still quite low, which again might manifest that despite current attempts towards computerization the computer ownership average is lower than the developed countries'.

As for people's choices as to how to access to the Internet, people often preferred Internet Cafes to the other options, potentially as a result of low levels of computer ownership

with the Internet access at home, and one of the places where computer usage was the lowest was in places of education, at 8,9% (Figure 4).

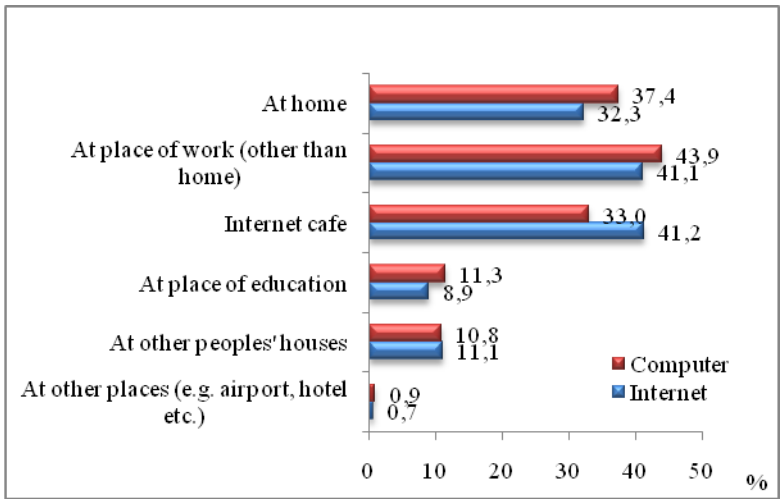


Figure 4. Turkish Users' Internet Access Place Preferences (TUIK, 2005)

In a similar survey (TUIK, 2005), it was found that using the Internet for education and training was one of the lowest ranking reasons for ICT usage, at 30,71%, while communication ranked first at 78,23% (Table 2).

Table 2. Percentage of Turkish Users' Internet Usage Purposes

Activities	**%**
Communication	78.23
Information Search and Online Services	90.16
Ordering and Selling of Goods, Banking	15.95
Interaction with public authorities	39.97
Training and Education	30.71
Health	22.97

Source: (TUIK, 2005)

As for student ICT usage, according to OECD statistics (2007) the percentage of 15-year-old students using computers for less than one year in Turkey was 28,5% and 14,8% for more than 5 years. As for the OECD average, the percentage of 15-year-old students using computers for less than one year was 9,9% and 36,8% for more than five years. As to the US, the percentage of 15-year-old students using computers for less than one year was 3,3% for less than one year and 62,1% for more than five years (Figure 5). This clearly shows that although Turkey displayed a sharp increase in the number of computer users in the younger generation, it was still far behind and the *wave* of computer usage, as the percentage of students who used

computers for less than one year was the highest in Turkey, while the percentage of students using computers for more than five years was the lowest.

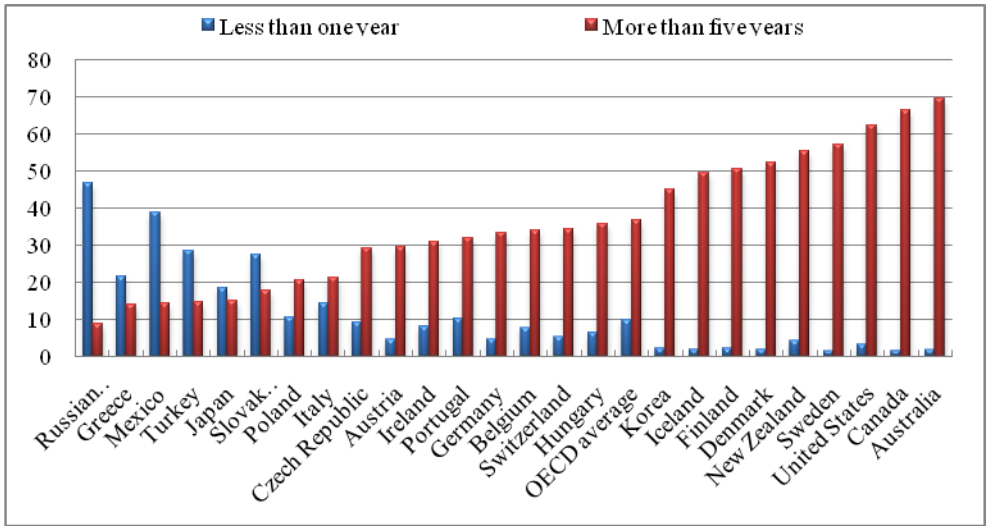


Figure 5. The Average of Students Using the Internet in OECD Countries (Organisation for Economic Co-operation and Development, 2006)

This increasing tendency to buy more computers for schools in Turkey could be a signal of a shift in policy makers' visions. However, compared to developed countries, the student-computer ratio is still low, and therefore the patterns of barriers to technology integration in the context of this study might carry different levels of importance. Therefore, in order to portray a clearer picture of the context of this study the condition of first and second-order barriers should be scrutinized.

2.6.2 First and Second-order barriers in Turkey

According to Özar and Askar (1997) "computers were first introduced to schools in Turkey in 1984. Between 1985 and 1987, secondary and vocational schools were provided 2,400 computers." (p. 118). They also add that in order to integrate IT into schools, the General Directorate of Computing, Education and Services (BILGEM) was established in 1992. Therefore, it could be asserted that this date can be considered the time when the national government took its first formal step toward the integration of technology into education. Again, according to Özar and Askar (1997), in 1996 6,500 more computers were bought for the schools in Turkey, increasing the number of computers to 8,900, although they do not state for what purpose these computers were used. Interestingly, in the same research the authors mention that

> In 1988-1989 the general education system covered about 54,000 primary and preschools with nearly 7 million students and 227 thousand teachers, 5,700 middle

> schools with 2 million students and 42 thousand teachers and 1,450 general secondary schools with about 700 thousand students and 57 thousand teachers. (p. 117)

Hence, with a simple calculation the ratio of students per computer can shockingly be found to be 1089 to 1. During the same period, the developed countries were aware of the fact that to serve better to the rapidly changing needs of the society they needed to start integrating technology in schools. During the same period when the ratio of students per computer was 1089 to 1 in Turkey, in the US the number of computers increased to 400,000 in 1980s. Moreover, in 1983-84 the ratio of students per computers was 125 to 1, and this decreased to 30 to 1 in 1998 and to 9 to 1 in 1995 in the US (OTA, 1995).

These depressing numbers has shown sharp increases during the 1990s. Varank (2003) states that after the implementation of 8-year compulsory education act in 1997, 2,802 information technology classrooms were established in primary schools and a total budget of the IT classrooms reached to 11.2 million dollars. Furthermore, Ministry of National Education (MoNE) defined goals to integrate information technologies into Basic Education Project. In a similar vein, Hatipoğlu (2006) states that in September of 1996, 4,500 schools had been equipped with 22,000 computers and 50,000 teachers had been trained for computer use. It may be argued here again that the general tendency of MoNE was towards establishing computer classes, rather than making classrooms computer equipped and letting the teachers and students easily integrate them into their teaching.

In accordance with the statistics presented above, the saddening picture of technology integration in Turkish schools seems to show an improvement. According to Bakia (2005) the ratio of students per computer has decreased to 40 to 1. Similarly, in Organization for Economic Co-operation and Development (OECD)'s report (2006) *Education at a Glance: OECD Indicators 2006,* it is indicated that the ratio of computers per student was about 25 to 1, which is still a ratio that can be considered as a serious first-order barrier for both learners and the teachers (Figure 6). Moreover, given the fact that the computers were all in computer labs in Turkish state schools, the increased ratio of computers may not be thought as technology integration in classroom.

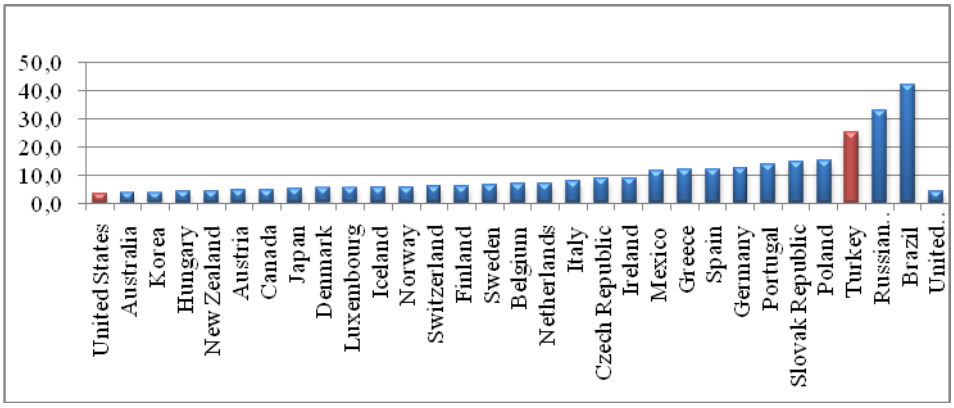


Figure 6. Students per Computer Ratio of OECD Countries (Organisation for Economic Co-operation and Development, 2006)

The latest strategies and statistics related to technology integration were published in the report prepared jointly by MoNE and OECD. According to the report, general strategies of Turkish education includes

- making the maximum use of technological facilities, particularly computer technology, at all levels of education to develop distance education methods;
- computer-assisted education shall be expanded to include all levels of education, particularly primary education institutions, and schools shall be equipped with tools and equipment to meet the needs of the 21st century; (Organization for Economic Co-operation and Development, 2005, p. 41)

As for the number of computers and computer classrooms, it is presented in the report that

- the infrastructure for 3,188 information technology classes in 2,802 primary schools was completed and IT classes were opened;
- 56,605 computers and other related equipment were distributed to 26,244 village primary schools in rural areas;
- 1,500 laptops were purchased and distributed to primary education inspectors;
- 130 laptops and 1 server were purchased for Board of Inspection/inspectors of the MONE. (Organization for Economic Co-operation and Development, 2005, pp. 53-54)

Besides the numbers presented above, some other expressions in the report make it clear as to the reasons of slow and ineffective ICT integration. It is stated in the report that according to a study conducted by MoNE, in May 2004, it was found that even though computer labs were built in schools, the teachers had the tendency to believe that those rooms were to be used only by computer literacy classes. Therefore, it is claimed that the teachers should be taught about the proper usage of ICT in all subjects. Moreover, it is stated in the report that lack of educational software and technical support, lack of motivation for teachers to use computers in their teaching, and lack of computers in the teachers' rooms of half of the nation's schools, keeping

computer classrooms under lock and limitedness of the Internet opportunities are among the main reasons for underuse of computers by the teachers (Organization for Economic Co-operation and Development, 2005).

The reasons stated above are mainly first-order barriers, and it could be argued that lack of necessary teacher training opportunities and lack of access to computers may cause a negative attitude among teachers, as limited access may mean limited usage and low usage is known to lead to anxiety and negative attitude toward computers (Bandura, 1977; Fishbein & Ajzen, 1975), even after they are made readily available for use in teaching.

Within the scope of the report, in the final part, some plans of MoNE in terms of its plans about ICT integration in education presents some optimistic information. According to the proposed plan, twenty-thousand teachers were given education by the end of 2004. In addition, by the end of three years 60,000 will have been given education as 20,000 in 2005 and 20,000 teachers in 2006. Moreover,

> IT classes will be established in 15,000 schools in rural areas, coordinators of 18,000 IT classes will be educated, 200,000 educational staff will be given in-service training on computer literacy and computer assisted education. And within the context of this programme 51,465 computers were provided for 26,276 primary schools and a printer, a scanner, software and an uninterruptible power supply (UPS) were provided for every one of these 26,276 schools. (Organization for Economic Co-operation and Development, 2005, p. 70)

As for educational reforms, the report claims that The Ministry of National Education aims to accomplish the following in order to integrate Information Technologies (IT) into the Turkish education system in the 2000s

- IT hardware/software and secure and fast Internet connection will be provided for every school including primary education schools;
- intranet connection per teachers' room and at least 1 computer will be provided with the same specs for the guidance services, libraries and administration offices;
- current curriculum will be transformed into a student-centered one and it will be provided that students access information by using IT tools by themselves during their educational processes;
- technical support centers for schools will be established in order to provide the necessary technical support for the update and continuous maintenance of the IT hardware at schools. (Organization for Economic Co-operation and Development, 2005, pp. 70, 71)

These goals seem optimistic, however, in some cases the investments might not be made on the areas that really need them; instead, they are made on the areas that have the power to attract them. As it is also claimed by Bayram and Seels (1997) the educational system of Turkey is mostly centralized. They claim that

> Centralization is the degree to which power and control in a system are concentrated in the hands of relativity few individuals. Rogers (1995) states that centralization is usually negatively associated with innovativeness because the more centralized an organization is, the less innovative that organization tends to be. (p. 116)

Therefore, due to its centralized nature, Turkish education system has the innate tendency to be slow at innovations, and as stated before, the innovations tend to miss their targets. This tendency can be seen clearly with the help of statistics provided by OECD (2006). According to statistics, the OECD average of percentage of the computers devoted to students is 64%, the USA's average is 78%, while Turkey's average is 47%; the OECD average of percentage of the computers devoted to teachers is 16%, the USA's average is 23%, while Turkey's average is 9%; finally, and more interestingly, the OECD average of percentage of the computers devoted to administrators is 10%, this percentage is 9%, while it is 38% in Turkey (Figure 7).

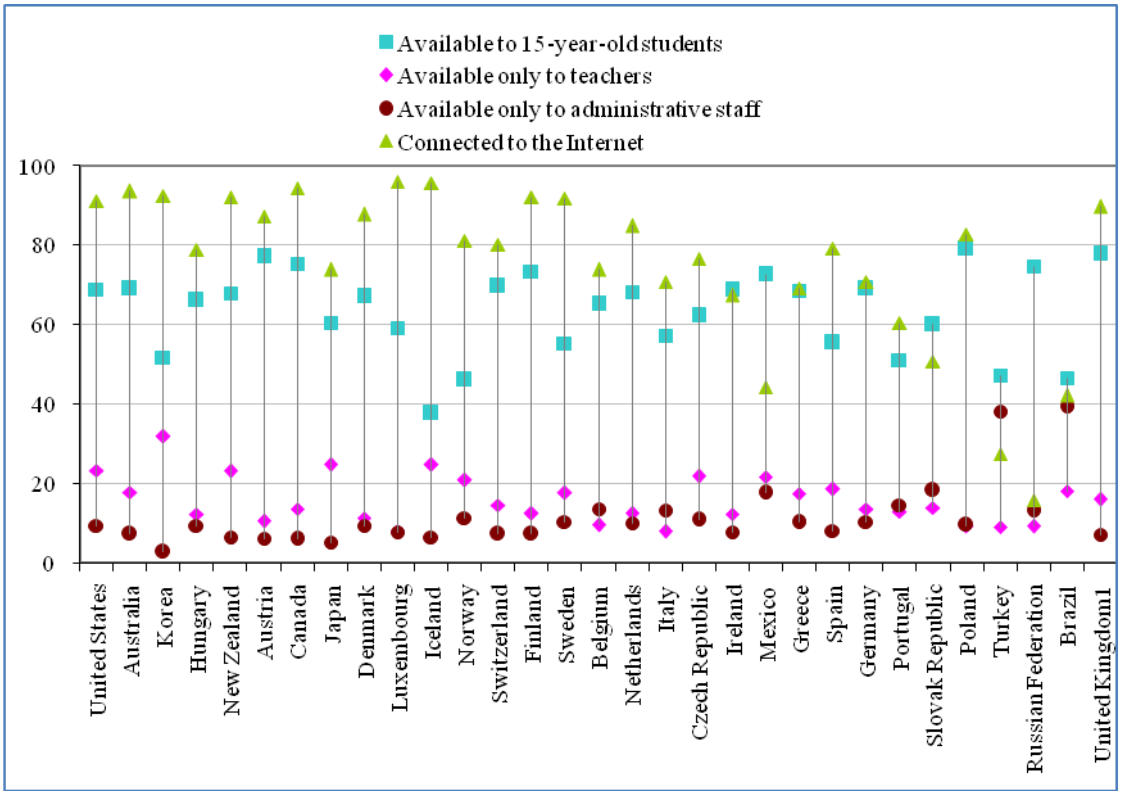


Figure 7. Percentage of computers and with Internet connection available to staff, students (Organisation for Economic Co-operation and Development, 2006)

Above statistics drastically and simply manifest the effect of centralization in Turkey, as well as statistical presence of the first-order barriers. Moreover, it may be an indication of the fact that although the projections for the future seem optimistic, the investments made might miss their

intended targets. Thus, the number of computers bought may not necessarily translate into an increase in the ratio of number of computers per students in schools.

As it is seen, despite the investments and changing visions, the technology integration in Turkey is still not at the levels of developed countries. In Göktaş's study (2006) it was stated that the K-12 teachers and the deans of education faculties had positive attitudes toward using technology in education. As for prospective teachers' attitudes, the statistics only provided the competence levels; therefore, a clear picture could not be depicted. In other words, in this study it is aimed to form a better picture of the ICT integration specifically for ELT and private universities, and therefore carries a unique perspective. In order to better compare the new and old generations of teachers, it is also aimed to compare preservice and in-service teachers, and the ICT education the preservice teachers get during their undergraduate education carries a high importance.

In the next section, the ICT courses offered for preservice teachers will be discussed.

2.7 Preservice Education and ICT

As one would expect, the new generation tends to keep up with the latest technology more easily as they mostly grow up using them (Lee, 2000). For instance, for people who spent most of their childhood in front of computers playing computer games, using computers might not pose any problems, or cause stress in most cases, as this "new" technology is not actually "new" for them. As for teachers of the current generation, Russell, Bebell, O'Dwyer, and O'Connor (2003) state in their study, Use, Support, and Effect of Instructional Technology (USEiT), that the current generation of teachers are more technology competent than their more experienced colleagues as they are more exposed to these new technologies.

Moreover, in a study conducted by Marcinkiewicz (1994), where he looked at the levels of expected computer usage of 150 preservice and 163 in-service teachers, he found that "the reported levels of use of practicing teachers differs widely from the expected levels of use of preservice teachers. Most importantly, preservice teachers overwhelmingly expect to use computers for teaching" (p. 516). In accordance with this finding, it may be argued that having exposed to technology more, the preservice teachers (the new generation) tend to expect to use the technology more, and furthermore, they show more competence in using technology. Interestingly though, in his later study conducted on his groups in 1994, two years later, Marcinkiewicz (1996) found that

> In comparison with the expectations of the preservice teachers, the levels of computer use of among practicing teachers is low. However, while the preservice teachers had

> very high expectations of computer use, after they had taught for a year their levels of use approached the average levels of use of the practicing teachers. (p. 470)

Correlating this decline in the use, namely higher use during preservice and lower use during in-service, Marcinkiewicz (1996) concluded that "it may be attributable to regression to the mean behavior, ambitious undergraduate expectations, or the effects of an excellent undergraduate program. Still, the differences in use between the two groups were statistically significant" (p. 470). Moreover, he also mentioned that administrative policies might play another major role in technology integration and the declining motivation of new teachers' computer usage statistics. On the same issue of declining motivation of preservice teachers' toward technology usage in teaching after they start practicing, Sime and Priestley (2005) claim that even the preservice teachers with good ICT skills will hesitate to apply their technology skills in teaching if the physical, human or cultural factors in the school are not adequate for an efficient integration of ICT in classes, especially if during their experience of using ICT, they had nothing but problems. In fact, these words of Kay (2006b) summarize the reason for the mismatch between preservice expectations and their in-service use:

> …one can provide technological training and guidance for preservice candidates in a computer lab, but if there is limited access to computers at the university or in the K–12 schools, it is difficult to use the technology in an effective manner. (p. 390)

Therefore, it could be maintained that high expectations of preservice teachers can only be realized if the schools they will work at has the necessary technical infrastructure, or else the mere knowledge and competence would not suffice for technology integration.

2.7.1 ICT Courses Offered During Undergraduate Education

In the education faculties all over the world, the ICT courses are one of the core components of the curriculum (Mehlinger & Powers, 2002). Generally served as stand-alone courses, these courses "…are usually designed to teach basic computer skills, introduce teachers to several common computer applications (e.g., word processing, spreadsheets, databases, telecommunications, and presentation programs), and teach how to integrate these applications into the classroom" (Yıldırım, 2000, p. 480).

It has been asserted by many researchers that increasing the preservice teachers' exposure will result in more confidence in using technology and will likely increase technology integration (Christensen, 2002; Watson, 2006; Yıldırım, 2000). However, these courses offered sometimes fail to prepare the preservice teachers adequately to integrate technology in their instruction (Doering et al., 2003; Kay, 2006b; Pope et al., 2002; Varank, 2003; Watson, 2006). Therefore, although the preservice teachers learn the basics of computing and tend to have a

moderate amount of competence of using computers, these courses may fall short in providing them with in depth knowledge as to how to integrate technology into their subject matter, which is ELT for the context of this study.

2.7.1.1 Improving the preservice education

Some suggestions are made in order for the Faculties of Education to overcome this inability to prepare the future teachers to integrate technology in teaching. First, it is claimed that these technology courses, having a stand-alone nature, are not enough to teach the prospective teachers "how to integrate technology in teaching," instead they only teach "how to use technology," which is quite a different practice (Braul, 2006; Kiridis et al., 2006). Braul (2006) argues that with respect to CALL teacher training usually consists of simply showing teachers how to use the technology. He further claims that

> ….For example, teachers are taken through the steps of how to use Microsoft PowerPoint or a word processor, how to find relevant and interesting websites, or how to access and navigate through language software programs. This is obviously important for teachers to learn, but what is equally important, and missing in many CALL professional development programs, is how these applications can be used to help students acquire the language and help teachers teach the language. (p. 49)

Therefore, although the preservice teachers become knowledgeable on how to use computers, they might still be in the gray as to how to integrate computers effectively in their specific lessons.

Secondly, as stated above, the ICT courses in Turkey has the stand-alone nature (Göktaş, 2006; Göktaş & Aybat, 2006; Yıldırım, 2000), which means that the technology is taught, instead of how to use technology in teaching. The suggested way to solve this problem could be to provide technology integration possibilities and opportunities throughout the curriculum, within even methodology courses, instead of teaching technology alone (Abdal-Haqq, 1995; Braul, 2006; Kadijevich, 2006; Mehlinger & Powers, 2002; Schrum, 1999; Wildner, 2000). Kesten (2006) states that "according to Halpin (1999), the integration of technology across the curriculum provides preservice teachers with an explanatory and discovery-oriented environment that enhances their abilities to use different computer applications for instructional purposes" (p. 14).

Finally, some aspects of the responsibility for the unpreparedness of the preservice teachers for the effective integration of technology falls on the shoulders of the faculty members in faculties of education, as the faculty's modeling plays a key role in motivating the preservice teachers to use technology in their lessons (Strudler & Wetzel, 1999). Moreover, the cooperating teachers at the practice sites also play an important role, as their exemplary

modeling encourages the teacher candidates toward using technology in their own practices (Doering et al., 2003; Kay, 2006b), and unavailability of such mentors makes if difficulty for the preservice teachers to use technology in their teaching. In a similar vein, Barton and Haydn (2006) state that "If no one is able to show the trainee confidently how to assemble the ICT resources and then to provide examples of how to exploit these resources within the classroom, this places a huge burden on the inexperienced trainee" (p. 266). Hence, the preservice teachers should be given both the right knowledge and opportunities to practice this knowledge before starting their actual teaching careers.

Having mentioned the needs for technology integration in education and especially in ELT, the current situation of technology integration in Turkey and the world and the barriers to technology integration, in the next section, the theory this study is based on will be explicated.

2.8 Theoretical Framework of the Study

2.8.1 Defining Attitude

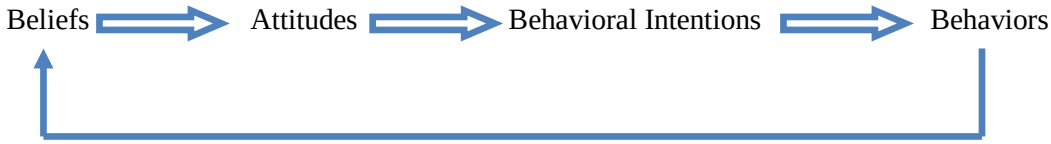
As one of the main elements of this study, attitude could be defined as the perceived effectiveness assigned to a certain object (Zhao & Cziko, 2001). In this respect, it could be claimed that the effectiveness the teachers perceive in using technology in their teaching constitutes their attitude toward computers. Therefore, one could maintain that the teachers who see that the computers could be effective in their teaching might develop more positive attitudes toward computers. In addition, in this respect, it could be claimed that attitudes, or positive attitudes, could trigger usage of a specific object (computers, in this case). As it will be explained in the next section, it was hypothesized that computer use would enhance beliefs about self-perceived computer confidence, which would in turn affect attitudes towards computers (Gardner et al., 1993). In other words, computer use positively affects computer confidence, and computer confidence positively affects computer attitudes.

2.8.2 The Relationship between Attitude and Usage

Behavior (the use of computers) is viewed as the result of a set of beliefs about technology and a set of affective responses to the behavior (Compeau, Higgins, & Huff, 1999). In other words, as one of the main determinant of behavior, belief is also affected by the outcome, and belief and behavior reciprocally shape each other (Liaw, 2002). Similarly, in accordance with the context of this study, namely computer usage and competence, Gardner,

Dukes, and Discenza (1993) claims that "increased computer usage causes increases in computer self-confidence, which in turn causes favorable attitudes toward computers" (p. 438).

The framework offered by (Gardner et al., 1993, p. 428) summarizes the concept of reciprocal relationship between beliefs and behaviors:



As it is stated above, the concepts of belief and behavior are closely linked and they have a reciprocal relationship. One of the major theories which bases its claims on this fact is Social Cognitive Theory (SCT) and Self-Efficacy theory, which is based on the works of Bandura (1977) and Compeau et al (1999). The main difference of this theory from the others is that this theory gives more importance on self-efficacy:

> …SCT gives prominence to the concept of self-efficacy —defined as beliefs about one's ability to perform a specific behavior —recognizing that our expectations of positive outcomes of a behavior will be meaningless if we doubt our capability to successfully execute the behavior in the first place. (Compeau et al., 1999, p. 146)

According to this theory, beliefs follow behaviors and in turn cause an increase in the occurrence of those behaviors (Ertmer, 2005), "which highlights the importance of building a teacher's confidence through successful experiences with small instructional changes before attempting larger changes."(p. 33). As in this study the competence levels and the attitudes of teachers toward computers will be one of the concerns at hand, basing the study on this theoretical framework could help explain the relationship between the computer usage and attitudes within the context of the results of the study.

2.9 Research Methodology of the Study

It is known that both qualitative and quantitative methods have innate weaknesses. While qualitative methods suffer from reliability and data collection difficulties, quantitative methods tend to overlook data due to their design related problems. In recent years, the use of mixed methods has shown an increase due to the fact that using both methods at the same time helped researchers overcome these limitations (Bryman, 2006). According to several researchers most of the research using mixed methodology tended to use a mixture of questionnaires as a quantitative data collection tool and an interview as a qualitative data collection tool (Bryman, 2006; Gudmundsdottir, 1996), as it was done for this research.

In this study, mixed-methodology approach enabled the researcher to combine qualitative and quantitative means of data collection and analysis, and gather data from a broader range of sources: questionnaires and interviews. To this end, Johnson and Onwuegbuzie (2004) define mixed methodology as "the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language in a single study" (p. 17).

The strength of mixed-method approach comes from the fact that by combining two data collection methods, namely qualitative and quantitative, the weaknesses innate to either of them is overcome (Hogarty et al., 2003; Krathwohl, 1998; Marshall & Rossman, 1995). Johnson and Onwuegbuzie (2004) summarizes this point and assert that

> The goal of mixed methods research is not to replace either of these approaches but rather to draw from the strengths and minimize the weaknesses of both in single research studies and across studies. If you visualize a continuum with qualitative research anchored at one pole and quantitative research anchored at the other, mixed methods research covers the large set of points in the middle area. If one prefers to think categorically, mixed methods research sits in a new third chair, with qualitative research sitting on the left side and quantitative research sitting on the right side. (pp. 14, 15)

As the third research method, mixed methodology used in this study helped the researcher cover a wide range of data sources, which otherwise would be overlooked if only questionnaires or interviews were used.

Another advantage of using mixed-methodology, apart from the fact that granting a wide data coverage, comes from the fact that using various data collection tools makes the study stronger in terms of validity and reliability, which was one of the prominent purposes of using this methodology for this study. Similarly, Krathwohl (1998) claims that using multiple research methods help strengthen the study. Moreover, in this study, the raw numbers calculated from the questionnaire data as to the usage statistics of the teachers gained deeper meaning with the help of the interviews, which asked the respondents the educational value they gave using computers and their actual computer usage practices for educational purposes. In other words, the quantitative data was validated with the help of qualitative data. By the same token, it is claimed that mixed-methods can be used in "making numeric data come alive, precisely summarizing narrative data, checking on the validity of data, developing rationales, catching in side effects, eliminating rival explanations, determining study's next steps and determining the demand conditions" (Krathwohl, 1998, p. 621).

Mixed-methodology approach used in this study was triangulation. With the help of triangulation "the convergence, corroboration, correspondence of results from different

methods" (Greene, Caracelli, & Graham, 1989, p. 259), was aimed to be achieved. According to Greene et al. (1989) the core premise of triangulation is that

> All methods have inherent biases and limitations, so use of only one method to assess a 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)

In this regard, in this study a questionnaire helped collect quantitative data on computer usage statistics of preservice and in-service teachers, as well as their attitudes towards computers and the perceived barriers that affect their technology integration. With the help of the face to face interviews, similar aspects were explored to gain a deeper understanding of the phenomenon; however, as some interview questions asked the participants questions that were beyond the coverage of the questionnaire, this study bases its methodological framework on triangulation.

2.10 Summary of the Chapter

A review of literature has revealed that in this age of technological advancements, we are not making enough use of information technologies in education (OTA, 1995). Although it is still under question whether investments in education is worth all the money spent, it has been proven by many researchers that these technologies help increase the potential of teaching and learning (BECTA, 2007; Pelgrum, 2001). Especially in the field of English Language Teaching, technology integration provides opportunities for learners that are not available otherwise (Braul, 2006). Furthermore, as the future will require a workforce knowledgeable of information technologies (Özar & Askar, 1997; Yedekcioglu, 1996), even if these technologies do not improve learning, they can provide the learners with the basic skills to survive in their future work lives.

Turkey, as a developing country, was slow in technology integration in the early 1990s, as the country was struggling with economic problems, and priorities were different (Al-Shehri, 2004; Bayram & Seels, 1997). However, nowadays there is big trend of computerization in schools and the ratio of students per student is dropping drastically (Bakia, 2005; Organization for Economic Co-operation and Development, 2005), although the level of computer access is still not at a desired level, and the computer laboratories in schools are often treated as classrooms for only computer literacy lessons and kept locked (Organization for Economic Co-operation and Development, 2005; Yedekcioglu, 1996). In addition, the level of teacher awareness on how to integrate computers in their lessons is quite low and computers are not

fully integrated into *curriculum*, as the current focus is mostly on teaching skills rather than teaching *vision* (Matzen & Edmunds, 2007).

Witnessing the low levels of infrastructure, it could be argued that Turkey is still struggling with first-order, extrinsic, barriers to technology integration, and its policies on overcoming second-order, intrinsic, barriers is still feeble as the policy makers are after tangible outcomes, at the peril of ignoring the teachers' beliefs and competences, disregarding the fact that they will be the ones making use of computers.

Additionally, it is seen that the preservice/in-service teachers should be provided with as much knowledge about technology integration -not only knowledge about using technology but also knowledge about how to teach with technology- as possible through training opportunities. As Gardner et al. (1993) states that as a result of positive experiences with objects, our beliefs and attitude toward them change positively. In other words, to form strong beliefs about the usefulness of computers, the in-service and the preservice teachers should be exposed to computers as much as possible, the exposure generates stronger beliefs and stronger beliefs lead to increased usage (Albirini, 2004).

Finally, it might be expected that growing up using the latest technology, the prospective teachers may graduate with better computer skills than their more experienced colleagues; however, after starting their practice these newly graduated teachers make little use of technology as the time progresses (Marcinkiewicz, 1994). The barriers that seem important for preservice and in-service teachers might show differences in this sense, and while taking the steps toward overcoming the barriers to technology integration, these two groups might be treated in accordance with their needs.

In accordance with the information presented in the literature review part, this study aims at answering the research questions stated in Chapter 1. As the previous research on technology integration does not provide a clear picture for teachers of English Language Teaching, this study carries importance as to see the level of technology competence and attitude of both preservice and in-service teachers simultaneously and causally.

In the next section, Chapter 3, the Methodology of this study will be explained.

CHAPTER 3
METHODOLOGY

3.1 Overview of the Chapter

In this chapter, the methodology of this study is explicated. After explaining the context of the study, data collection and analysis methods are discussed. The instruments used in data collection process are mentioned in order to get a clear picture of the data collection and analysis procedures.

3.2 Research Questions and Research Methodology

3.2.1 Research Design

This research study was designed to answer three research questions. Firstly, the usage, competence, attitude and perceived barrier levels of preservice and in-service teachers were explored and defined.

After revealing the computer usage related factors, the relationship between computer usage/competence, attitudes towards computers, perceived barriers to technology integration and other factors like age, gender, work experience and institutional factors were investigated. To gather data on these issues, both a questionnaire and semi-structured face-to-face interviews were used and the data was analyzed both quantitatively and qualitatively. The preservice and in-service teachers were compared in terms of computer competence/usage, attitude and perceived barriers to technology integration.

Finally, the pedagogical value given to technology usage in language teaching was explored to gain insight about preservice and in-service teachers' knowledge about effective usages of technology in ELT. In order to address this research question, qualitative data gathered through semi-structured face-to-face interviews were used.

Thus, in order to reach these aims ranging from qualitative concerns to quantitative concerns, this research grounded its methodology on mixed-methods approach (Table 3).

Table 3. Research Questions, Methods and Instruments Used in the Study

Research Question	Method	Instrument
Question 1: What are the preservice and in-service English teachers' attitudes toward computers, their personal computer competency, perceived barriers to technology integration and the degree of their computer usage?	Quantitative and Qualitative	Questionnaire and Face to Face Interview
Question 2: What factors affect preservice and in-service teachers' attitudes toward computers, their personal computer competency, perceived barriers to technology integration and the degree of their computer usage? **a.** What are the factors (age, gender, institution, work experience) that affect **in-service** teachers' attitudes towards computers, computer competencies, perceived barriers to technology integration and the degree of computer usages? **b.** What are the factors (gender, pc ownership) that affect **preservice** teachers' attitudes towards computers, computer competencies, perceived barriers to technology integration and the degree of computer usages? **c.** Is there a significant difference in preservice and in-service teachers' attitudes towards computers, computer competencies, perceived barriers to technology integration and the degree of computer usages?	Quantitative and Qualitative	Questionnaire and Face to Face Semi-structured Interviews
Question 3: What educational value do the preservice and in-service ELT teachers perceive in using computer technology in language teaching?	Qualitative	Face to Face Semi-structured Interviews

The primary design of the study was a quantitative study with face-to-face interviews nested within it to complement data coverage.

3.2.2 Research Methodology

In this study, in order to address research questions of qualitative and quantitative nature, data collection and analysis techniques from both methodologies were implemented, hence mixed-method approach was chosen as the methodology of this research. Mixed-method approach enables the researcher to draw on all possibilities (Tashakkori & Teddlie, 1998, as cited in Creswell, 2003) and provides a broader perspective to the study as the qualitative data helps describe aspects the quantitative data cannot address (Creswell, 2003). In this study, the mixed methodology helped explain the English teachers' perceived barriers to technology integration with the help of the questionnaire and with the help of the interviews, the barriers that were not covered by the questionnaire were revealed. Moreover, while the questionnaire revealed the educational computer usage statistics of the teachers, the interviews revealed the educational value assigned to these usage purposes.

In the next section, the setting, participants, data collection instruments and data analysis procedures will be explained and a clear picture of the methodology of this study will be formed.

3.3 Settings and Participants of the Study

3.3.1 Population and Settings

3.3.1.1 Questionnaire Population and Settings

The respondents for this questionnaire were selected using random sampling procedures. Random sampling requires "that each unit of population have an equal chance of being selected. A more precise definition is that all possible samples of a given size have an equal opportunity of being selected" (Krathwohl, 1998, p. 164). In accordance with this definition, respondents for the questionnaire were randomly selected from the participating institutions.

The population of this questionnaire was two different groups of English Language teachers. Preservice group (N=62) was composed of 4th year students who study in the Department of Foreign Language Education, Middle East Technical University, Ankara, Turkey. In-service group (N=120) was consisted of English instructors who have been working for private universities in Ankara, Turkey.

The preservice teachers were students at Middle East Technical University and these respondents were having their teaching practice in different state schools with varying levels of computer availability. Four of these respondents were also interviewed on a voluntary basis, after the administration of the questionnaire.

The in-service teachers were all working at private universities, and the schools varied in terms of technological infrastructure. TOBB Education and Technology University was the only school equipped with LCD projectors and computers in its classrooms. The university was also donating a laptop to each student upon their enrollment to the university as a policy, and during English lessons, the teachers were asked to make use of technology for at least 3 hours a week.

The other schools, although they were all private institutions, lacked technical infrastructure within school boundaries, both inside and outside classrooms. The teachers had hard time accessing computers even for their personal purposes, such as checking their emails. At Çankaya University, there was a language lab, where the teachers could use the computers for several hours a week if they wanted to have their lessons there and if they prearranged it with the administration. Başkent University and Atılım University were alike in the sense that neither the classrooms nor the teacher rooms had computers or any other technical infrastructure.

The schools for this study were purposefully selected for two reasons. Firstly, universities in Turkey have a more independent structure in terms of their budgets and expenditures than state K-12 schools, which are directed by a centralized Ministry of Education. From this perspective, having a freer nature, the universities could overcome the sluggishness in innovation caused by centralization (Bayram & Seels, 1997). Secondly, being private, selected institutions had more independence in terms of their budget and expenditures than state universities did. Having a more independent budget might make it easier to overcome the first order barriers to technology integration, and these institutions can individually shape the route of their educational philosophy in accordance with the demands of the stakeholders (parents, students and teachers). For these reasons, the private universities were selected as research sites.

3.3.1.2 Age, Gender and Work Experience of the Respondents

The questionnaire was distributed to a total of 182 respondents, which was composed of 62 preservice teachers and 120 in-service teachers. As for the gender distribution of the respondents, the groups, preservice and in-service, showed a similar pattern with 85% of females and 15% of males (Table 4).

Table 4. Gender Ratio of In-service and Preservice Teachers

		N	% of Total
Preservice	Overall	62	34,1
	Male	9	14,5
	Female	53	85,5
In-service	Overall	120	65,9
	Male	18	15
	Female	102	85

In terms of age, the preservice group did not show any variance as all of the respondents belonged to the group of 18-23 years category. As for the in-service group, the majority of the respondents were between 24 and 30, while 18 to 23 and 41 to 50 group together constituted only a small fraction of the overall population (Figure 8).

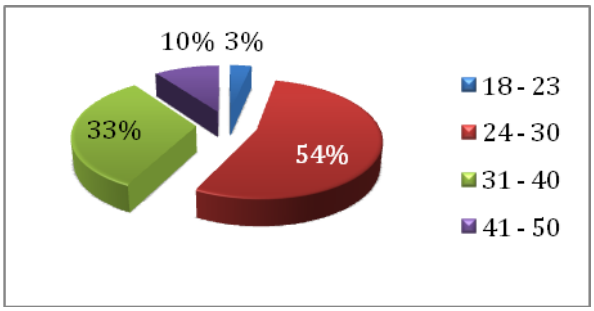


Figure 8. Age distribution of the Questionnaire Population

As for the distribution of the respondents in terms of institutions, all the preservice teachers were from Middle East Technical University. The in-service group respondents were distributed among Atılım, Başkent, Çankaya and TOBB Education and Technology University (Figure 9).

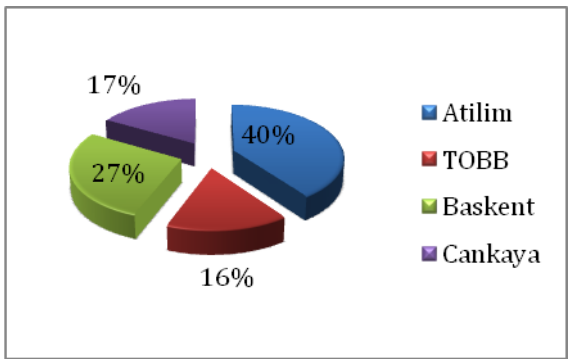


Figure 9. Institution Distribution of the In-service Teachers

Work experience was another demographic characteristic that showed variation for the in-service respondents. The majority of the respondents belonged to 1 to 5 years experience group (Table 5). The work experience for the preservice teachers was the same for all of the respondents, as they had not started teaching at the time of the administration of the questionnaire.

Table 5. Work Experience Distribution for the In-service Teachers

Work Experience (years)	*N*	*%*
1 to 5 years	58	48,3
6 to 10 years	34	28,3
11 to 15 years	15	12,5
16 years and above	12	10,0

Finally, in terms of demographics, the in-service teachers were asked if they held an MA or Ph.D. degree, or they were in the process of getting one. 21.7% of the respondents indicated that they had already obtained one, while 43.3% indicated that they did not have an academic degree. 35.5% of the respondents indicated that they were in the process of getting an academic degree. As it was not asked from the respondents to indicate the type of their academic degree, data on this aspect is not available.

3.3.1.3 The Analysis of Computer Ownership

Apart from personal characteristics of the respondents, in the questionnaire it was also asked from the respondents to indicate if they had computers, an internet connection and a printer at their homes to see what percentage of the teachers had access to technology. The majority of the in-service teachers had computers (97.5%) and an internet connection at their homes (92.5%), while the preservice teachers showed lower percentages of computer ownership (78.5%). The printer ownership was higher for the preservice group (77.4%) than for the in-service group (66.7%) (Figure 10).

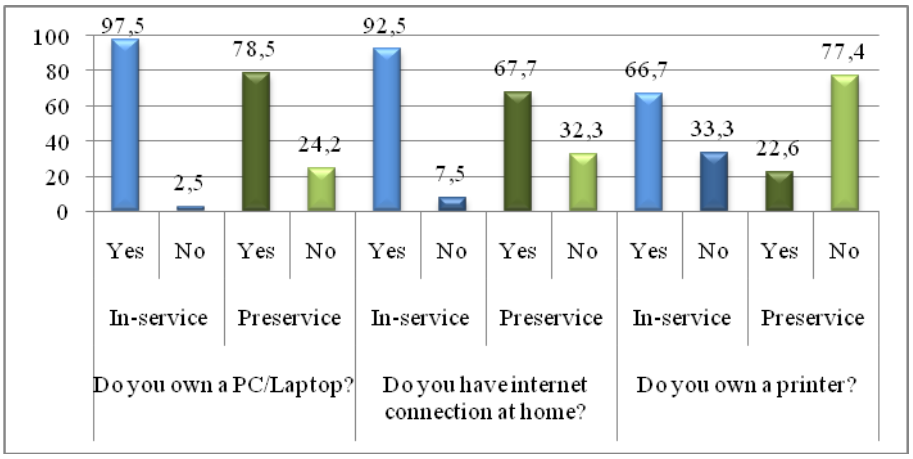


Figure 10. Computer Ownership Percentages of Preservice and In-service Teachers

3.3.1.4 Interview Participants and Settings

As for the selection of the interviewees, purposeful sampling procedures were implemented. Purposeful sampling is defined as "selecting the individuals and sites for study because they can purposefully inform an understanding of the research problem and central phenomenon of the study" (Creswell, 2007, p. 125). It is also claimed that in qualitative research all sampling is purposeful as the sample is always selected according to the needs of the study and the research questions (Coyne, 1997). As the nature of the research questions required gathering data from the teachers who were technologically competent and who used technology inside/outside the classroom more frequently than their colleagues, purposeful sampling technique served the purposes of this research. The purpose of deliberate selection of the technologically competent teachers as interview respondents was to see how the competent teachers, being competent and having potentially positive attitudes towards technology usage, felt about usage of technology in language teaching.

Overall, for this study a total of 8 in-service teachers, 2 teachers from each institution; and 4 preservice teachers were interviewed on a voluntary basis. The interviews took about fifteen minutes and they were conducted in the available quiet rooms of the institutions visited. After getting permission from the interviewees, an audio recorder was used and upon their approval the interviews were recorded to be transcribed and analyzed later. In order to prevent language related constrains the interviews were conducted in Turkish, the mother tongue of the interviewees.

3.4 Data Collection Instruments

In this study, mainly two types of data collection methods were used: a questionnaire (See Appendix 1) and face-to-face semi-structured interviews (See Appendix 2).

3.4.1 The Questionnaire

The advantages of using a questionnaires as data collection tools mainly comes from the fact that with the help of questionnaires large amount of quantitative data can be collected quickly and economically from a large sample (Krathwohl, 1998). Moreover, with the help of data analysis software, such as SPSS, the data can be statistically analyzed easily and efficiently. However, as the questionnaires are designed subjectively by the researchers, some valuable data may be overlooked as the related questions were not included in the questionnaire. However, as semi-structured face to face interviews were also conducted in this study to capture the information that were not covered by the questionnaires and the data was gathered from a large sample, increasing the generalizability of the results, this weakness of the questionnaires was overcome.

Questionnaires, as the main form of quantitative data collection tools, can easily be assessed in terms of reliability. From the questionnaires' perspective, reliability refers to the ability of questionnaire to produce the same results in different implementations, leading to a consistency and dependability of the results (Leftwich, 2007). Moreover, the strengths of questionnaires generally include accuracy, generalizability, and convenience (Marshall & Rossman, 1995). However, besides these strengths, the questionnaires usually fall short in "examining complex social relationships or intricate patterns of interaction" (Marshall & Rossman, 1995, p. 97). In this study, as data related to the attitudes and perceptions of the teachers were gathered, in this sense the weaknesses of the questionnaire were compensated for with the help of interviews.

3.4.1.1 The Design and Development of the Questionnaire (Technology Perception Survey)

The questionnaire (TPS) used in this study consisted of five parts and 81 items (including background information questions) and during the design and development of TPS several previous instruments that were validated before (Albirini, 2004; NCES, 2000; Schulenberg, Yutrzenka, & Gohm, 2006) were analyzed.

The first section of the questionnaire, *background information*, included questions about demographics of the respondents. The seventh question of this part asked the respondents what the source of their technology knowledge was. With the help of these items in this part of the questionnaire, basic background information about the respondents was collected, which was used in inferential analysis of computer use and perceptions.

The second part of the questionnaire, *Access to Technology and Use Types*, was designed to find the computer and the Internet usage statistics of the respondents, as well as the types of computer use conducted by the teachers.

In the third section of the questionnaire, *Technology Competence*, the respondents selected the frequency of their use of the computer for the listed functions by selecting from the options ranging from *strongly agree (5 points)* to *strongly disagree (1 point)*.

The fourth part of the questionnaire, *Potential Barriers*, aimed at finding the perceived potential barriers to technology integration on part of the respondents. Similar to the previous sections' structure, the respondents selected from the options ranging from *strongly agree (5 points)* to *strongly disagree (1 point)*.

Computer Perceptions, the fifth part of the questionnaire, consisted of 26 items. With the help of likert-scale questions, the options of which ranged from *strongly agree (5 points) to strongly disagree (1 point)* the attitudes of the respondents towards computers were calculated and analyzed.

3.4.1.2 Piloting the Questionnaire

In order to both improve the quality of the prepared questionnaire and analyze the potential effectiveness of the questions, the questionnaire was piloted two times, one month before the actual data collection process. During the design stage of the questionnaire, the knowledge of the researchers as to the desired information might be limited, and in such cases this lack of knowledge might cause the researcher miss out or overlook important data (Hague, 1987). For this reason, piloting the questionnaires before the actual data collection process is useful to prevent potential errors that could go unnoticed and could not be remedied during the actual data collection stage (N. Reynolds, Diamantopoulos, & Schlegelmilch, 2002). Thus, with the help of two piloting sessions, the questionnaire was improved in terms of both question understandability and overall questionnaire reliability.

As it is known that the piloting population should closely resemble to the intended population (Krathwohl, 1998; N. Reynolds et al., 2002) in the first piloting, the questionnaire was piloted to a group of 15 teachers who closely resembled the intended population in terms of

demographics and work statuses, and in the second piloting, a group of 11 different teachers were selected. The sample chosen for the piloting seemed to satisfy both quantitative and qualitative requirements. During the first piloting stage, the opinions of the respondents regarding the overall design and understandability of the questionnaire were gathered individually by means of personal interviews. Similarly, Reynolds et al. (2002) suggests that during piloting process, the personal opinions of the respondents are of great value and should be gathered through personal interviews in order to improve the overall effectiveness of the questionnaires.

The reliability analysis of the first piloting indicated that the overall reliability of the questionnaire was low, although acceptable, *r*=.657. When reliability is concerned, Freedheim, Weiner, Velicar, Schinka, and Lerner (2003) claim that reliability coefficient over *r=.60* is acceptable depending on the purpose of the questionnaire. With the help of the first piloting, some question formats were refined, and the wordings of some items were changed in order to prevent ambiguity. Moreover, some questions assessing the same quality were discarded from the questionnaire in order to improve its reliability and internal validity. The reliability analysis was conducted using SPSS. The reliability of the overall questionnaire improved to *r*=.93, from *r*=.66, indicating that the reliability of the second piloting improved the questionnaire substantially with the help of the feedback received and the changes made after the first piloting.

3.4.2 Semi-structured face to face interviews

In this study, besides collecting quantitative data and getting statistical information about the respondents, gaining an insight from the teachers with regard to the educational value of using technology in their language learning practices was also one of the main agendas. To this end, with the help of face-to-face interviews qualitative data was collected.

As the interviews are the personal interaction of the researcher and the interviewee (Marshall & Rossman, 1995), for the purposes of this study, they enabled the researcher to gain a deeper insight into the research questions at hand. Commenting on the explorative and insight giving nature of the qualitative data, Creswell (2007) similarly states that "Qualitative researchers strive for 'understanding,' that deep structure of knowledge that comes from visiting personally with participants, spending extensive time in the field, and probing to obtain detailed meanings" (p. 201). Therefore, within the framework of this study, the interview data helped the researcher probe into the deeper meanings of technology usage, which would be harder to gain otherwise.

As the research questions of this study had a preplanned nature, more structured interviews were used as data collection tools. One of the main reasons for the selection of semi-structured face-to-face interviews as the data collection tool is that they fit best when the research purpose is to understand the meaning of the experiences of the people involved in education (Kvale, 1996; Seidman, 2005). Moreover, according to Krathwohl (1998) when the research questions are preplanned in nature, rather than emergent ones, more structured interviews suits better as data collection tools.

The semi-structured face-to-face interviews used in this study were composed of predetermined, theory-driven themes. These themes included

- curriculum and subject culture,
- perceived barriers to technology integration,
- preservice education and ICT training, and
- Educational value of technology integration in language learning related questions.

3.5 Data Analysis

3.5.1 Analysis of the Quantitative Data

The Likert scale questions were analyzed with the help of the statistical analysis software program SPSS (Statistical Package for the Social Sciences). Frequency calculations (i.e. how many teachers selected each answer) were used to produce descriptive central tendency statistics that were used to present an overall picture of the teachers' attitudes, computer competence levels, perceived barriers to technology integration and computer usage frequency and purposes. The means for the factors of the questionnaire were computed to see the tendency. Moreover, with the help of SPSS, inferential statistics were also calculated as to the effect of various factors on computer related factors.

3.5.1.1 Factor Analysis

In order to ease the analysis of the questionnaire, factor analyses were conducted. According to Green, Salkind and Akey (2000) factor analysis can be viewed as "a data-reduction technique since it reduces a large number of overlapping measured variables to much smaller factors." (p. 292). In accordance with the results of the factor analysis, some factors were extracted from the questionnaire parts and the means for the factors were reported instead of explaining the questionnaire items one by one.

The extracted factors can be seen in Table 6.

Table 6. Factors of the Questionnaire

Part of the Questionnaire	Factors	Variance Covered
Part 2 (Computer Usage Purposes)	Instructional Computer Usage Communicative Use Recreational Use	62.2%
Part 3 (Computer Competence)	First level competence, Second Level competence Third Competence	64.5%
Part 4 (Perceived Barriers to Technology Integration)	Infrastructure and Funding Technology Support Access to computers Training	82.4%
Part 5 (Attitudes toward Technology)	Computer Aversion Belief in the usefulness of computers Personal liking of computers Thoughts on efficiency of computers Thoughts about usefulness of computers for students	60.3%

The reliability coefficients of the parts of the questionnaire were generally high (Table 7).

Table 7. Reliability Statistics of the Questionnaire Parts

	Number of Items	Cronbach Alpha Coefficient
Part 2	12	.629
Part 3	17	.906
Part 4	11	.938
Part 5	26	.883
Overall	78	.933

The reliability statistics of the test items were above the acceptable level, in accordance with the claim by Freedheim et al. (2003) that reliability coefficient over r=.60 is acceptable, although not desirable.

3.5.2 Analysis of the Qualitative Data

During the analysis of the interviews, in order to keep the privacy of the interviewees, pseudonyms were used for each participant instead of their real names.

The analysis of the interview data began by transcribing the audio files. Then using qualitative analysis software, *QSR Nvivo 7*, the interview transcripts were coded into themes. As the interviews were in the format of semi-structured face-to-face interviews, the themes created in *Nvivo* had both a theory driven and a data driven nature. As it is claimed by Boyatzis (1998) the thematic analysis of the interviews can be done using both theory driven and data driven techniques, and theory driven coding gets its elements from prior research and hypotheses. In the case of this research, the idea of barriers to technology integration and related subcategories were designed in accordance with the theory of several researchers (Brickner, 1995; Christensen, 1997; Ertmer, 1999).

The main purpose of using *QSR Nvivo 7* was because it was easy to create codes using *nodes* property of the software and the quantitative data could easily be evaluated quantitatively, as the frequency of the codes (e.g. technology use types) mentioned in the interviews can easily be calculated with the query options in the software (Figure 11).

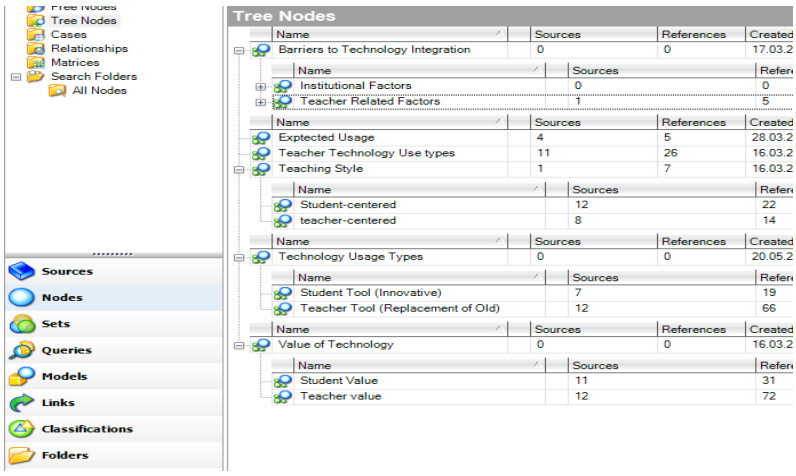


Figure 11. Nodes section of Nvivo

After creating the codes or themes and pasting transcripts into the software, by highlighting the parts from the transcript and dragging them onto the codes, similar views from all of the interview transcripts were categorized under same themes (Figure 12).

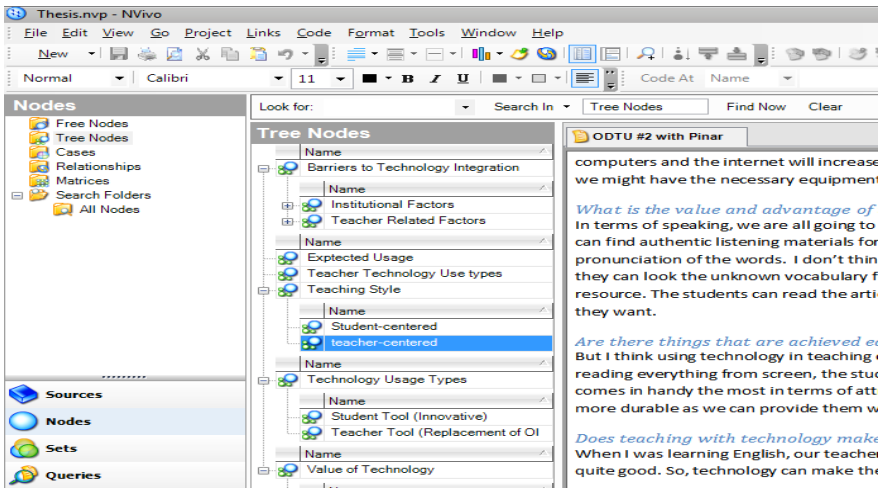


Figure 12. Coding Transcripts in Nvivo

After coding transcripts into themes, with one mouse click statements falling under the same themes can be retrieved, and the frequency of the codes can be calculated simply (Figure 13). This way, the frequency of the themes in the interviews could be observed with ease.

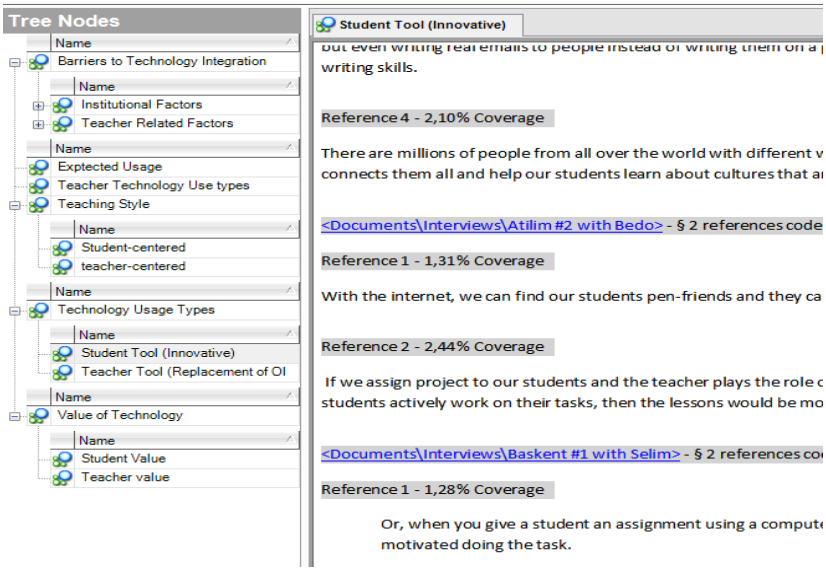


Figure 13. Retrieving Codes in Nvivo

After creating the themes, and coding the interviews with the help of the software, the qualitative analysis phase was completed. The themes created with the help of *Nvivo* were used in the analysis of the quantitative data in order to support the findings and insightfully explain factors emerged.

CHAPTER 4
RESULTS

4.1 Overview of the Chapter

In this chapter, the results of the collected data will be presented. The data from the questionnaire was analyzed through descriptive and inferential statistics using the SPSS program. The statements that claim similar views, and loaded to the same factor were examined in groups in accordance with the factor analysis results presented in the previous chapter and presented in Appendix 3. After the analysis of each factor, in order to define the usage statistics, competence levels, computer usage types, attitudes and perceived barriers to technology integration, the frequencies and means of the responses are presented in the form of tables and figures.

Analysis of each factor also included the analysis of gender differences, institutional factors, age differences, work experience differences, and the effect of being preservice or in-service. Moreover, interview data complementing the quantitative data is also presented throughout the chapter. While a theory and data driven thematic analysis was used in the analysis of the interviews, independent sample *t* tests and one-way ANOVA were used to analyze factors that affect computer related factors in the questionnaire.

A total of 12 interviews were conducted in order to collect data on both perceived barriers to technology integration, and the educational value of technology usage in language teaching. The interviews were conducted in a face-to-face fashion, and in every institution, two volunteer teachers were interviewed for about fifteen minutes. As the interviews were semi-structured, the questions were constructed around themes, such as curriculum and subject culture, pre-service - in-service training and ICT courses and educational value give to technology integration. Therefore, in the analysis of the interviews the themes were taken as the basis of the data interpretation.

The overall analysis of the data was conducted in alignment with the research questions of the study. While the quantitative data explained the overall tendency of the population, the qualitative data was used to support and gain insight about the questionnaire findings.

4.2 Defining the attitudes, computer competencies, perceived barriers to technology integration and the degree of computer usages of preservice and in-service ELT teachers

4.2.1 Computer Usage Frequency and Usage Types/Purposes

In order to get an insight about the computer usage frequencies of the respondents, in the questionnaire it was asked from the respondents to indicate their daily usage amounts (hours) of computers at their schools and homes. The analysis of the question revealed that daily computer usage hours for home usage was higher (*M*=2,27) than school usage (*M*=1,25) for both preservice and in-service teachers.

Apart from the daily computer usage statistics, the respondents were also asked to indicate their frequency and ease of access to computers and the Internet at their schools and homes by selecting an option from likert-scale, which had options ranging from *Not Available (0)* to *Always (4)*. The higher averages indicated more frequent access and thus usage. According to the results of the analysis it was observed that at home the respondents used computers (*M*=3,43) and the Internet (*M*=3,43) more than they did at school, and at school the classroom usage averages (Computers *M*=1,28, Internet *M*=,94) were the lower than other usage places (Computers *M*=2,44, Internet *M*=2,45). This highlights the fact that the teachers in general tended not to have computers in their classrooms and buildings in general (Figure 14).

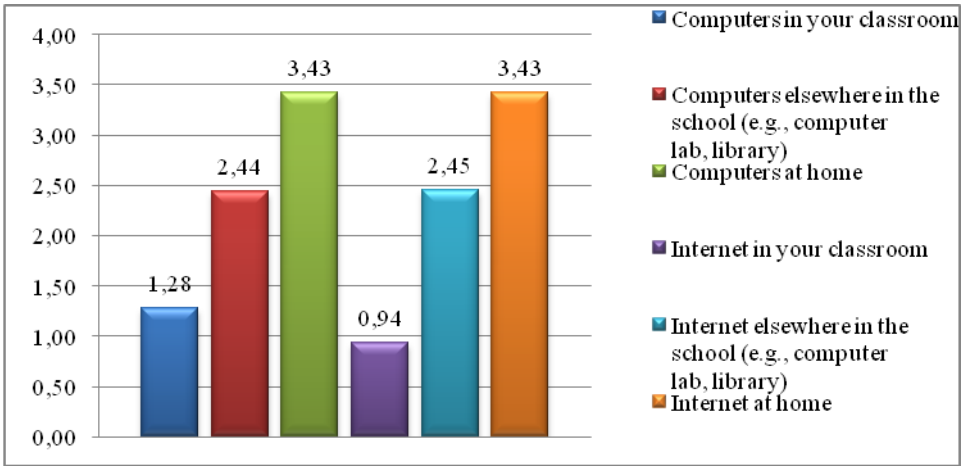


Figure 14. Teachers' Computer Usage Frequencies at home and school

Similarly, during the interviews apart from the two teachers from TOBB University, the rest of the interviewees mentioned that their institutions were lacking basic infrastructure in terms of computers and the Internet. The preservice teachers also mentioned that the practice schools they visited did not have any technical resources that would help them integrate

computers in their lessons. On the other hand, all of the teachers mentioned using technology for personal and instructional purposes whenever they had the chance indicating that their out of school usage frequency was higher than the school usage.

In the first part of the questionnaire, the respondents were also asked to indicate the source of their Information-Communications Technologies (ICT) knowledge by indicating on likert-scale how well the sources specified on the questionnaire helped them gain knowledge of computers. The greater averages of the items meant that the teachers believed in the effectiveness of that source in terms of preparing them to use ICT. The results of the analysis showed that that highest average (*M*=3,3) belongs to *independent learning* for the entire group, while computer literacy classes had the lowest average (*M*=2,25)(Figure 15).

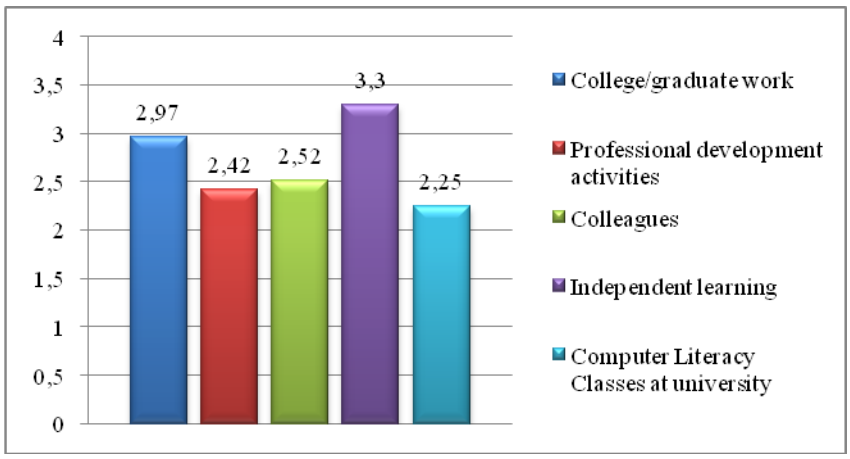


Figure 15. Source of ICT Knowledge of Teachers

On the contrary, during the interviews, the preservice teachers expressed that they valued the content they learned from these courses to a limited extent. All of the preservice teachers indicated that although they learned the basics of computing from these courses, their effect on teaching them how to use computers in their teaching was limited. Similarly, in-service teachers also showed similar contrast. Although they indicated that they appreciated ICT courses teaching them the basics, they indicated that their learning of computers was through their personal efforts rather than the help of ICT courses.

Moreover, with the help of nine likert-scale items, the option range of which changed from *Never (1)* to *Always (4)*, the computer usage types/purposes of the teachers were analyzed. As this part of the questionnaire was composed of three factors, *Instructional, Communicative, Recreational* use, the averages for the factors were calculated. *Communicative usage* was not included in preservice questionnaire, so the means for that factor was not calculated for preservice teachers, and thus lower than the other usage types for the entire group. The averages

for usage types were close to each other for the entire group, and was slightly higher for recreational usage (*M*=2,94) than instructional usage (*M*=2,75) (Figure 16).

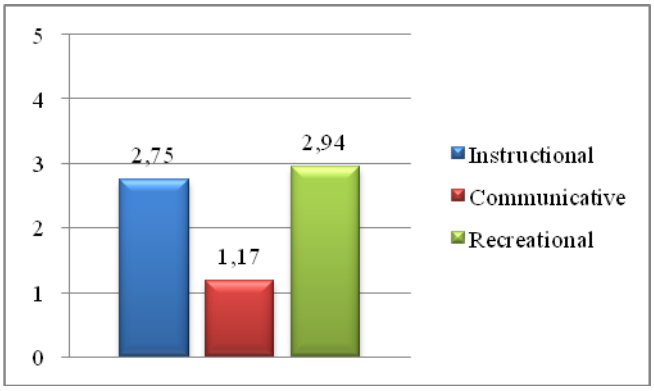


Figure 16. Computer Usage Frequency Distribution for Purposes

During the interviews, it was also mentioned by the teachers that they made use of technology in their classrooms. The use types the teachers mentioned were mainly in alignment with the questionnaire factors, and the teachers mainly mentioned the instructional usage of computers, both for pre-lesson preparation and during lessons to help instruction.

The teachers who did not have technology access in their classrooms (the preservice teachers and in-service teachers at Atılım, Çankaya, and Başkent Universities) mentioned that, as one type of instructional computer usage, the usage of computers for lesson preparation helped them prepare more professional looking worksheets and make their lessons more attractive for students. They also mentioned that using computers saved them a lot of time in terms of lesson and material preparation.

Both preservice and in-service teachers also mentioned using technology during their lessons as tools to motivate students and make the lessons more colorful, in a way a tool to increase the attractiveness of their instruction for the students. Especially, preservice teachers who had a chance to use PowerPoint and LCD projectors mentioned that they attracted the students' attention more easily with the help of technology.

4.2.2 Computer Competence

The computer competence levels of the respondents were analyzed through three factors, *First Level Usage*, *Second Level Usage*, and *Third Level Usage*, in accordance with the factor analysis of this part. The results of the analysis indicated that the competence levels of the groups decreased from first level usage (*M*=4,66) to third level (*M*=3,76), as the difficulty level increased to more advanced usages of computers (Figure 17).

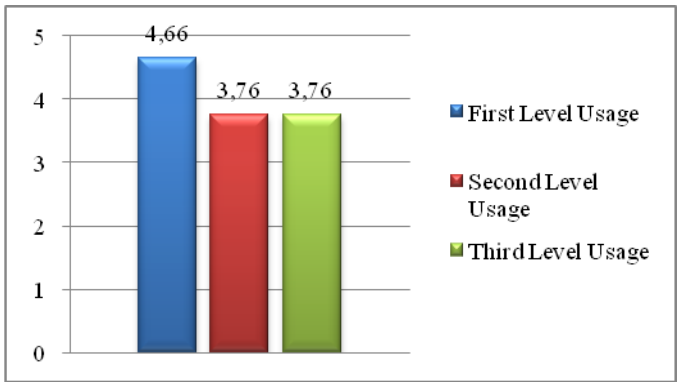


Figure 17. Teachers' Computer Competence Averages

Similarly, during the interviews, in accordance with the questionnaire data, some of the in-service teachers mentioned that the teachers generally lacked advanced skills to use technology efficiently, although they possessed basic skills, and these skills were quite important to ease the technology integration process. One of the in-service teachers indicated that the older teachers would have a harder time getting good at using technology in their lessons. Similarly, one of the preservice teachers mentioned that even small bits of information, such as how to turn on an LCD projector, could have a high importance and the teachers in general might lack these skills that would both save time and make their technology integration more effective.

4.2.3 Barriers to Technology Integration

The barriers to technology integration were analyzed through four factors in the questionnaire and barrier-related questions in the interview data. The higher averages meant that the respondents thought the schools had good conditions for technology integration. The analysis of the means unveiled that the infrastructure (M=2,36) had the lowest average in terms of barriers to technology integration, while access to computers had the highest average (M=2,98). The results tended to indicate that the teachers overall felt negatively about their institutions' overall technical adequacy (Figure 18).

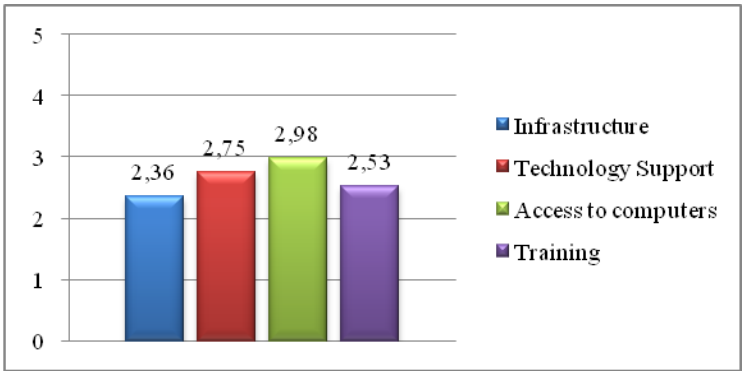


Figure 18. Teachers' Perception Averages of Barriers to Technology Integration

Corroborating with the results of the questionnaire, the results of the interviews showed a similar pattern in terms of the barriers to technology integration. The interviews revealed more details as to the potential barriers to technology integration, and the details of institutional barriers (Figure 19). The interview results mainly evolved around two main barriers, namely teacher-related barriers and institutional barriers. Closely resembling the categorization of Ertmer (1999), the barriers emerged from the interviews were categorized as first-order barriers, namely institutional factors, and second-order barriers, namely teacher-related barriers.

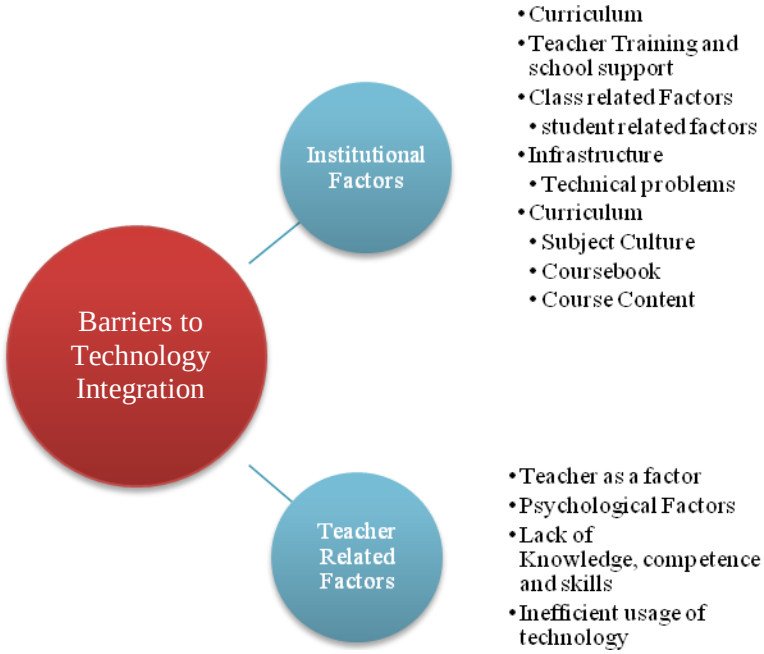


Figure 19. Thematic Analysis Tree of the Interviews

The analysis of coding frequency of the interviews showed that in-service teachers tended to mention institutional factors more (*M*=5,75) than the preservice teachers (*M*=4,75).

The coding frequency of the barriers in the interviews, generated by *Nvivo*, divided by preservice and in-service groups can be seen in Table 8.

Table 8. The Frequencies of Themes in the Questionnaire

	In-service	Preservice
Institutional Factors		
Course book	4	2
Curriculum	7	2
Infrastructure	7	4
Technical problems	4	0
Teacher training and school support	7	2
Student related barriers	3	3
Subject Culture	8	4
Course Content	5	2
Class related factors	1	0
Teacher Related Factors		
Preservice education (ICT Courses)	7	4
Traditional Technology Usage	5	1
Teacher as a factor	5	3
Psychological Factors	4	2
Lack of competence and skills	4	2

4.2.4 Attitudes towards Computers

The attitudes of the teachers towards computers were analyzed through five factors, *computer aversion, attitude towards computer usage, personal liking of computers, thoughts on efficiency of computers* and *thoughts on usefulness of computers for students*. The averages for the factors were calculated, and since the likert scale was designed from *(1) strongly disagree* to *(5) strongly agree*, the higher averages meant more positive attitude towards computers. All of the attitude factor averages were over 4 out of 5, indicating a positive attitude towards computers. The highest attitude average was for *attitude towards computer usage* (*M*=4,34), while *personal liking of computers* (*M*=4,08) was the lowest, although the average was close to 5 (Figure 20).

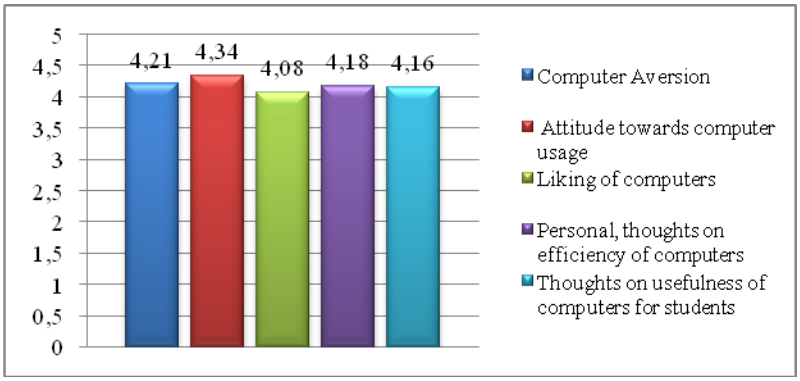


Figure 20. The Averages of Teachers' Attitudes toward Computers

The interview analysis revealed that the teachers' attitudes towards computers were one of the main factors affecting computer usage. The teachers mentioned that the anxiety of the teachers, namely *computer aversion*, hindered the likelihood of the computer usage. On this issue, Ronald from Başkent argued that "In fact, for most of the teachers using a computer is a source of anxiety. We can say that there is a link between anxiety and usage, the more they use it the less their anxiety gets." The teacher further claimed that the new generation of teachers would have less anxiety and be more comfortable and motivated to use computers, in a way relating computer anxiety with age of the teachers. Similarly, other in-service teachers agreed that anxiety could be a determining factor in using computers, and they agreed that senior teachers might have slightly more negative attitudes towards computers.

As for the interrelationship of the computer usage, competence, and attitude towards computers, a Pearson Correlation analysis was conducted, and it was seen that the items were statistically related. A positive moderate correlation between computer usage and competence (r=.505, p<.001) was observed, while computer usage and attitude towards computers had a positive small correlation (r=.364, p<.001) (Table 9).

Table 9. Correlation of Computer Usage, Competence and Attitudes toward Computers

		Computer Usage	Competence	Attitude towards computers
Computer Usage	Pearson Correlation	1	,505(**)	,364(**)
	Sig. (2-tailed)		,000	,000
	N	182	182	182
Competence	Pearson Correlation		1	,556(**)
	Sig. (2-tailed)			,000
	N		182	182

Closely related to the correlation between computer usage and attitudes, during the interviews the teachers also mentioned that computer usage might help increase the competence of teachers. One teacher from Başkent University, Teacher G, mentioned that "As the teachers use computers, they start to feel more comfortable around them; they start to overcome that fear." Thus, it could be maintained that the qualitative data tended to corroborate the correlation analysis and it can be claimed that both the teachers' responses to the questionnaire and the interview data indicated that the teachers believed in the reciprocal relationship between usage and increased attitudes.

4.3 The factors affecting technology integration perceptions and actual practices of preservice and in-service teachers

4.3.1 The factors that affect technology usage, competence, perceived barriers to technology integration and attitudes towards computers of in-service teachers

4.3.1.1 The effect of gender

For the in-service group, the effect of gender on the perceived importance of ICT knowledge sources, access to technology, computer usage types, computer competence, perceived barriers to technology integration and attitudes towards computers were analyzed using independent sample *t* tests.

Firstly, the effect of gender was analyzed for the ICT knowledge sources. For the in-service group, the only statistically significant difference between males and females in terms of ICT source, in accordance with the results of the independent *t* test, was for professional development activities, t (26,260) = -2.629, p = .014. The *t* test yielded negative results as the male group (M=1.78, SD=.88) had a lower average than the female group (M=2.39, SD=1.04). This indicates that professional development activities helped males less than females in terms of gaining computer skills.

Gender also seemed to be a statistically significant factor in terms of access to technology. The *t* test was statistically significant for computer usage in classroom, t(101,000) = -4.901, p < .001, for computer at home t(38,411) = 3,234, p = .003, for Internet in classroom, t (101,000) = -4.757, p < .001, and finally for Internet at home, t(49,102) = 4,492, p < .001. The *t* test for computers in classroom and Internet in classroom were negative as the first group, the males' averages were lower than those of females', possibly indicating that males tended to use computers less than the females in classroom, while the males had higher averages than the

females in terms of home computer usage, as an indication of male teachers' tendency of using computers to a greater extent than females did (Figure 21).

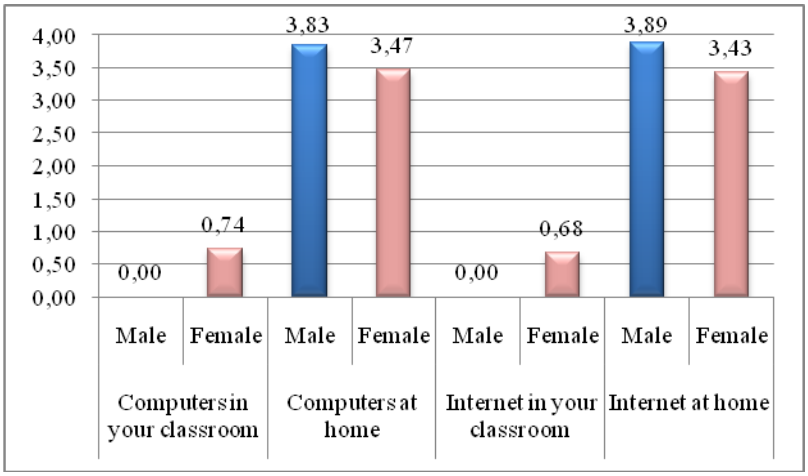


Figure 21. Computer Usage Frequencies Distributed by Gender for In-service Group

In order to see the effect of gender on *computer usage types* an independent sample *t* test was run. The *t* test did not yield any statistically significant results for gender for the in-service group, thus it could be concluded that the genders showed similar usage frequencies of computers for various purposes.

To see if gender had any statistically significant relationships with the computer competence factors, an independent sample *t* test was conducted. The results of the *t* test produced statistically significant results for *Second Level Usage* and *Third Level Usage* (the competence levels at moderate and advanced levels) indicating that males and females differed in terms of competence levels. (Table 10).

Table 10. *t*-test Statistics for Computer Competence of In-service Teachers'

Technology Competence	***t***	***df***	***Sig.***
Second Level Usage	5.899	29,853	.000
Third Level Usage	2,561	23,186	.017

For all of the levels, males had higher averages than females, while for the first level usage the means of the groups were closer (Figure 22).

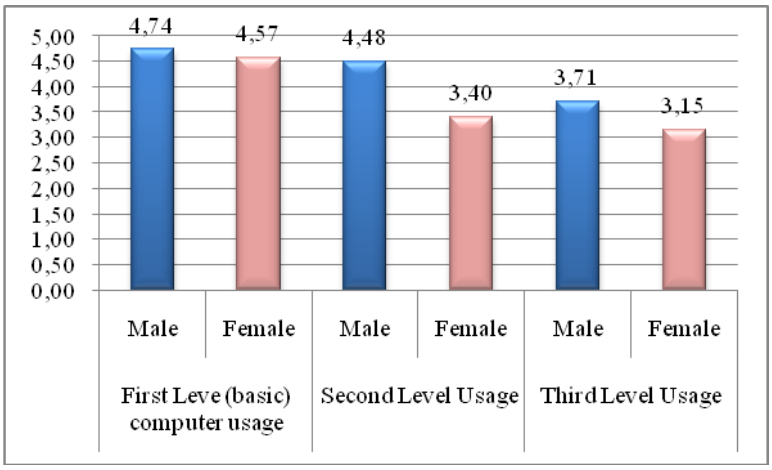


Figure 22. Computer Competence Frequencies Distributed by Gender for the In-service Group

The barriers to technology integration and its factors were also analyzed in terms of gender for the in-service group. An independent sample *t* test was conducted to see if gender significantly affected factor averages. The results of the *t* test were not significant for any of the factors, meaning that both males and females had similar opinions of the barriers.

In order to analyze *attitudes toward computers* and its factors in terms of gender, an independent sample *t* test was conducted and it yielded statistically significant results for all of the attitude factors, indicating that males and females have different attitude levels towards computers (Table 11).

Table 11. *t*-test Statistics of Gender's Effect on Attitudes toward Computers

Attitudes toward Computers	***t***	***df***	***Sig.***
Computer Aversion	3.667	31,180	.001
Attitude towards computer usage	2.714	23,553	.012
Liking of computers	3.943	33,125	.000
Personal, thoughts on efficiency of computers	4.282	28,129	.000
Thoughts on usefulness of computers for students	2.132	26,210	.043

Further analysis of the results revealed that males had more positive attitude towards computers than females for all of the attitude factors (Figure 23).

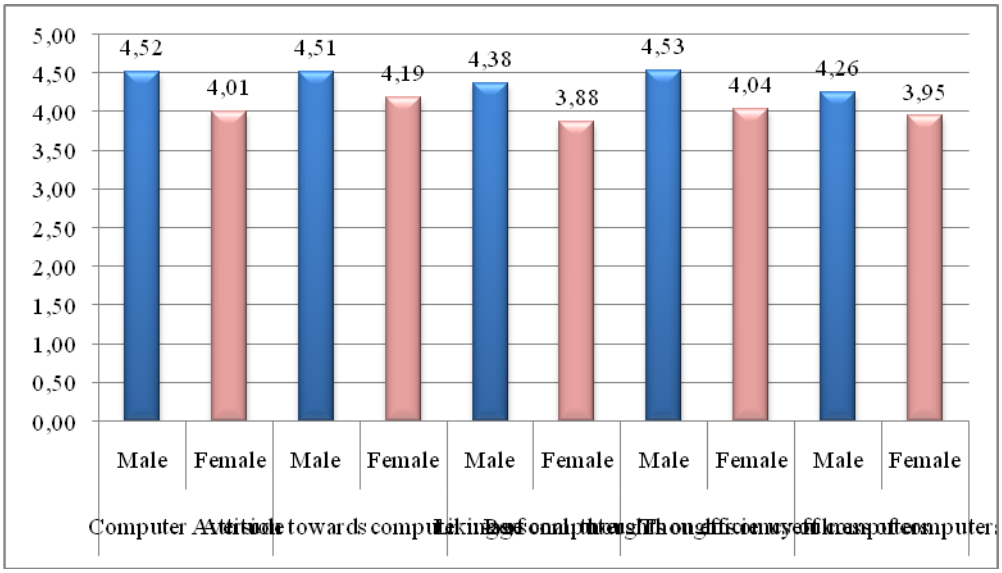


Figure 23. Average Distribution of Attitudes toward Computers by Gender for the In-service Group

4.3.1.2 The effect of age

Apart from analyzing the effect of gender on computer usage factors, the age of the respondents was also taken as a factor that might possibly affect the computer usage, ICT knowledge sources, technology access, computer usage types, computer competence, perceived barriers to integration and attitudes towards computers of the respondents. As the preservice group was homogenous in this sense, age analysis was not conducted for this group.

Firstly, daily computer usage of the respondents was analyzed in terms of age. The one-way ANOVA did not yield statistically significant results for neither home usage nor school usage, meaning that different age groups tended to use or not use computers at resembling levels.

Secondly, the source of ICT knowledge was also analyzed in terms of age, using a one-way ANOVA. The test was statistically significant for some of the items, when the *F* values for between the groups were taken into consideration. The ANOVA was statistically significant for College/Graduate work, F (3,118) = 17.029, $p < .001$, and for Computer Literacy Classes at University, F (3,118) = 8.950, $p < .001$. With a further analysis it was observed that 18-23 age group had higher averages for both *college/graduate work* (*M*=3,75) and *computer literacy classes* (*M*=3,5) than the other age groups, meaning that they learned from these sources more than the other age groups did. Expectedly, 41 and above age group had the lowest averages for the aforementioned factors (*M*=1,42; *M*=1,33 respectively).

As for the analysis of technology access places in terms of age, a one-way ANOVA was conducted to see if the groups had any statistically significant differences. The ANOVA yielded statistically significant results for usage of computers and the Internet in classroom, meaning that the age groups showed different usage statistics of computers in classroom (Table 12).

Table 12. *t*-test Statistics for Computer Usage Places for Age (In-service Group)

Access to Technology (between the age groups)	***F***	***df***	***Sig.***
Computers in your classroom	3,480	3,119	.018
Internet in your classroom	3,386	3,119	.021

Further analysis of the results manifested that *31-40* and *41 and above* age groups had the lowest averages for usage of computers (*M*=,21) and the Internet in the classroom (*M*=,18).

In a further analysis of age's effect on computer factors, a one-way ANOVA was conducted to see if it was statistically significant for computer usage purposes. In terms of communicative usage and recreational usage, the ANOVA yielded statistically significant results, indicating that different age groups used computers at different levels for communicative and recreational purposes (Table 13).

Table 13. ANOVA for Usage Purposes of Computers for Age Groups (In-service)

Usage Purpose of Computers	***F***	***df***	***Sig.***
Communicative Usage	3.722	3,119	.013
Recreational Usage	4.487	3,119	.005

The 18-23 age group had highest averages for communicative and recreational use (*M*=2,5; *M*=3,75), while 41 and above group had the lowest average (*M*=1,44; *M*=2,73).

In order to see if age had any effect on computer competence, a one-way ANOVA was conducted and it yielded statistically significant results for first and second level competence, but not for third level competence, indicating that the groups were similar in terms of third level competence (Table 14).

Table 14. ANOVA of Computer Competence by Age (In-service)

Technology Competence (effect of age)	***F***	***df***	***Sig.***
First Level Usage	5.031	3,199	.003
Second Level Usage	5.317	3,199	.002

The analysis of the averages unveiled that 18-23 age group had the highest average for first (*M*=4,71) and second (*M*=4,13) competence levels, while 41 and above group had the lowest for those (*M*=4,39; *M*=2,99).

Similarly, the interviewees also mentioned that the age might be a factor that might affect the computer competence of the teachers. Mike from Atılım University claimed that "in this school, the teachers are very young and I guess the percentage of teachers who can use computers would be high, as they newly graduated and should know a lot about computers during their preservice education," indicating his belief that younger generation would be more competent at using computers. The teachers mentioned new generation of the teachers were graduating from education departments with higher competence knowledge and awareness, and they agreed upon the fact that the older age group tended to have low competence of computers, which might eventually make them nervous about using computers.

Perceived barriers to technology integration of the respondents were also analyzed in terms of age and a one-way ANOVA was conducted to this end. The test yielded statistically significant results only for *infrastructure*, $F(3,119)=2.591$, $p=.043$. Further analysis revealed that the 18- 23 and 24-30 years age groups combined had more positive thoughts about infrastructure (*M*=2,15) than the 31-40 and 41 and above age groups combined (*M*=1,66).

Finally, age of the respondents for the in-service group was taken as a factor that might statistically influence the attitudes of the respondents towards computers, and therefore a one-way ANOVA was conducted. The ANOVA was significant for only one of the factors, *Thoughts on usefulness of computers for students*, $F(3,119)=4.676$, $p=.004$, indicating that different age groups did not differ much in terms of their attitudes towards computers. Further analysis of the results revealed that the youngest age group had significantly lower average (*M*=3,00) for this factor than the rest of the age groups (Figure 24).

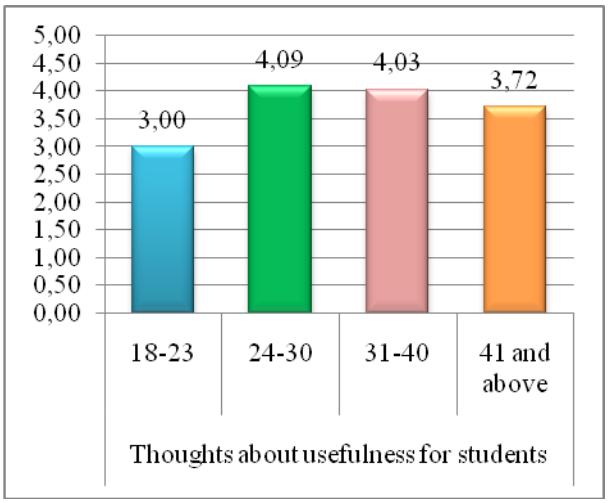


Figure 24. Averages for Thoughts about Usefulness of Computers for Students by Age (In-service)

4.3.1.3 The effect of the institutions the teachers work

Apart from analyzing the effect of gender and age, the in-service group was also analyzed in terms of the institutions they worked at, again, as the preservice teachers were all from one institution this analysis was not conducted for them. As the institutions had different levels of computer infrastructure and computer availability, they were taken as a factor that might potentially affect the results and thus it was speculated that being exposed to computers more might statistically affect the computer usage statistics, access to technology, computer use types, computer competence, perceived computer barriers and attitudes of the respondents towards computers.

Firstly, the institutions the in-service teachers worked at were analyzed as a factor affecting computer usage frequencies. A one-way ANOVA was conducted to this end, and it was statistically significant for both home usage, F (3,116) = 3.58, p = .016, and for school usage, F(3,116) = 149.637, p < .001, meaning that teachers at different institutions had differing levels of home and school computer usage. The follow up tests were conducted to evaluate pairwise differences among the means. It was seen that TOBB University had the highest average in terms of computer usage at school, M=6.21, SD=2.04, while Başkent University had the lowest averages for both home and school usage (M=1.55; M=.27) (Figure 25).

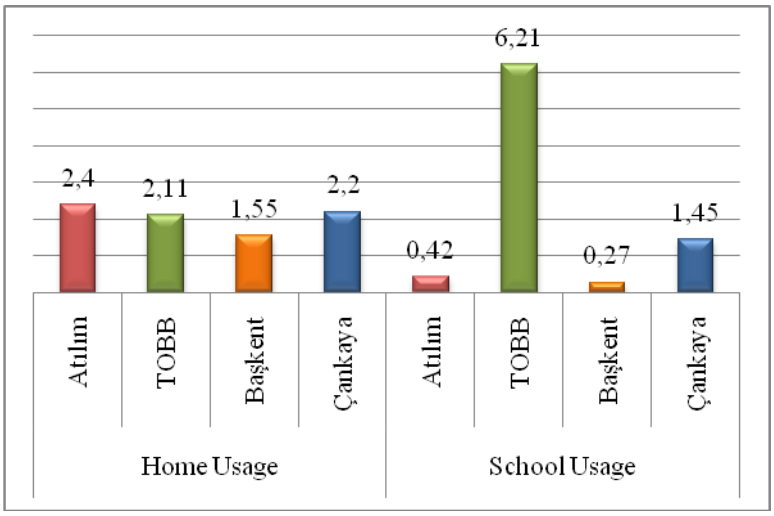


Figure 25. Computer Usage Frequency of In-service Teachers by Institutions

The usage places of computers were also analyzed in terms of the institutions. A one-way ANOVA was conducted and it yielded statistically significant results for all usage places for between the groups, indicating the fact that the teachers at different institutions had varying levels of computer usage statistics in terms of home and school (Table 15).

Table 15. ANOVA of Computer Usage Places for Institution (In-service)

Access to Technology (between the Institutions)	***F***	***df***	***Sig.***
Computers in your classroom	1410.933	3,119	.000
Computers elsewhere in the school (e.g., computer lab, library)	15.363	3,119	.000
Computers at home	5.567	3,119	.001
Internet in your classroom	1844.573	3,119	.000
Internet elsewhere in the school (e.g., computer lab, library)	15.493	3,119	.000
Internet at home	6,091	3,119	.001

In the further analysis, it was observed that the access and usage averages of the teachers at TOBB University were the highest for classroom usage of computers (*M*=3,84) and the Internet (*M*=3,63) than the teachers at other institutions, while in terms of home usage they ranked the last (Computers *M*=3,05; Internet *M*=3) (Figure 26).

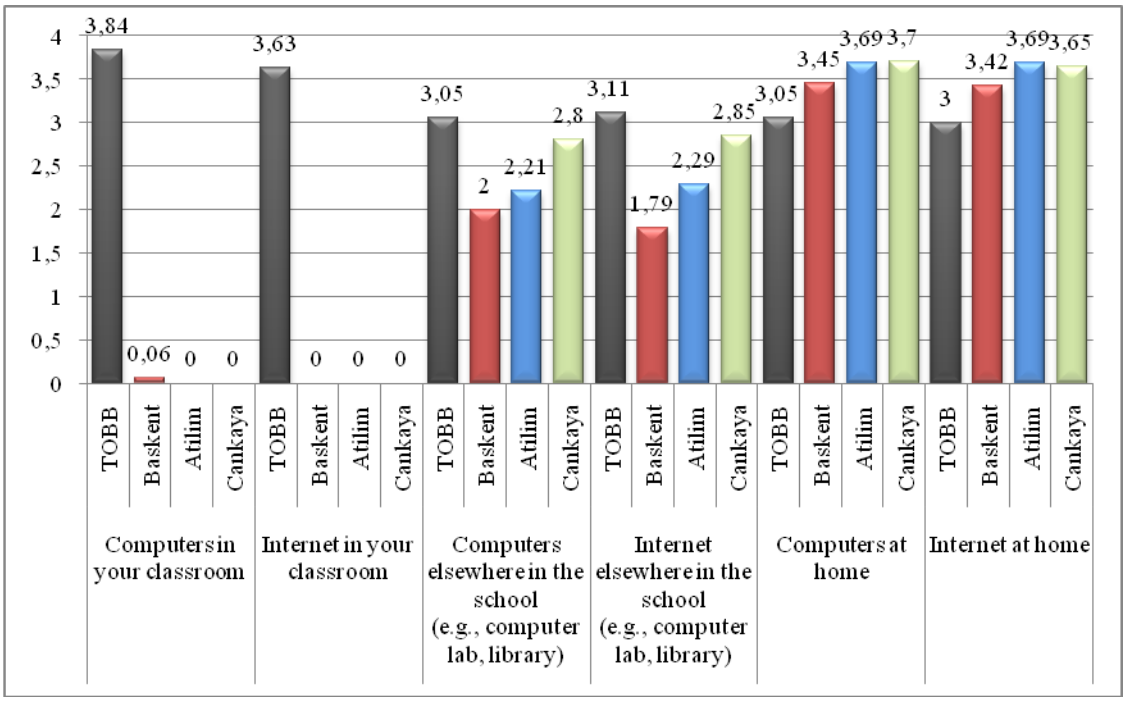


Figure 26. Averages of Computer Usage Places by Institution (In-service)

As for taking the institutions as a factor affecting computer use types, the one-way ANOVA yielded statistically significant results, except for recreational usage, indicating that the teachers did not vary in terms of recreational computer usage among institutions (Table 16). The averages for TOBB University were higher than the other schools for both instructional usage (M=3,52) and communicative usage (M=2,49) than the teachers' of other institutions .

Table 16. ANOVA of Computer Usage Purposes by Institution (In-service)

Usage Purpose of Computers	***F***	***df***	***Sig.***
Instructional Usage	51.205	3,119	.000
Communicative Usage	16.154	3,119	.000

In order to see if the institutions the in-service teachers worked at had any statistically significant relationship with the computer competence factors, a one-way ANOVA was conducted. The ANOVA was statistically significant for all three factors (Table 17), meaning that teachers at different institutions had different levels of computer competence.

Table 17. ANOVA of Computer Competence for Institutions (In-service)

Computer Competence	***F***	***df***	***Sig.***
First Level Usage	6.378	3,199	.002
Second Level Usage	5.302	3,199	.000
Third Level Usage	6.774	3,199	.000

Further analysis revealed that TOBB and Çankaya Universities had the highest averages, while Başkent University had the lowest in terms of the computer competence levels of the teachers (Figure 27).

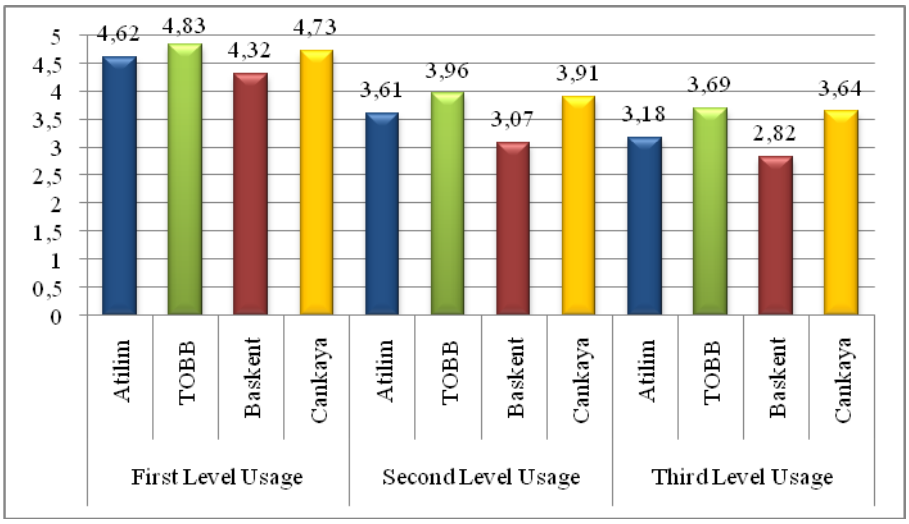


Figure 27. Averages of Computer Competences of In-service Teachers by Institutions

As for perceived barriers to technology integration, a one-way ANOVA was conducted to see if institutions had any statistically significant effect on the factors. The ANOVA was statistically significant for all of the factors, which suggested that institutions differed in terms of barriers (Table 18).

Table 18. ANOVA of Perceived Barriers to Technology Integration for Institutions (In-service)

Barriers to Integration	***F***	***df***	***Sig.***
Infrastructure	153.176	3,119	.000
Technology Support	40.468	3,119	.000

Table 18. Continued

Barriers to Integration	*F*	*df*	*Sig.*
Access to computers	20.718	3,119	.000
Training	21.914	3,119	.000

The higher averages for the factors meant that the institutions suffered less from barriers to technology integration. The results revealed that TOBB University had the highest averages for all of the factors, while Başkent University had the lowest (Figure 28).

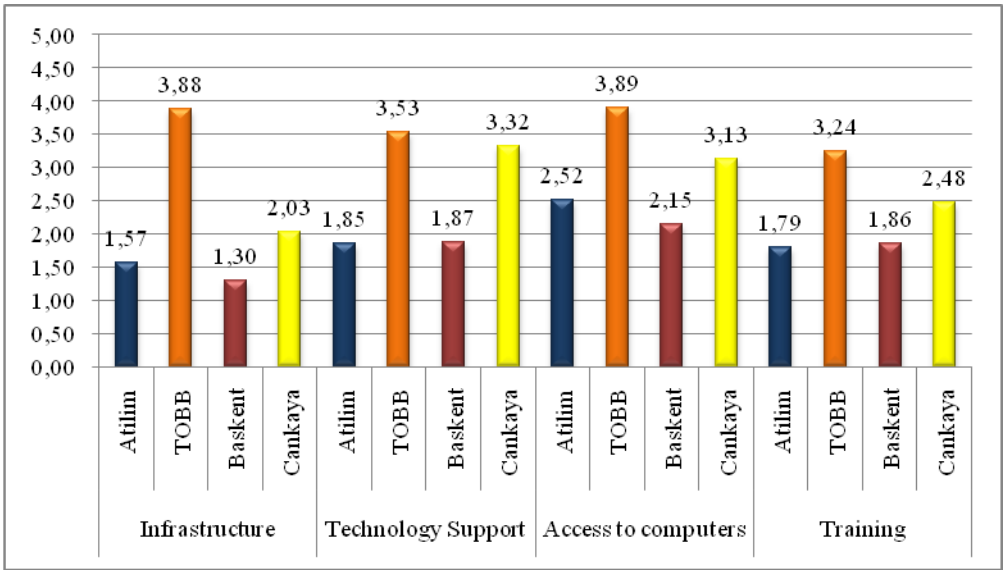


Figure 28. Averages of Perceived Barriers to Technology Integration by Institutions (In-service)

Finally, in order to see the effect of institution on computer attitudes, a one-way ANOVA was conducted. The ANOVA between groups was statistically significant for all of the items except for Factor 4, *thoughts on the efficiency of computers*. It may be argued that the teachers at different institutions had different levels of attitudes towards computers (Table 19).

Table 19. ANOVA of Attitudes toward Computers for Institutions (In-service)

Attitudes towards technology	*F*	*df*	*Sig.*
Computer Aversion	4.886	3,199	.003
Attitude towards computer usage	4.674	3,199	.004
Liking of computers	3.326	3,199	.022
Thoughts on usefulness of computers for students	5.225	3,199	.002

Higher averages meant that the teachers had more positive attitudes towards computers. Çankaya University had the highest averages for factors 2, 3, 4 and 5, while Başkent University had the lowest averages for all of the factors, except for *Thoughts on usefulness of computers for students*, for which TOBB university had the lowest average (*M*=3,67) (Figure 29).

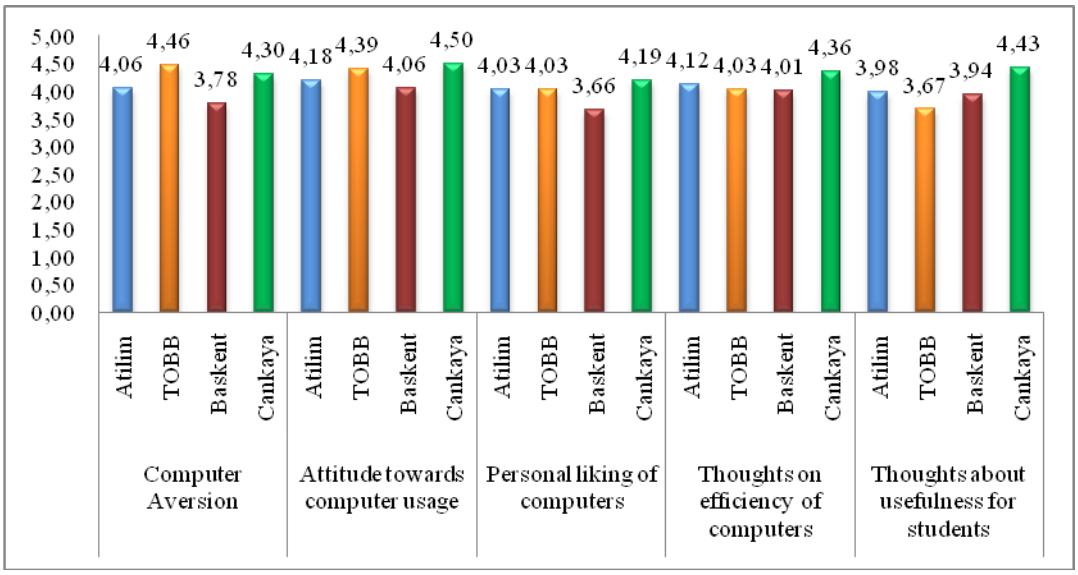


Figure 29. Averages of Attitudes toward Computers by Institutions (In-service)

The analysis of the interviews helped both explain the effect of institution on usage of computers, computer competence and attitudes towards them; and gain insight into the possible factors that might play a role under the category of *institutional factors*. The thematic analysis of the interviews helped create the following subcategories under the category of institutional barriers (Figure 30).

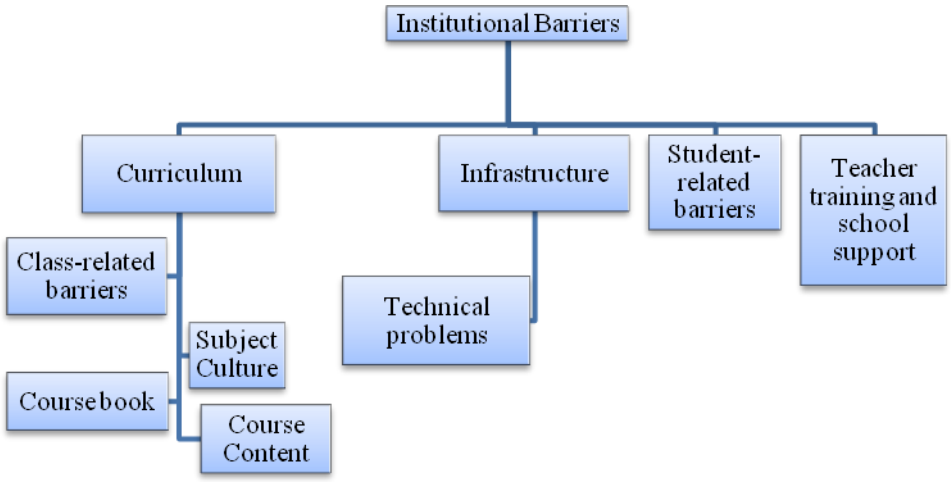


Figure 30. Institutional barriers mentioned in the interviews

4.3.1.4 The effect of work experience

The analysis of computer usage hours in terms of the work experience of the respondents yielded similar results to the comparison of usage hours according to age of the respondents. The ANOVA was slightly over significance level and therefore not statistically significant, revealing that different work experience groups tended to have similar amount of work and home computer usage frequencies. As the preservice group of teachers did not have any work experience, the analysis was not conducted for them.

As for the work experience of the in-service teachers as a factor affecting technology access, one-way ANOVA indicated that there were statistically significant differences among groups of different work experiences in terms of usage of computers, and the internet in classroom and computers elsewhere in school. This might indicate that teachers with different experience levels differed in their school computer usages (Table 20).

Table 20. ANOVA of Access to Technology for Work Experience (In-service)

Access to Technology	***F***	***df***	***Sig.***
Computers in your classroom	5.016	4,119	.001
Computers elsewhere in school	2.483	4,199	.048
Internet in your classroom	5.757	4,119	.000

Further analysis unveiled that the new teachers tended to have higher usage averages of computer and the internet in classroom and internet usage elsewhere in school (*M*=1,5; *M*=2,52; *M*=1) than their more experienced colleagues.

As for the effect of work experience on the technology competence of the teachers, a one-way ANOVA was conducted to see the effect. First and second level usage competence differed significantly between the groups, while third level usage seemed to be equal for different experience groups (Table 21).

Table 21. ANOVA of Technology Competence for Work Experience (In-service)

Technology Competence (effect of work experience)	***F***	***df***	***Sig.***
First Level Usage	4.746	4,119	.001
Second Level Usage	6.127	4,119	.000

It was revealed that in terms of first and second level usage the new teachers tended to have higher averages (*M*=4,74; 3,81) than the more experienced teachers (Figure 31).

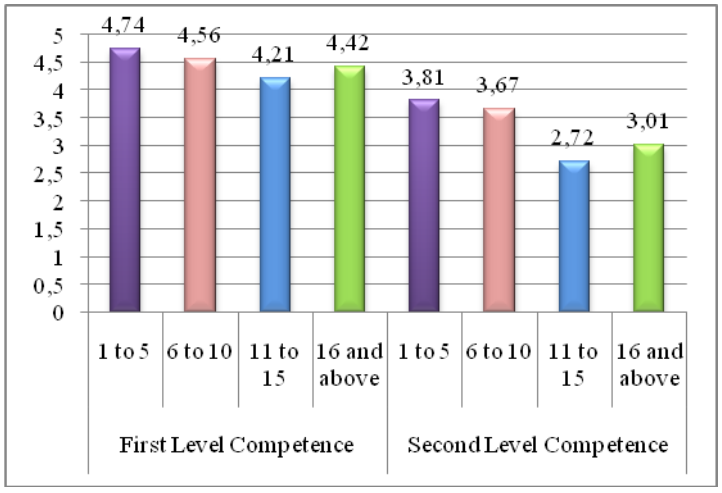


Figure 31. Averages of Computer Competence by Work Experience (In-service)

The perceived barriers to technology integration were also analyzed in terms of work experience, and the results of the ANOVA yielded statistically significant results for only one factor: *infrastructure*, $F(4,119) = 4.571$, $p = .002$. The higher averages for infrastructure meant having a more positive opinion for that factor. The 1 to5 years of experience group had the highest average (*M*=2,21), although the average was still below the mean (*M*=2.5).

As to the attitudes of in-service teachers, in order to see if work experience significantly affected the attitude averages of the respondents, a one-way ANOVA was conducted. ANOVA yielded statistically significant results for the first and fifth factor, namely *computer aversion*, $F(4,119)=2.611$, p=.039, and *thoughts about the usefulness of computers for students*, $F(4,119)=2.468$, p=.049. The higher averages meant that the groups felt better about that specific factor. 11 to 15 group had the lowest average for the *computer aversion* factor (*M*=3,64), while 16 and above group had the lowest average (*M*=3,78) for the *thoughts about the usefulness for students* factor (Figure 32).

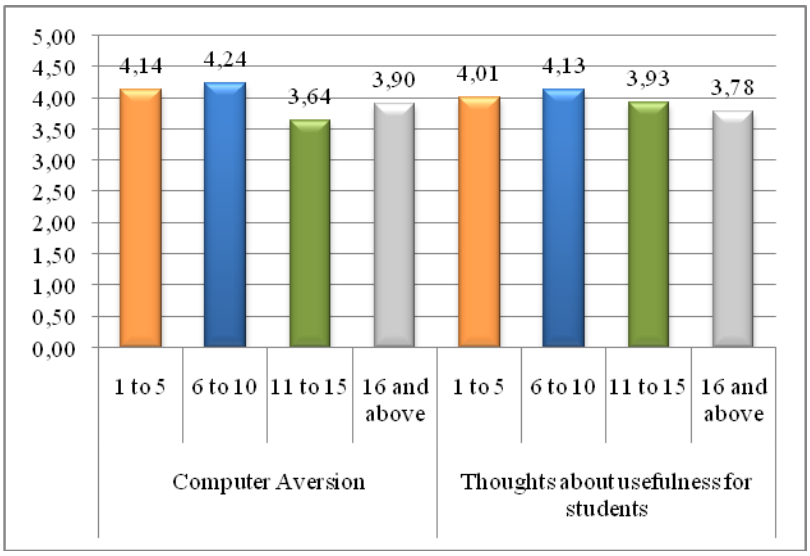


Figure 32. Averages of Computer Aversion and Usefulness of Computers for Students by Work Experience (In-service)

During the interviews, the respondents thought of work experience as closely linked with the age of the teachers, so the analysis the interviewees made on the age of the respondents were also valid for the experience of the respondents. The respondents mentioned that young teachers, namely new teachers, would have more knowledge about computers, and therefore would feel better about using them. In a way, the teachers felt that knowing more about computers, the new generation would have more positive attitudes towards using them.

4.3.1.5 The effect of other factors

Firstly, computer usage hours were analyzed taking the academic statuses of the in-service teachers into consideration. As there were three groups present (Yes, No, In progress) a test of ANOVA was used to see if there was a statistically significant relationship between holding an academic degree and computer usage frequency. The ANOVA yielded statistically significant results for home computer usage, F (2,117) = 11.990, $p < .001$, meaning that the groups differed in their home computer usages. As for school usage, the test was not significant. To see the real mean differences follow up tests were conducted, and it was seen that the *in progress* group had the highest averages for home usage (M=2,71).

Next, a one-way ANOVA was conducted to see if there was a statistically significant relationship between the groups and the computer usage place statistics. It was seen that only *computer usage elsewhere in school* item was significantly varied among groups, F (2,119) = 3,527, p = .033. The means for the group had a graduate degree (M=2.62, SD=.70) was higher than the group that did not (M=2.19, SD=.72), while the teachers who were working on their

degrees at the time of the data collection was in the middle in terms of averages (*M*=2.48, *SD*=.74).

Computer competence of the teachers was also analyzed in terms of academic degree. A one-way ANOVA was run to see if there were any statistically significant effect on technology competence. The ANOVA was only statistically significant for first level usage, *F*(2,119)= 9.342, *p*<.011. The averages for *in progress* group was higher (*M*=4,8) than both the group that held an academic degree (*M*=4,65) and that did not (*M*=4,4).

The perceived barriers of the in-service teachers were analyzed in terms of the respondents' having an academic degree. A one-way ANOVA was conducted and the results were not statistically significant for any of the factors, indicating the fact that teachers with different academic levels felt the same about the perceived barriers to the technology integration.

Finally, the attitudes of the in-service teachers were analyzed to see whether holding an academic degree affected the attitude averages significantly. A one-way ANOVA was conducted, and it only yielded statistically significant results for *personal liking of computers*, *F*(2,119)=3.875, *p*=.023. The analysis of the averages for this factor revealed that the average of the *in progress* group (*M*=4,8) was higher than the others for this factor, meaning that the in progress group showed more personal liking of computers (Figure 33).

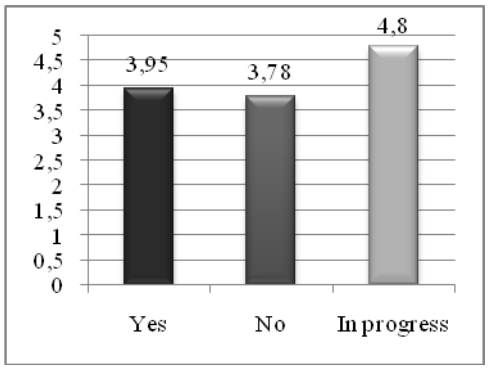


Figure 33. Averages of Personal Liking of Computers by Academic Degree (In-service)

As for the preservice group, a *t* test was conducted to see if having a PC/Laptop had any statistically significant effect on computer competence. The second level usage competence of computers was the only factor that had a statistically significant relationship with computer ownership, *t*(21,980)=2.456,*p*=.022. The second level competence average of pc owners was higher, *M*=4,18, *SD*=.55, than non-pc owners, *M*=3,81, *SD*=.75.

4.3.2 The factors affecting computer usage, competence, attitudes and perceived barriers to technology integration of preservice teachers

4.3.2.1 The effect of gender

As to the effect of gender on technology access, an independent sample *t* test was run, and the only statistically significant result was found for computer usage in classroom, *t* (12,492) = -2.642, *p* = .021, computer usage at home, *t* (10,842) = -2.556, *p* = .027, and for Internet usage at home, *t* (9, 382) = -3.722, *p* = .004. The analysis of the means for the groups manifested that females had higher averages than the males in terms of usage of computers both at home and in classroom (Figure 34).

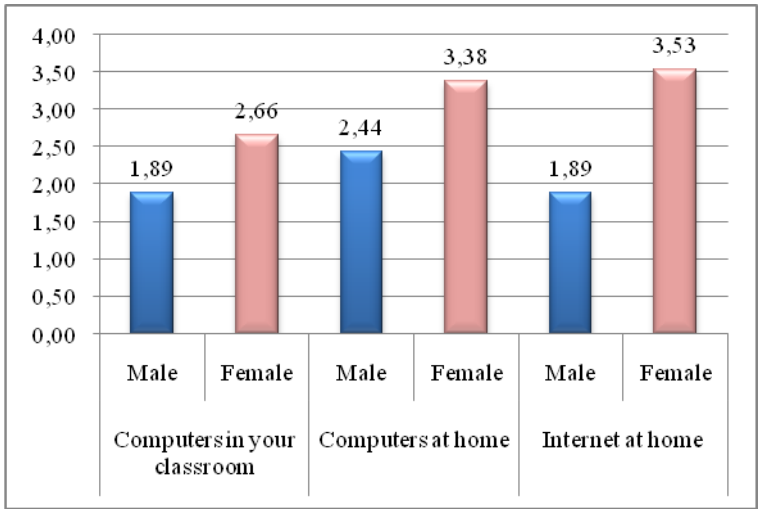


Figure 34. Averages of Computer Usage by Gender (Preservice)

As for the analysis of computer usage types for the preservice group, the group was analyzed in terms of gender and the *t* test yielded significant results for *instructional* usage only, *t*(14,835)=-3.087,*p*=.008, meaning that the groups differed in terms of instructional computer usage frequencies. The averages for *communicative* usage were not calculated and so removed from further analysis as it was not included in preservice questionnaire. As for instructional usage, the averages of the females were higher (*M*=3,31) than the males (*M*=2,96).

As for the analysis of the computer competences, a *t* test was conducted to see if gender had any statistically significant effect on the factors. The result of the independent *t* test was not statistically significant for any of the factors, which meant that genders were equal in terms of their computer competence levels.

As for the analysis of the results for perceived barriers to technology integration for the preservice teachers in terms of gender, a *t* test was conducted, and the test did not yield any statistically significant results for any of the factors, either.

When the attitudes of the preservice teachers towards computers were analyzed in terms of gender, an independent sample *t* test was conducted. The results of the *t* test did not yield any statistically valid results, meaning that both males and females had similar attitude levels towards using computers.

4.3.3 The difference between preservice and in-service teachers' technology usage, competence, attitudes and perceived barriers

When computer ownership was scrutinized to see if it showed any statistically significant differences between preservice and in-service group, it was seen that computer ownership differed significantly between the two groups. The *t* test for unequal variances was significant, t (69,43) = 3.828, $p < .001$. In the further analysis it was revealed that a higher percentage of in-service teachers owned computers (97,5%) than preservice teachers (78,5%). As for the Internet connection availability at home, again the groups showed statistically different patterns. The *t* test for unequal variances yielded significant results, t (81,37) = 3.836, $p < .001$. The frequencies for the groups showed that in-service teachers had higher averages of Internet connectivity (92,5%) than preservice teachers (67,7%). The printer ownership also showed a statistically significant difference between the two groups. The *t* test was significant, t (136,654) = 6.408, $p < .001$. The frequencies for the groups showed that more in-service teachers (66,7%) owned printers than preservice teachers (22,6%).

The computer usage hours was also compared between the in-service and preservice groups. To see if the difference between the groups was statistically significant an independent *t* test was conducted. Only for daily school usage, the test was statistically significant, t (178,15)=-2.339, $p = .020$. The test yielded a negative result as the preservice group spent less time (M =0.82, SD = 1.35) with computers at school than the in-service group (M = 1.47, SD = 2.36).

When the two groups, preservice and in-service teachers, were compared in terms of the ICT knowledge sources from which they learned about computers, the *t* test yielded statistically significant results for all of the sources items, meaning that preservice and in-service groups had differing levels of appreciation for different ICT knowledge sources (Table 22).

Table 22. *t*-test Statistics for the Comparison of ICT Knowledge Source for In-service Preservice Teachers

ICT Knowledge Source	*t*	*df*	*Sig.*
College/graduate work	4,361	153,438	.000
Professional development activities	2,173	117,413	.032
Colleagues	3,651	150,421	.000
Independent learning	-3,370	115,273	.001
Computer Literacy Classes at university	5,521	122,122	.000

Further analysis of the means for the groups revealed that the means for the ICT knowledge sources were higher for the preservice teachers for all of the items than the in-service group, except for independent learning, where the in-service group had higher an average than the preservice group (Figure 35).

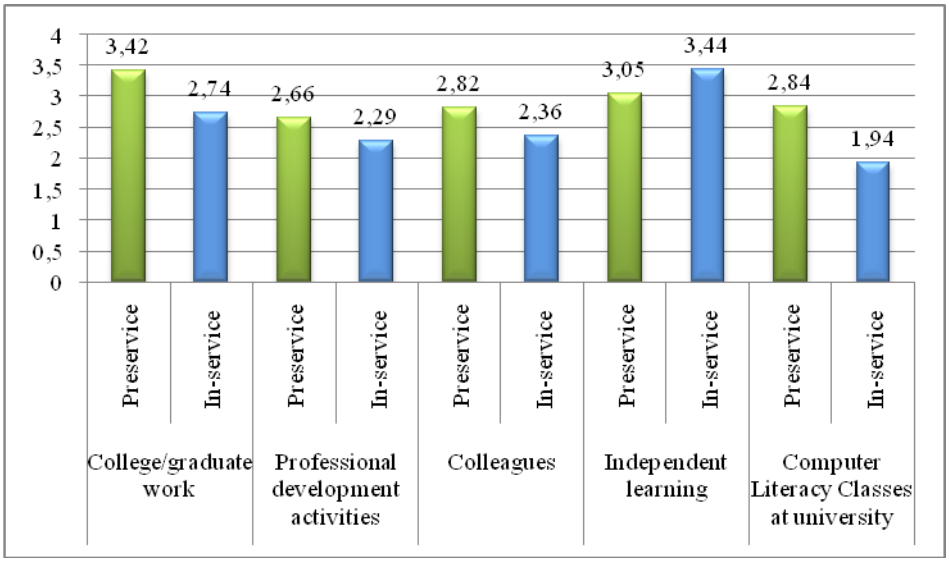


Figure 35. Averages of ICT Knowledge Sources by Preservice and In-service Teachers

When the ICT Knowledge sources were analyzed within the context of the interviews, it was seen that the preservice teachers valued the ICT courses (computer literacy courses) less than the in-service teachers did, although they indicated in the questionnaire that they learned basics from those courses. Commenting on the low value they gave to computer literacy courses, one of the preservice teachers (Sam, METU) said, "I don't think that they helped me at all. I think I learned the basic usage of computers, and PowerPoint, independently. In those ICT classes what we learned was only theory, not practice." The same preservice teacher added,

"These courses do not teach us how to use technology in our teaching." Similarly, other preservice teacher commented these courses due to their monotonous and theory based nature tend to demotivate students in terms of using technology in their teaching. Thus, it could be maintained that although the preservice teachers believed that they learned the basics of computing from the ICT courses offered at their faculties, they felt that these courses were not adequate in their preparation for the classroom technology usage.

The in-service group, on the other hand mentioned that the courses helped them gain basic computing skills that still enable them to operate computers easily. Two teachers (Teacher A and B) who graduated from METU and currently working at Atılım University mentioned that the IS 100 course they took helped gain basic computer knowledge that constituted the basis for their current computer competence. Moreover, the in-service teachers who did not have a chance to take these courses during their undergraduate education, as they were not offered back then, mentioned that these courses could have given them a head start in terms of their awareness of using technology for language learning. To this end, one teacher mentioned:

> I didn't have ICT courses during my undergraduate education, they didn't offer them then. But, I think it would definitely affect my overall attitude towards computers. If I had taken those courses back then, I would have had a better start with technology in teaching. (Howard, Çankaya University)

Thus, it could be argued that the in-service teachers, both who took ICT courses and those who did not, had more positive attitudes towards these courses than their preservice counterparts did. However, corroborating with the preservice teacher, the in-service teachers mentioned that these ICT courses helped them learn technology to a certain extent, but the actual implementation of computers in classroom was dependent on their own creativity and interests. Teachers in general mentioned that the course projects they worked on during their undergraduate education helped them give meaning to their computer knowledge. Moreover, an in-service teacher who was working at Çankaya University (Eileen) mentioned that during her MA degree she took courses that helped her learn about the actual usage of computers in language teaching, despite the fact that she was also complaining about the theory driven nature of the undergraduate ICT courses. Therefore, it might be concluded that although the in-service teachers appreciated their ICT courses in terms of giving them a basic idea about computers, they also felt that these courses did not give them knowledge of practical value.

As for the analysis of usage places of computers in terms of being preservice and in-service, it was seen that it changed significantly for the groups. In order to test the hypothesis, an independent *t* test was conducted. The *t* test revealed that access to technology differed significantly between the groups for some items. For classroom usages of both computers,

t(166,402)=10.755, *p*<.001, and the internet, *t*(154,870)=5.978, *p*<.001, the *t* test was statistically significant. The results showed that preservice teachers tended to use computers and the Internet more in the classroom (Figure 36).

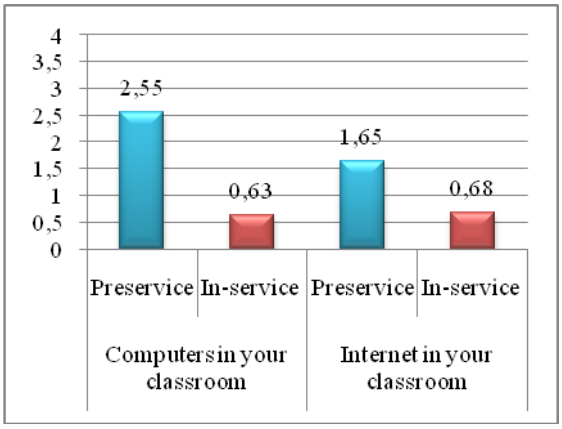


Figure 36. Averages of Computer Usage by Preservice and In-service Teachers

As for the comparison of the in-service and preservice teachers in terms of their computer usage purposes, the *t* test yielded statistically significant results, meaning that preservice and in-service teachers had differing levels of computer usages for different purposes (Table 23).

Table 23. *t*-test Statistics for Usage Purpose of Computers for Preservice and In-service Teachers

Usage Purpose of Computers	***t***	***df***	***Sig.***
Instructional Usage	8.813	176,092	.000
Communicative Usage*	-31.568	119,000	.000
Recreational Usage	2. 527	142,273	.013

Note *won't be taken into consideration as this factor was not included in preservice questionnaire

The mean for the preservice group was higher for both instructional (*M*=3.26, *SD*=.44) and recreational usage (*M*=3.07, *SD*=.48) than the in service group (instructional: *M*=2.49, *SD*=.74; recreational: *M*=2.87, *SD*=.57).

Next, a *t* test was conducted to see if there was a statistically significant difference between the preservice and in-service groups in terms of technology competence, and the *t* test was statistically significant for all of the factors, revealing the fact that the two groups showed different levels of competence (Table 24).

Table 24. *t*-test Statistics for Computer Competence for Preservice and In-service Teachers

Computer Competence	***t***	***df***	***Sig.***
First Level Usage	3.021	166,112	.001
Second Level Usage	4.850	174,970	.000
Third Level Usage	3.453	148,507	.001

The averages of the preservice group for computer competence levels were higher than the in-service group for all the competence levels (Figure 37).

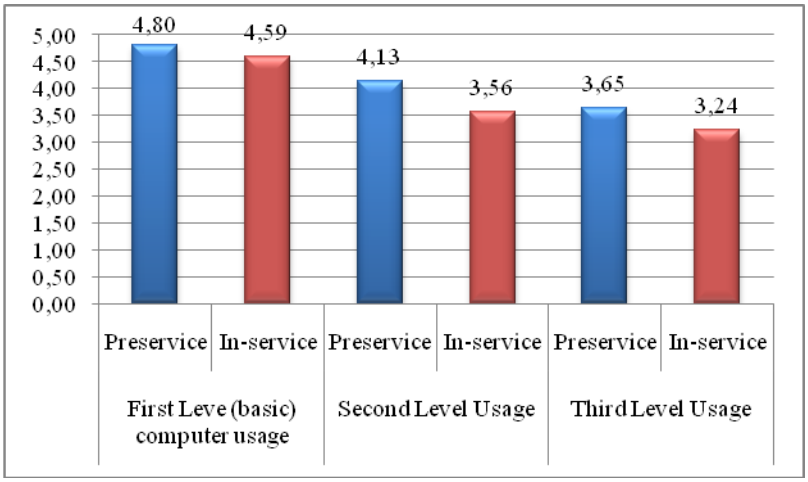


Figure 37. Averages of Computer Competence Levels by Preservice and In-service Teachers

When the preservice and in-service groups were compared in terms of their perceived barriers to technology integration, the independent sample *t* test yielded statistically significant results for all of the factors (Table 26), meaning that the preservice and in-service teachers had different averages for different barriers to technology integration.

Table 25. *t*-test Statistics for Barriers to Technology Integration for Preservice and In-service Teachers

Barriers to Integration (preservice vs. in-service)	***t***	***df***	***Sig.***
Infrastructure	8.066	124,653	.000
Technology Support	7.379	131,331	.000
Access to computers	4.137	112,947	.000
Training	7.381	110,361	.000

The preservice teachers had higher averages for perceived barrier factors, meaning that they felt better about these factors at their training sites, than the in-service teachers (Figure 38).

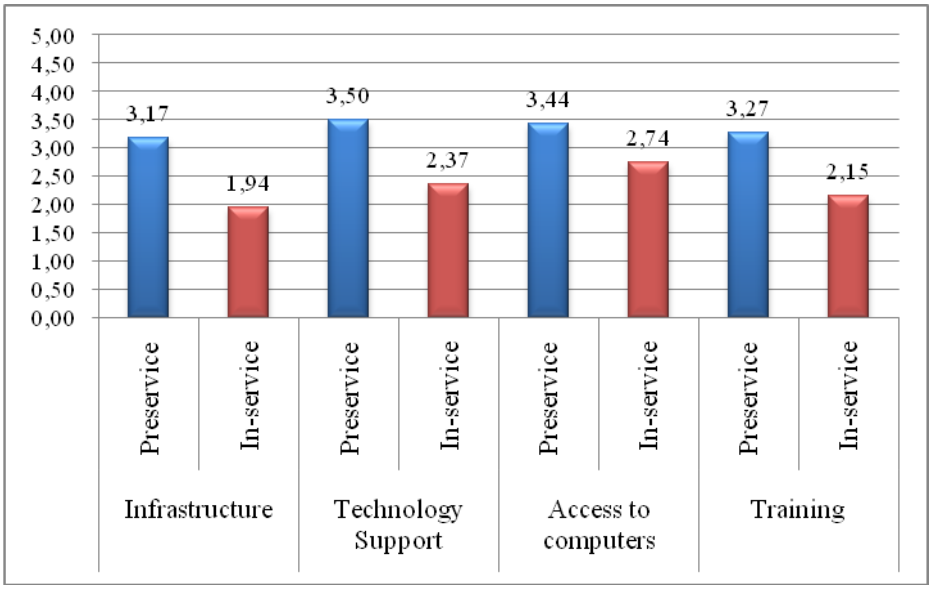


Figure 38. Averages of Perceived Barriers to Technology Integration by Preservice and In-service Teachers

The respondents' current work statuses, namely their being preservice or in-service, were also taken as a factor that might affect the attitudes of the teachers towards computers. An independent sample *t* test was conducted to this end and it yielded significant results for all the factors (Table 27), showing that preservice and in-service teachers had different levels of attitudes towards computers.

Table 26. *t*-test Statistics for Attitude toward Computers for Preservice and In-service Teachers

Attitudes toward Computers	***t***	***df***	***Sig.***
Computer Aversion	3.904	158,565	.000
Attitude towards computer usage	4.264	132,610	.000
Liking of computers	3.808	147,473	.000
Personal, thoughts on efficiency of computers	2.214	116,429	.029
Thoughts on usefulness of computers for students	2,104	69,645	.039

The higher averages meant the more positive attitudes towards computers in terms of the factors. The analysis of the means for the groups revealed that the preservice group had more positive attitudes towards computers than the in-service teachers (Figure 39).

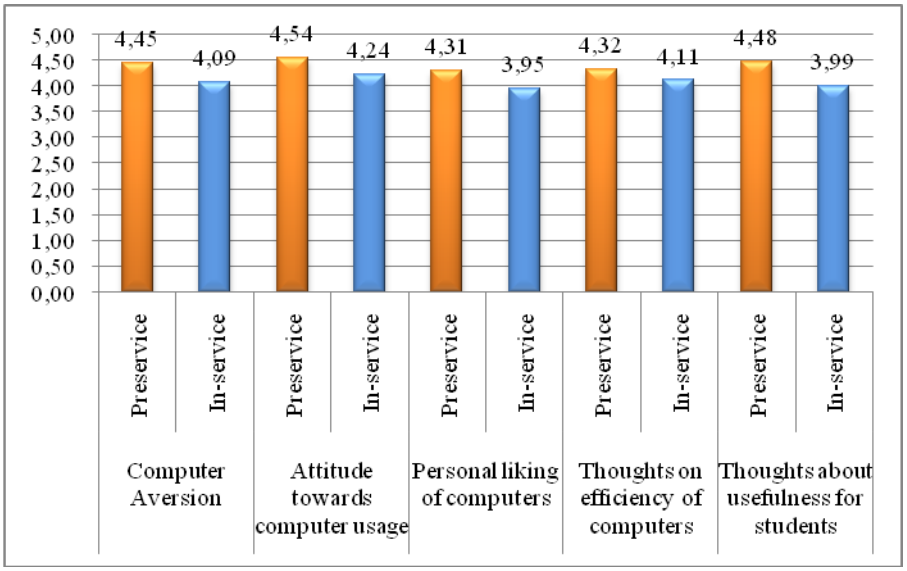


Figure 39. Averages of Attitudes toward Computers by Preservice and In-service Teachers

4.4 The educational value the teachers give to using computers in language teaching

The analysis of educational value assigned to computer usage in language teaching was mainly based on the data from the interviews. After interviews were transcribed, with the help of qualitative analysis software, *QSR Nvivo 7*, the transcriptions were coded and then the codes were developed into themes. The themes under the category of educational value of using computers were categorized into: teaching style change, educational value of computers for lesson preparation, during lessons and specifically for language skills.

On the topic of educational value of computers in ELT, the teachers tended to mention two separate usages of computers and the Internet: student tools and teacher tools. Teacher tools can be defined as the usage of computers that replace traditional teaching tools, such as usage of LCD projectors instead of black boards or flashcards. Student tools, on the other hand, includes the usage of computers to help the students integrate language skills, to raise their higher order thinking skills (analysis, synthesis, researching, presenting, collaboration, scaffolding, etc.), to provide them with unmatched communication opportunities and with authentic and meaningful means of using the language.

The analysis of the interview data in terms of teachers mentioning of the two distinct usages of computers showed that the teachers were generally more knowledgeable about teacher tools than student tools. The teachers mentioned the teacher tools 66 times, while they only mentioned the student tools 19 times. Thus, it could be maintained that the quantitative analysis

of the interview data manifested that the teachers have an inclination to have more knowledge about teacher tool usages of computers than student tool usages.

4.4.1 Teaching Style Change

On the continuum stretching from teacher-centered to student-centered teaching, where the students are more active and responsible for their learning, the teachers mentioned that technology integration would help their lessons, and thus teaching styles to become more student-centered.

The teachers interviewed generally defined their current teaching as teacher-centered and mentioned that the exams and the curriculum had an effect on this tendency. Mike from Atılım University, where the technical infrastructure of the institution was not adequate for technology integration, mentioned that his current teaching style would easily be classified as teacher-centered. On the issue, he claimed that the exam was one of the prominent factors affecting the style of the teachers. Thus, the teacher concluded that "the exam, so the curriculum does not let us make our lessons student-centered." Similarly, other teachers, relating lack of infrastructure and teacher-centered nature of the lessons, claimed that the books and contents they had been following were heavily directing their teaching style towards teacher-centered practices. To this end, one of the in-service teachers claimed that

> If you conduct your lesson depending on the book, whether you want it or not, the teaching becomes teacher-centered. Here, we expect students to learn the grammar and read well, we tend to overlook listening and speaking, this is also because of the exam. Even if you try to do listening and speaking activities, the students are not motivated because we don't test our students on those skills. (Ronald, Başkent University)

Thus, the structure of the schools, namely the curriculum and related components, such as exam and the course books, were considered as factors negatively affecting technology integration, and making the lessons heavily teacher-centered.

As for technology's help in making the teaching more student-centered, one of the in-service teachers from Atılım University (Brandon) mentioned that with the help of computers, the curriculum would be more project based and it would help make the students more active during the lessons. Similarly, both preservice and in-service teachers tended to agree that with technology integration the instruction became more student-centered and thus more individualized. To this end one of the teachers at TOBB University (Isabelle), the institution with high levels of computer infrastructure, claimed that using technology helped teachers address the individual needs of their students, making the their lessons student-centered to a great extent.

However, some of the teachers mentioned the effect of the task types offered with the help of technology and mentioned that using technology would not bring about any changes if the tasks themselves were teacher-centered. Teachers mentioned that assigning project-based activities to students would bring student-centeredness in teaching eventually. Regarding this, one teacher from Atılım University (Brandon) claimed that assigning projects to the students would eventually make the teacher more of a facilitator where the students actively work on their tasks, and in turn making the lessons more student-centered. On the other hand, the teachers mentioned that using drill and practice type activities with the help of computers would not make the lesson student-centered, indicating the importance of the activities the computers used for. To this end, Ronald from Başkent University claimed that

> …using computers all the time does not necessarily mean it is going to do any good. I do not approve using computers for drill type activities. There is no difference between doing an exercise on a worksheet or on a monitor if they are based on the same pedagogy.

Therefore, it could be argued that although the teachers tended to believe that using technology would help their teaching become more student-centered, they acknowledged the fact that using computers would not bring about any changes in their pedagogy so long as the use of technology does not produce activities that are not possible without using computers, and thus unique.

In alignment with the idea that technology can drag a teacher's teaching style to either side, depending on the activities chosen; the teachers also mentioned that the beliefs and awareness of a teacher would play a substantial role in terms of technology's effect on changing the atmosphere of the classroom. On this issue, one of the in-service teachers working at Çankaya University summarized that

> …everything depends on the teachers, but the teachers must be knowledgeable and trained on technology usage, and they must be aware of the possibilities of the technology. If teachers have this awareness they can make their lessons student-centered or teacher –centered. If they don't have this, they can only follow the technology wherever it drags them to. (Howard, Çankaya University)

Thus, it may be argued that as the determiners of the activities, which shape the classroom atmosphere, the teachers carry the responsibility of having the awareness and setting the tone of their classrooms. Similarly, one preservice teacher mentioned the effect of a teacher's awareness on successful technology integration, and added that the teachers' established beliefs would also have an effect on the technology's effect on changing a teacher's teaching style. She summarized the point by claiming that

> …teachers' technique and philosophy is always there. So, whether using technology would change a teacher's style totally depends on the teacher. How you are going to

> make use of the materials at hand is solely up to the teacher. With the same materials, you can create wonders or disasters. (Zoey, METU)

Hence, it can be claimed that the teachers interviewed agreed upon the fact that the power of technology to realize student-centered classrooms is heavily dependent on the activities chosen and eventually on the teachers, who are the makers of them.

From the interviews, it can be concluded that the teachers believed in the power of technology that it can make their lessons more student-centered, making their students more autonomous and responsible for their learning. It was also observed that the teachers were aware of the fact that technology itself would not be enough as the activities selected play a great role in determining the activeness levels of the students. Moreover, closely linked with the analysis of using technology as teacher tools or student tools, it can be maintained that the teachers indicated their knowledge about teacher tools, which trigger student-centeredness less than student tools, which aim at pushing students towards working autonomously.

4.4.2 Educational value of computer usage during lessons

As for the value of using computers during the lessons, the teachers mentioned that the computers would help the English lessons become more colorful and thus motivating for the students.

On the value of technology making lessons more appealing for the students, one of the in-service teachers (Ronald) mentioned that the usage of technology would help the teachers eliminate the monotonous flow of their lessons. To this end, he claimed that textbooks might not offer the variety the students look for to motivate them, and added that "teaching only with a course book makes the lessons monotonous, and less motivating. Offering a variety with multimedia definitely improves the students' motivation." Therefore, it could be argued that teachers agreed on technologies positive impact on students' motivation with its colorful outlook. Moreover, teachers also seemed to agree that making the lessons more colorful with the help of technology would help shy students participate.

The teachers also mentioned that as the learning became more colorful, it also became longer lasting. Ronald from Başkent University claimed that involving audiovisual materials in language learning would make learning longer lasting. Similarly, another teacher, Sarah from TOBB University, mentioned one incident, where the usage of visual aids had helped her explain a complex writing structure and helped make the learning longer lasting. She explained that

> When I was teaching writing traditionally, it was really boring to explain the whole format on the board. But, when we visualized the format it really became more

> enjoyable. I vividly remember this incident: we were talking about opinion essays, and we used a picture of a sandwich and showed the parts of the essay on that picture. That remains in students' brains longer.

Similarly, other teachers also believed that with increased motivation towards learning, and easy comprehension of abstract concepts with the help visual aids, the students seemed to have a better grasp of the notions explained by their teachers.

It could be concluded that the teachers generally regarded using computers in teaching as one of the best and easiest ways of making their lessons more colorful and motivating. Moreover, they claimed that besides increasing the motivation of the students towards learning, the colorful digital materials help make the learning longer lasting, as students can grasp abstract concepts with ease with the help of visual aids the computers provide. Furthermore, it could be argued that the general tendency of the teachers was highlighting the multimedia features of technology integration, and thus valuing the teacher tool perspective of using computers. As it was seen that 66 times the teachers mentioned this type of computer usage during the interviews, it can be maintained that the teachers had deeper knowledge about using computers as teacher tools that replace old audiovisual materials and offer new resources than student tools that trigger autonomy in language learners.

4.4.3 Value of Computer Use for Lesson Preparation

The teachers also mentioned that the usage of the Internet and the computers helped them while getting prepared for lessons. In terms of accessing lesson plans or lesson related realia, teachers tended to agree that the Internet provided them with an invaluable resource, where they can get any material they wanted with a click of a mouse. To this end, one of the teachers (Eileen, Çankaya) mentioned that "A simple example, sometimes right before I go to a class I search Google about the topic I will talk about and I go the class with a photo I found online." Moreover, one of the preservice teachers (Samantha, METU) mentioned the ease of access and immensity of resources the internet provided and added that "instead of going to a library and search, I can go online and search the whole world in an instant." Teachers seemed to acknowledge that fact that the internet was providing them with lots of new ideas and resources for their lessons and lesson plans, which would otherwise be available for them with a tedious library search.

Teachers generally agreed that with the help of the Internet the preparation of lesson plans and classroom materials had become easier for them. Especially, the preservice teachers mentioned that technology played an indispensible role in their lesson planning. To this end, one of the preservice teachers (Samantha, METU) mentioned that "Without a computer and the

Internet, I feel that I cannot prepare a lesson plan, as I constantly search online resources as I prepare my lesson plans." One could argue that particularly the preservice teachers felt "lost" without computers. On this issue, one of the preservice teachers stated that

> I think as we don't know how teaching without technology would be I cannot think of teaching without technology anyway. Sometimes we have problems with our modem and so we don't have Internet connection at home, at those times I feel desperate. I feel that technology is indispensible for me. (Zoey, METU)

Therefore, it could be concluded that the teachers, especially the new generation, tended to use computers for lesson preparation in the form of searching for ideas and resources to use during their lessons. Moreover, teachers felt that the Internet was an indispensible resource that helped them in their lesson preparation by both providing them with innumerable resources and swiftness of preparing better materials in a shorter time.

The teachers also mentioned that using computers brought about practicality and reusability materials. To this end, the teachers mentioned that with computers they could save, adapt and reuse a material repeatedly, if they wanted to. One of the in-service teachers (Murray, Başkent) highlighted this fact by comparing computer prepared worksheets with handwritten ones and claimed that "If you lose your handwritten worksheet, it is gone, but if you prepare your documents using a word processor, unless something terribly bad happens to your computer, you can retrieve it even after 50 years." Thus, it could be resolved that teachers acknowledged the fact that their usage of computers could help them save time and energy by easily recreating their work in a matter of seconds.

Likewise, teachers indicated that computers helped them become better organized. On this issue, teachers seemed to agree that they can more easily retrieve their computer prepared materials and this helps them have a better organization for their work. Commenting on this issue, one in-service teacher (Murray, Başkent) claimed that "typing on a computer you can create longer lasting documents instead of one-time-only handwritten ones, and you can organize your work better." Therefore, it may be argued that the teachers tended to agree that computers with their easy material retrieval abilities help the teachers to be better organized and save a lot of time during their material preparation.

In terms of using computers for lesson preparation, as teacher tools, the teachers seemed to appreciate the fact that using computers helped them reach an innumerable number of materials with ease and speed. Moreover, they seemed to value the long-lastingness of computer-created materials to a great degree and appreciated the fact that computers help them keep a better organization of their lesson plans and materials.

4.4.4 Educational value of computers in ELT

While talking about the educational value of technology integration in ELT, the teachers mentioned that Internet and computers could provide interaction opportunities that were never available for the language learners before, which could help foster language skills largely. To this end, one of the in-service teachers (Mike, Atılım University) indicated that

> With the Internet's becoming more common, the interaction opportunities skyrocketed. You can instantly interact with someone who is in the other corner of the world. As you know, interaction is a key in language learning nowadays, and so the Internet makes it convenient for everyone to interact with others with ease.

Thus, it could be maintained that the teachers were aware of one of the unique opportunities the internet brought about: authentic interaction opportunities.

In terms of improving language learning in general, firstly, the teachers mentioned that the use of computers and the Internet can help foster every language skill and make language learning more meaningful provided the right tasks were prepared. To this end, one of the in-service teachers (Brandon, Atılım University) mentioned, "If we can set up nice interactive tasks and design our curriculum accordingly, technology integration can be valuable to a great extent." In other words, technology provides the teacher with the opportunities to prepare interactive tasks, which in turn make can make the language learning more meaningful and enjoyable. Moreover, teachers added that the activities get more meaningful as the students get the chance to find real audience for their works. To this end a preservice teacher (Zoey, METU) and an in-service teacher (Howard, Çankaya University) argued that with technology every task became more meaningful. Thus, it can be concluded that the teachers agreed upon the fact that using technology can help foster language skills through meaningful and authentic tasks, and therefore, being aware of this unique chance, the teachers were aware of these opportunities the computers brought about.

As for the technology's help in fostering specific language skills, the teachers mentioned the potential help of the Internet and the computers in terms of different skills. For reading, the teachers tended to agree that the Internet provided the students with an invaluable source of authentic reading materials, which would appeal to the individual needs of different students.

As for the improving listening skills of the students with the help of computers, the teachers stated that online listening activities were countless and it was very easy to reach authentic listening materials on the internet. Teachers in general agreed that with the rapid advances on internet audio technology the listening opportunities skyrocketed. Moreover, they acknowledged that the internet could provide them with correct and authentic listening materials

in a matter of seconds. On this issue, one teacher of the preservice teachers (Samantha, METU) mentioned that "…we can find authentic listening materials for our students and have an idea about the correct pronunciation of the words." This might be indication of the teachers' awareness that the ease of access to authentic listening materials could help them show their students the correct speech forms and get exposed to authentic input, which is as simple as one click of a mouse. To this end, another preservice teacher (Zoey, METU) added that

> All in all, we are not native speakers of English and we might make lots of pronunciation mistakes. When we get an audio file from the Internet, we can find songs and news by BBC. The students can both hear correct pronunciation and get to work on authentic materials, and you can show them the real usages of the language they are trying to learn. There are loads of materials of this nature on the Internet.

Thus, it could be maintained that the teachers concurred that the internet audio opportunities were becoming indispensible for them day by day.

An in-service teacher, who compared today's opportunities with his own student years, indicated the drastic change the internet brought about in authentic listening opportunities by claiming that

> During our undergraduate education, in 90ies, let alone CDs, we could hardly find cassettes to listen to. We used to go to British Council, get a cassette and try to listen to on our walkmans. But now, the students have the internet and they can easily find the audio versions of the books. (Howard, Çankaya University)

Therefore, one could claim that the teachers expressed awareness of the wide range of authentic listening opportunities the internet provided for the language learners of today.

In terms of writing, the teachers believed that integrating computers and the Internet into their lessons would also be useful, as the tasks offered with the help of computers would be more authentic and meaningful. To this end, one of the preservice teachers mentioned that using computers to assign writing tasks was more authentic than making the students write "emails on paper." The teacher mentioned that

> As for writing, we all learn about how to write a formal essay, but when it comes to writing an email, none of us has been shown how to address people in an email. So, the students can learn these things with technology integration. (Zoey, METU)

In other words, the teachers seemed to value the authentic opportunities the Internet can provide the language learners in terms of writing tasks, although only two out of twelve teachers mentioned such usages, the usages that require student autonomy and authenticity of tasks.

In terms of speaking, the teachers mentioned that Internet and computers might not be of direct help, although indirectly the internet can help foster speaking skills of the students. To this end, one preservice teacher (Samantha, METU) mentioned that "As the students listen to authentic audio materials, this in a way fosters their speaking skill." Similarly, commenting on

the fact that listening to native speakers would provide authentic input, one of the in-service teachers from Atılım University (Brandon) added that "If nothing else, a students' seeing someone speaking English would motivate him more towards speaking." Moreover, the a few teachers mentioned the online chat and audio conferencing opportunities when they were talking about help of the internet in fostering speaking skills. Thus, it can be summarized that teachers tended to believe that the internet can directly and indirectly foster the speaking skills of their learners by both providing the learners with correct language input and creating opportunities to authentically practice their speaking skills.

Finally, the teachers mentioned that using computers could also help integrate language skills with one another, rather than teach them in a separate fashion. Although this was mentioned by only a couple of teachers, the teachers seemed to be aware of the skill integration opportunities the computers provided. To this end, one in-service teacher (Howard, Çankaya) mentioned that "…the students can listen to an audiobook and also follow it from the screen, which improves both their listening and reading skills. The skills can be improved in an integrated fashion." However, the teachers in general mentioned fostering skills in separate fashion, and this fact could be linked with teachers' knowledge of teacher tools more than student tools, as student tools while aiming at autonomy and higher order thinking skills bring about skill integration in language learning.

As it can be seen the value of using computers during lessons ranged from integrating skills to finding authentic materials and helping students have real interaction opportunities. The teachers in general mentioned that when right types of activities were implemented using the internet and the computers would bring about changes in language teaching profession that were out of reach before.

4.5 Summary of Findings

The data analysis was conducted in the alignment with the research questions of the study. As the questions had both quantitative and qualitative nature, during the analyses both methods of analysis were administered. In order to answer the descriptive questions, the questionnaire data was analyzed in terms of descriptive and inferential statistics using SPSS; while the interview data was analyzed in accordance with thematic analysis methods.

As it was stated in the first section of this chapter, as an answer to the first research question, the computer usage statistics, usage types, computer competence levels, perceived barriers to technology integration and attitudes of the respondents towards computers were defined with the help of descriptive statistics. It was seen that the teachers in general tended to

use computers more at home than they did at their schools. Moreover, the respondents indicated that they learned about the computers mostly by themselves, while college work also played a major role, on the other hand, the respondents indicated that computer literacy classes at college had the least amount of effect on their computer knowledge. As for the computer usage types of the respondents, the teachers indicated that they mainly used computers for recreational type activities, while they also indicated that they made use of computers for instructional and communicative purposes. The respondents also indicated that overall they had a good command of the computers, as first level usage average was *M*=4,66 out of 5, second level *M*=3,76 and third level *M*=3,76.

As to the perceived barriers to technology integration, the infrastructure had the lowest average (*M*=2,36), while access to computers had the highest average (*M*=2,98). Coding the interview transcripts revealed other barriers to technology integration that were beyond the coverage of the questionnaire (Table 27). The interview data seemed to unveil subcomponents of institutional and teacher related factors, bringing an insight as to their potential effects on technology integration.

Table 27. Barriers to technology integration (revealed by the Interviews)

Institutional Factors	Teacher Related Factors
Course book / Course Content	Preservice education (ICT Courses)
Curriculum	Traditional Technology Usage
Infrastructure	Teacher as a factor
Technical problems	Psychological Factors
Teacher training and school support	Lack of competence and skills
Student related barriers	
Subject Culture	
Classroom related factors	

Finally, according to the results of the questionnaire, it was seen that the attitude averages of the respondents were overall high for all factors, *liking of computers* being the lowest with a mean of 4,08 out of 5.

As a response to the second research question, the computer usage statistics, usage types, competence levels, perceived barriers to technology integration and attitudes of the respondents towards computers were analyzed inferentially using SPSS in order to see if age, gender, work experience, institution and being preservice or in-service had any effect on them.

Firstly, the effect of gender was scrutinized for the in-service group and it was seen that gender affected statistically the knowledge source of computers, access to technology, computer competence and attitudes towards computers, where males had higher averages than females in

terms of computer usage at home, computer competence and attitudes towards computers. Females indicated that they learned more from professional development activities than men, and they tended to use computers at school more than males.

Next, age's effect was analyzed. It was observed that age statistically affected the knowledge source of computers, computer usage statistics, usage types, competence and attitude towards computers of the respondents for the in-service group. The younger age group indicated that they learned more from college work and ICT courses than the older teachers did. Moreover, the younger group tended to use computers and the internet more at school, and they used computers for communicative and recreational purposes more than the veteran teachers did. It was also seen that the new generation of teachers had more competence of using computers, and they felt slightly better about the infrastructure levels of their institutions than more experienced teachers, although the average was significantly low for all age groups, indicating that the teachers felt their institutions lacked the necessary infrastructure for successful technology integration. Although the age groups showed similar attitudes towards computers, in terms of *Thoughts on usefulness of computers for students* the youngest age group had the lowest average.

During the analysis of factors in terms of work experience, it was seen that the tests yielded similar results to the analysis of factors in terms of age. Thus, it was assumed that age and work experience covered similar constructs.

As to the effect of institution of the respondents, it was found that institution was a significant factor in terms of computer usage frequency, usage types, competence, perceived barriers to technology integration and attitude towards computers.

It was seen that TOBB University's teachers had the highest computer usage average at school while they indicated that they had the lower usage frequency of computers at their homes. It was also observed that teachers at TOBB University used computers for instructional and communicative purposes more than the teachers at other institutions. Moreover, it was seen that the teachers at TOBB and Çankaya Universities had higher computer competence averages than the teachers at Başkent and Atılım Universities. TOBB University's teachers also indicated that they felt better about their institution's technical infrastructure than the teachers at the other universities did. In terms of attitudes towards computers, Başkent University had the lowest average, while Çankaya University and TOBB University had the highest. In terms of *Thoughts on usefulness of computers for students*, teachers at TOBB University had the lowest average, while Atılım University had the highest.

Finally, it was seen that for the in-service group having an academic degree was a statistically significant factor for usage frequency of computers, first level competence and personal liking of computers. The *in progress* group tended to use computers more at home than other teachers, while the group with an academic degree tended show higher usage frequency of using computers elsewhere at school. In terms of first level computer competence, the in progress group had the highest average (M=4,8) than the others. Similarly, the in progress group indicated that they had higher averages for personal liking of computers than the other groups.

As to the preservice group, since the group was homogenous in terms of age, institution, work experience and holding an academic degree, the only inferential analysis was conducted to see if gender was a statistically significant factor. It was found that gender was a statistically significant factor for the knowledge source of computers, computer usage frequency and usage types. In the further analysis, it was seen that males tended to believe that they learned more from computer literacy courses than females. Moreover, in contrast to in-service group, females in the preservice group indicated higher computer usage statistics at both home and school. Moreover, females indicated higher instructional usage of computers than males. In terms of attitudes, competence and barriers to technology integration the groups did not differ, showing that both males and females had similar averages for the factors.

The preservice and in-service group was also compared to each other in order to see if there were any statistically significant differences between the two groups. It was observed that computer ownership, daily school computer usage, the knowledge source of computers, computer usage types, computer competence, perceived barriers to technology integration and attitudes towards computers differed significantly between the two groups. In the further analysis it was seen that the in-service group had higher computer ownership frequency than the preservice group. Moreover, the preservice group indicated that they learned more from college work and computer literacy classes than the in-service group, while the in-service group indicated that they learned the basics of computer usage through individual means. Unlike questionnaire data, during the interviews the in-service teachers indicated that they appreciated the things they learned from their ICT courses, while the preservice teachers tended to complain about the theory-driven nature of these courses and the fact that their ICT courses did not take them to a level where they would feel confident about using computers in their lessons smoothly. In terms of computer usage statistics, the preservice group had higher instructional and recreational computer usage average, and they were more competent at using computers than the in-service teachers. Moreover, it was seen that the preservice teachers felt better about

the barriers to technology integration, and they had more positive attitudes towards using computers than the in-service group.

As to the educational value of using computers in language teaching, the interview data showed that the teachers thought of computers both as a tool that helped them ease their lesson preparation, motivate their students towards their classes, namely as teacher tools, and as tools that trigger learner autonomy and integration of language skills through authentic and meaningful tasks. However, it was seen by the quantitative analysis of the interview coding that the teachers tended to have more knowledge of using computers as teacher tools (mentioned 66 times) than student tools (mentioned 12 times).

The teachers also mentioned that computers could affect their teaching style and make their lessons more student-centered. They also seemed to acknowledge the fact that using computer would alone would not help as the activities chosen could play a crucial role in setting the tone of the classroom. As for the benefits of using computers for language learning, the teachers mainly mentioned that the Internet brought authentic opportunities for communication and finding resources for all language skills. In terms of fostering language learning, the teachers tended to mention that the computers both helped them prepare lesson plans and materials easily and they could offer a wide range of authentic resources to their students that were nearly impossible to reach before. However, while mentioning ways that they could integrate computers in language learning, they tended to show more knowledge of teacher tool usage of computers than student tool usage, as they mainly mentioned bringing students authentic and colorful materials, rather than directing the students to use computers as means for analysis and synthesis of materials.

CHAPTER 5
DISCUSSION

"Problems cannot be solved by the level of awareness that created them."

Albert Einstein

5.1 Overview of the Chapter

In this chapter, the results of the data presented in the previous chapter are interpreted, while possible educational implications are presented as to define more successful technology integration into language teaching within the context of this study.

5.2 Defining Preservice and In-service ELT Teachers' Computer Usage Frequencies/Purposes, Computer Competence Levels, Perceived Barriers to Technology Integration, Attitudes toward Computers

5.2.1 Defining Access, Usage and Barriers to Integration

5.2.1.1 Access and Usage

As one of the main objectives of this study, with the help of questionnaire data gathered from preservice teachers (*N*=62) and in-service teachers (*N*=120) who worked at four different private universities, the computer usage and perceived barrier related statistics of English teachers in Ankara, Turkey were analyzed and interpreted.

According to the results of the questionnaire data, the teachers indicated that they used computers more frequently at home than they did at school. As for the usage types of the computers, it was observed that the teachers generally used computers for recreational purposes more than instructional and communicative purposes. This finding is supported by previous research where the researchers also found that the teachers tended to use computers for personal purposes more than instructional purposes (Berkowitz, 2000; Ertmer, 2005; Kesten, 2006; Milbrath & Kinzie, 2000; Pope et al., 2002; Wozney et al., 2006). It could be speculated that this

tendency to use computers more at home and for recreational purposes more than instructional purposes could be explained by the low infrastructure availability at the institutions and the teachers' desires to be in favor of using computers for activities that would not change their traditional teaching practices (Wang, 2002).

Moreover, the questionnaire data about teacher computer usage revealed that the respondents in general had a hard time accessing and using computers in classroom, while they used computers for various purposes in their daily lives. This again might lead to a conclusion that the higher computer usage frequency of teachers cannot or do not translate into usage of computers during instruction due to institutional and teacher pedagogy related reasons. This low instructional usage statistics are not unexampled, as computer usage for instructional purposes ranks low in accordance with the results of various research (Barton & Haydn, 2006; Cuban, 2001; Goedde, 2006; Harrison et al., 2002; NCES, 2000; Pope et al., 2002; Varank, 2003; Wozney et al., 2006). It is also indicated that frequent usage of computers at home may not be directly transferrable to classroom usage, due to institutional and subject related barriers (Strudler & Wetzel, 1999). Similarly, the fact that teachers used computers less frequently at school within the context of this study may be due to the fact that they did not have access to computers to use in the classroom (lack of infrastructure) or when they found them they preferred using them for recreational or teacher tool purposes more than instructional purposes.

Although it was seen that the teachers indicated that they used computers for instructional purposes at a moderate extent, from the questionnaire data the nature of instructional use (teacher tool vs. student tool) could not be analyzed. Therefore, during the interviews the teachers were asked to indicate the ways they could implement computers in their lessons, namely the instructional computer usage types. It was seen that the teachers mainly talked about using the internet and the computers for making their lessons more colorful and as a resource for authentic materials, namely as teacher tools, rather than using them as student tools which help students develop higher level thinking skills and skill integration in terms of language learning. Teachers mentioned that they tended to use LCD projectors and PowerPoint presentations if they had them available in their classrooms, and they also indicated that they even brought their laptops to the classrooms to make use of the audiovisual materials the computers offer. It was also seen that even at the institution with the highest level of technical infrastructure, TOBB University, the teachers mentioned teacher tool usage of technology. Hence, it may be argued that the teachers tended not to direct their students to use computers and trigger autonomous and meaningful activities using the computers (student tools) when they were mentioning the instructional uses of computers. Instead, they seemed to be more interested

in teacher tool usages of computers, which might be an indication of lack of knowledge as to the effective usages of ICT in ELT.

Zhao and Frank (2003) summarize the issue of using technology as a simple teacher tool by claiming that using computers for making the instruction more colorful, or easing their lesson preparation cost teachers little time and energy and used fairly frequently. However, the tasks that require student involvement and autonomy are much harder to implement than are tasks that do not involve students, because the former require teachers to reconfigure their teaching practice. Thus, the usage of computers for simple instructional purposes, and more for recreational type activities could be explained by the teachers' desire to be loyal to their current teaching practices and the easiness of using computers for purposes that does not require a drastic change in their current teaching philosophies.

As for the low average of communicative usage, it could be speculated that the main reason could be the exclusion of that part from the questionnaire of preservice teachers. Moreover, some of the items in the in-service questionnaire referred communicating with students for instructional purposes (posting homework, etc.), which again according to Zhao and Frank (2003) could be something the teachers might stay away in order to maintain their traditional roles as teachers. In addition, it could also be argued that communicating with students using the internet could be categorized as using computers as student-tools, as this kind of usage will eventually require student autonomy, skill integration, which from a broader perspective will require a significant change in curriculum, and current teaching practices. This might also explain the low average of communicative usage.

5.2.1.2 Barriers

During the analysis of the interviews, it was seen that one of the main barriers to usage of computers for instructional purposes was the lack of computers. Both preservice and in-service teachers mentioned that not having computers at their disposal was negatively affecting their computer usage in the classroom. Commenting on the issue teachers indicated that although they used computers for personal purposes to a moderate extent, the infrastructure was limiting their usage of computers in their classrooms. Both preservice and in-service teachers mentioned that the lack of infrastructure was hindering their potential to use computers during their instruction. Thus, it could be argued that infrastructure stood in the way of teachers who were actually willing to use them and were aware of the possibilities the instructional technology use could bring about.

The severity of teachers' perceived barriers to technology integration also showed itself during the analysis of the questionnaire data. It was seen that infrastructure had the lowest average, which clearly indicates that the respondents in general had negative opinion of their institutions in terms of infrastructure availability. Apart from TOBB University, the other private universities had neither computers nor projectors available in the classrooms. Moreover, the availability of computers and the internet outside the classroom was also substantially limited for the institutions other than TOBB University. As for the preservice teachers, in general they were having their teaching practice at state K-12 schools, where they were having difficulty accessing technology to use in their lessons. Therefore, the lack of computers for the respondents of this study seemed to be forming the most significant barrier to their technology integration.

The discrepancy between high computer competence, home usage and low school usage could be explained by limitedness of the technical resources. Commenting on that fact that lack of infrastructure could be a significant factor affecting the technology integration of teachers, Zhao and Frank (2003) assert that

> Technology infrastructure (network, location of computers, and availability of computer hard- ware and software), scheduling, the physical layout of the building, and the subjects and grades that teachers teach make up the abiotic component of the school ecosystem, which influences the types and frequencies of uses. (p. 816)

These institutional barriers, or lack of infrastructure, are considered to constitute the first-order barriers to technology integration (Brickner, 1995; Ertmer, 1999; Marcinkiewicz, 1993). According to Ertmer (1999) "first-order barriers to technology integration are described as being extrinsic to teachers and include lack of access to computers and software, insufficient time to plan instruction, and inadequate technical and administrative support" (p. 48). Therefore, it could be maintained that first-order barriers were considered to be one of the main barriers to technology integration by the population of this study, as it was indicated by both questionnaire and interview results.

Corroborating the results of this study, it could be argued that first-order barriers seem to constitute a major problem for technology integration throughout the world. In a meta-analysis study, where they analyzed 48 studies published between 1995 and spring 2006 that reported empirical research findings, Hew and Brush (2007) found that among 123 barriers to technology integration, lack of resources was mentioned 40% of the studies, confirming the fact that infrastructure can be one of the prominent factors affecting usage frequency of computers.

As for the other barriers to technology integration, in this study, training opportunities had the second lowest average, which was followed by technology support and access to computers. Similar findings were also found in the study by NCES (2000) where the teachers

indicated that apart from access to computers, lack of support and training opportunities constituted a major barrier to their technology integration. During the analysis of the interviews, it was seen that curriculum, student and class-related factors emerged as subcategories of institutional factors that hindered the teachers' technology integration. Therefore, it could be speculated that the findings of this study, corroborating with the previous studies, showed that institutional barriers, or the first-order barriers, were still standing as the main hindrances to technology integration.

In terms of curriculum-related factors, the teachers shared two opposing views. While one group of teachers mentioned that the curriculum they had been following was a barrier to their usage of computers in classroom, the other group indicated that they could easily adjust their materials and curriculum to fit in technology. In the latter case, the teachers seemed to be mentioning teacher tool usages of technology, and therefore it could be speculated that this thought could be triggered due to their lack of knowledge about the student tool usages of computers and the potential difficulties of integrating such uses in the curriculum.

In addition to the effect of curriculum on effective technology integration, teachers also seemed to consider the effect of the proficiency exams and the course books they have been following as a subcategory of curriculum related barriers. Teachers claimed that the books were making them helpless in terms of technology integration. This issue was also pointed out by a teacher in Zhao et al.'s study (2002)

> Our school is, by and large, textbook driven. We have textbooks in every subject and most teachers do lesson one, followed by lesson two, followed by lesson three, and so on. . . . We're very MEAP [the State's standardized tests—authors] driven, MEAP conscious. We're trying to get North Central accreditation. So our district is starting to look at the MEAP tests and state documents and design curriculum to that. (p. 497)

Similarly, the teachers in this study mentioned the same fact and claimed that their expectations of students to learn grammar and reading well due to the proficiency exam was making them tend to overlook listening and speaking activities. Therefore, the teachers argued that their efforts to integrate computers and foster these skills would not succeed, as the students would not be motivated because the exam would not test them on those skills. Moreover, a few teachers also mentioned that the course books were not designed for technology integration and they suggested changing the books for a more successful integration. In other words, course books, as concrete reflections of curriculum objectives, needed to be altered for technology integration to be successful. Thus, it could be maintained that teachers working at the institutions with low computer infrastructure tended to mention that usage of computers would be limited due to curriculum and school policy related issues, even if they were provided with computers. In this

respect, it may not be wrong to argue that curriculum would come as the second biggest barrier to effective technology integration if infrastructure were provided. Moreover, it could be argued that for effective technology integration the investments in infrastructure and curriculum change should go hand in hand.

Opposite to the fact that curriculum was a barrier for some teachers; it was an enabler for the teachers at TOBB Education and Technology University. The teachers interviewed at this institution mentioned that their curriculum helped them integrate computers in their teaching. Teachers at this institution mentioned that they used computers as frequently as they used their pens and notebooks, and claimed that their curriculum was one of the main enabling factors for their technology integration. Moreover, the teachers acknowledged the effect of the nature of the proficiency exam they offered (TOEFL IBT) as one of the factors that they could easily used computers in their lessons. Ergo, the curriculum, when technical infrastructure is provided, could work in a way to encourage technology integration, which might also lead to the conclusion that infrastructure and curriculum change should be provided simultaneously.

One could maintained that the curriculum might work either as a barrier or as an enabler. However, some teachers in schools where curriculum was not set up for technology integration mentioned that their use of technology would not be hindered by the fact that the book or the curriculum was not designed for technology integration, so long as they have enough computer facilities. The teachers, in this sense, argued that the teacher himself/herself was a key factor. They mentioned the teacher tool usages of computers, and maintained that they could integrate computers even into a grammar activity with the help of LCD projectors. However, as is known this kind of technology integration, although helpful to a great extent, does not require skill integration or higher order thinking skills, but merely replaces the usage of cassette players and blackboard with more efficient and colorful computers and projectors. Therefore, one could argue that the lack of knowledge as to the effective technology integration might have led these teachers to believe that curriculum would not pose a problem if they had computers in their classrooms. Here, again it could be speculated that the teachers see infrastructure as one of the biggest barriers to technology integration, and they tend to think fixing the curriculum for technology integration could be an easier task. The reason for this thought could be that they mainly consider teacher tool usages of computers, which would not require drastic changes in pedagogy and merely replace old tools with new and more effective ones.

Another barrier mentioned under curriculum related barriers was the effect of subject culture, which is defined as “the general set of institutionalized practices and expectations which have grown up around a particular school subject, and shapes the definition of that subject as a

distinct area of study" (Hew & Brush, 2007, p. 231). Considering the fact that ELT might have innate barriers to computer usage, during the interviews the teachers were asked for their opinions on the topic. Hennessy, Ruthven and Brindley (2005) argue that "teachers are considered to be reluctant to adopt a technology which seems incompatible with the norms of an antecedent sub-culture" (p. 161). Similarly, in a study by Selwyn (1999) some subjects due to their assessment methods were found not suitable to be taught using technology. However, unlike the previous research, all of the teachers interviewed for this study agreed that ELT was highly suitable for technology integration and would not pose a barrier to computer usage in lessons. Therefore, it could be argued that within the context of this study, ELT was seen as a subject that was highly compatible for technology integration. The teachers mentioned their disagreement with the fact that ELT might not be suitable for technology integration and argued that ELT was one of the first areas to look for uses of computers in teaching. Nearly all of the teachers indicated that they could find various ways they could use technology in language learning, usages ranging from using language-teaching software to directing to students meaningful tasks using the internet for authentic communication opportunities. Therefore, it could be maintained that ELT as a subject does not pose any problems for technology integration, as there are various ways to use the internet and computers for language teaching purposes (Liu et al., 2002; Yang, 2001; Young, 2003).

Finally, during the interviews, the teachers also mentioned the possible hindrance of classroom and student related factors as barriers to technology integration. Some teachers mentioned that students were not ready for using the internet for academic purposes, and they mentioned that the students tended to lack the skill to work on their own and sidetracked when their teachers left them on their own to work on a project. Teachers also added that the students might not always be motivated to use computers and overusing or using them for the sake of using would end up with student dislike toward computers. Therefore, it could be argued that apart from instructional barriers (curriculum or infrastructure), the motivation and awareness of the students were other barriers for effective technology integration.

Closely related to the involuntariness of the students, the teachers mentioned that classrooms themselves might not be feasible for using computers for instruction. The class size could be considered under the category of institutional factor, as the teachers mentioned and as it could be observed, it might be a factor that might influence technology usage of the teachers. Therefore, it may be concluded that teachers perceived institutional barriers (lack of infrastructure, being the most prominent one, and curriculum) as the major factors that posed a barrier to their usage of computers in classroom.

5.2.2 Defining Computer Competence, Source of the Competence and Attitude towards Computers

5.2.2.1 Computer Competence

The questionnaire data revealed that the teachers were highly competent in using computers at basic level, while their intermediate and advanced competence levels were lower, although the averages for these competence levels were still highly above average. This linear decrease in the competence levels were closely related to the complexity level of the activities within the levels, and similar trends where teachers competence of higher level usages were low can be found in other studies on teachers' computer competences (Abdal-Haqq, 1995; Albirini, 2004; Ertmer, 2005; Göktaş, 2006; Jaber & Moore, 1999; Kesten, 2006).

It could be claimed that the basic level computer competencies of the respondents may be manifested through their higher home computer usage statistics and their frequent usage of computers for instructional and recreational purposes. It may also be maintained that the teachers in general have the basic computing skills to use computers for basic tasks, and the fact that the teachers are not using computers at their schools can majorly be caused by lack of infrastructure. Hence, this finding consequently supports the fact that teachers overall have good command of computers and they use computers in their daily lives, thus leading to a conclusion that due to institutional factors they could not make use of them in their instruction.

Therefore, within the context of the previous studies conducted in the US it may asserted that the teacher related barriers (second-order) to technology integration were more difficult to overcome and had more effect than the first-order barriers, thinking that the US schools mostly overcome first-order barriers (Ertmer, 2005). However, within the context of this study, it may be argued that due to the different developmental levels of the US and Turkey, even though private universities were selected as data collection sites, first-order barriers which were overcome years ago in the US, are still major constraints in our technology integration process. Moreover, the teachers in general seemed to be competent and willing to use computers in their language teaching practices and their low school usage seemed to be closely linked with the low infrastructure levels of the institutions. The infrastructure levels of the schools in Turkey might be getting better (Organization for Economic Co-operation and Development, 2005), but these findings imply that developing the competence of teachers alone may not have a great effect upon integration, unless suitable contexts are built for the teachers to put their creativity, knowledge and competence to work.

5.2.2.2 Source of ICT Knowledge

As for the source of their computer competence, the teachers agreed that independent learning and college/graduate work had the biggest impact, while the computer literacy classes contributed the least to their computer competence. Similarly, in National Center for Education Statistics' (NCES) report (2000) similar results were found; indicating that the teachers felt independent learning was the main source of ICT knowledge, while in that study the teachers indicated that college graduate work ranked the last in terms of providing ICT knowledge. The reason for the college graduate work having a higher average in this study might be due to the inclusion of preservice teachers in the analysis of this part, as they did get their computer literacy knowledge from those courses, unlike more experienced in-service teachers.

5.2.2.3 Attitude toward computers

As for the attitude levels of the teachers, it was observed that the teachers generally had positive attitudes towards computers. Several studies conducted in Turkey also revealed similar results where they reported high teacher attitudes towards computers (Göktaş, 2006; Mumtaz, 2000; Şumuer, Doğusoy, Kurşun, Gürer, & Bakar, 2006). In Middle East Technical University's Technology Report of 2006, it was also revealed that the students of Foreign Language Education Department, the preservice population of this study, had the highest attitude averages among other education faculty departments. Therefore, it could be maintained that this study corroborated the previous research on the fact that both preservice and in-service ELT teachers in general had positive attitudes towards using computers in their lessons.

The results of this study manifested that the teachers already had positive attitudes toward computers, and had high computer competence levels. In the literature, it is argued that attitudes are the major predictors of computer usage (Albirini, 2004; Berkowitz, 2000; Christensen, 2002; Gardner et al., 1993; Liaw, 2002; McGrail, 2005), and as second-order barriers (teacher-related barriers), they play a crucial role in technology integration (Ertmer, 2005). As the teachers in this study had high attitude and competence levels, but low school computer usage, it may be speculated that the institutions within the context of this study, although private in nature, lacked technical resources for technology integration. In other words, the readiness of the teachers in terms of basic computer competence and attitudes toward computers are not translated into high instructional computer usage due to the lack of access to technology.

In a deeper analysis of teachers' computer competence levels and their attitudes towards computers, it was seen that attitudes toward computers were related to both computer

competence and usage at moderate levels, confirming the theory of reasoned behavior. It is widely accepted that attitudes and computer usage have a reciprocal relationship, where one triggers another (Chua, Chen, & Wong, 1999; Gardner et al., 1993; Levine & Donitsa-Schmidt, 1998). This reciprocal relationship may be best explained by Fishbein and Ajzen's theory of reasoned action (1975), according to which, beliefs about an object lead to attitudes toward it and attitudes, in turn, lead to behavioral intentions regarding the object. To explain Fishbein and Ajzen's (1975) theory within the framework of this study, it could be argued that the higher attitudes of the respondents were not caused by their classroom usage but their personal and home usages of computers. The results of this study seemed to support the theory of reasoned action and it could be maintained that this result may be closely related to the lack of infrastructure, and help explain the lower school computer usage statistics, as the teachers' home usages, attitudes and competence levels were all at high levels.

During the interviews, all of the teachers showed positive attitudes towards computer usage and they all mentioned that the teacher competence levels, although might vary depending on some factors like age and gender, were high, and they mainly confirmed that their lack of access to computers restrained their usage. Despite this barrier, teachers mentioned using computers in a number of different ways they could think of, or finding ways to overcome lack of infrastructure, and this may also explain their high competence, attitudes, and beliefs in the power of computer usage. Some of the teachers mentioned that they would try bringing their laptops to the classrooms if they could not find a projector and really needed the multimedia feature the computers offered. Thus, it could be concluded that acknowledging the low levels of infrastructure at their institutions, the teachers have high levels of competence and positive attitude and they try to implement technology into their teaching even if it requires them to bring laptops to the classrooms and watch videos from small screens. This seems to show the magnitude of the first-order barriers, and the positive attitudes of the teachers.

Hence, one could expect from the teachers within the context of this study to have low computer competence and attitude levels, looking at the low school usage of computers and poor infrastructure levels of the institutions. However, it may be construed from the interviews that the teachers keep their competence and attitudes high by both finding opportunities to use computers outside the classroom and finding innovative ways (e.g., bringing a laptop to the classroom) to use technology in their lessons.

5.2.3 Factors affecting computer usage frequencies, computer usage purposes, computer competencies, perceived barriers to technology integration and attitudes of preservice and in-service teachers toward computers

5.2.3.1 Age, Work Experience and Gender

5.2.3.1.1 Age

Age for the in-service group (it was not considered as a factor for preservice group as they were homogenous in this sense) proved to be a significant factor determining computer related factors within the context of this study, as it was seen that the younger age group had higher competence and more positive attitudes towards computers. Similarly, in previous studies, it was observed that the older teachers tended to have more negative attitudes towards technology, and had lower competence levels of computer usage than their less experienced colleagues (Albirini, 2004; H. J. Becker, 2000; Czaja & Sharit, 1998; Russell, Bebell, O'Dwyer et al., 2003; Russell, Bebell, & O'Dwyer, 2003; Shaw & Marlow, 1999). Likewise, in a study conducted on over 3000 teachers in the US (Russell, Bebell, O'Dwyer et al., 2003) it was indicated that teachers with 5 or fewer years experience were significantly more confident using technology than were teachers who entered the profession 6 to 15 years or more than 15 years ago. Similarly, Huang (2003, cited in Albirini, 2004) found that senior teachers had less positive attitudes toward computers and were less willing to use them in their classes than did new teachers.

Within the context of this study, in terms of computer usage, it was seen that 18 to 23 age group used computers more than the 31 to 40 age group did, showing that the younger age group tended to use computers more than veteran teachers. Similarly, the younger group indicated that they used computers and the internet more in classroom, when they had the chance, than more experienced teachers, indicating that new teachers tended to use computers for instructional purposes more than senior teachers did. Therefore, it could be argued that the population of this study confirmed the pattern and indicated that more experienced teachers tended to use computers less than new teachers.

Another significant difference was found in terms of ICT knowledge sources. It was seen that 18 to 23 age group had significantly higher averages for both college/graduate work and computer literacy classes than 41 and above age group. These results may mean that the older age group did not have ICT training while they were having their undergraduate degrees and thus rated those ICT knowledge sources as sources that minimally affected their knowledge of computers. Similarly, the results of the interviews showed that the newly graduated teachers

appreciated the fact that these courses helped them learn using computers. The teachers stated that with the help of their ICT courses, they learned how to use a mouse and a keyboard, and they mentioned that these courses helped them have a good start in learning about using computers.

Moreover, the teachers who did not have chances of getting such courses indicated positive attitudes towards these courses. They acknowledged the fact that learning how to use computers could have been more effective and quicker if they had the chance to take ICT courses, instead of learning the basics later on with trial and error method. Thus, within the context of in-service teachers, it may be settled that for the young teachers' computer literacy courses and college/graduate work were two important sources of their ICT knowledge, and the older teachers seemed to agree that these courses would have helped them, had they been offered at their time.

As for the usage types of the computers, the analysis indicated that for instructional purposes the age groups did not differ much. For communicative purposes and recreational purposes, the 18 to 23 age group tended to use computers more than the other age groups, showing that new generation was more inclined to using computers for personal purposes, as they grow up using them (Russell, Bebell, & O'Dwyer, 2003).

The computer competence analysis of the age groups yielded similar results to the previous studies conducted, confirming that younger generation had more competence of computers than the older teachers (Czaja & Sharit, 1998; Russell, Bebell, & O'Dwyer, 2003). As this study provides the baseline data for the context of Ankara, Turkey, it could be maintained that the effect of age on computer competence shows a similar pattern to previous studies conducted in the US.

In terms of perceived barriers to technology integration, the group was homogenous for all of the factors, apart from infrastructure. In the analysis, it was seen that the older group felt more negatively about the institutions' overall infrastructure than the younger group did. This might suggest that although both of the groups felt negative about infrastructure level of schools they worked at, the younger group felt slightly more positively about their institutions, which may be explained by the fact that TOBB University had younger teachers in general and as this institution's infrastructure means were high, so were the younger age group's. As no other study was conducted on a similar issue within this context, the findings provide baseline data and might mean that teachers of different age groups tend to have similar negative opinions about the institutional barriers, although the older group tended to feel slightly more negatively about their institutions' infrastructure levels.

Finally, in terms of attitudes, unlike the previous research findings where the younger age group had higher attitudes towards computers than the older group, the groups in this study had resembling averages for all of the factors apart from *Thoughts on usefulness of computers for students*. For this factor, the new teachers had more negative attitudes than the older group. This finding exactly matches with the findings of the USEiT study (Russell, Bebell, O'Dwyer et al., 2003) where the authors claimed that new teachers were more likely to believe that use of technology harmed specific aspects of student learning, such as making students lazier, decreasing research skills, and decreasing the quality of student writing. They also mentioned that this counterintuitive pattern can be best explained by the fact that "because these teachers used technology as students, it is their past experiences learning with technology that have instilled these more negative beliefs" (p. 305). Similarly, within the context of this study, it could be speculated that the new generation of teachers felt more negatively about computers help in student work, as they might as well know the sidetracking possibilities of computer usage, as they also grew up using them.

During the interviews, the teachers also mentioned the possibility of senior teachers' lacking competence and skills for integration. The teachers correlated age with computer competence and stated that younger teachers would graduate with more knowledge of computer usage than the senior teachers did. The teachers stated that senior teachers would possibly be unwilling to use computers even if the infrastructure was provided, due to their high anxiety levels and lack of competence and knowledge. Therefore, it may be seen that the age of the respondents also seemed to be a factor that might affect technology integration, according to the teachers interviewed, as well.

Work experience was also taken as a factor that might affect technology integration, but the results were quite similar to the analysis for age, as these two constructs were in fact quite the same. Therefore, the results and interpretations for age could perfectly explain the results for work experience within the context of this study.

5.2.3.1.2 Gender

As for gender, both groups (preservice and in-service) were analyzed and it was seen that some significant differences were present between the males and females.

The gender analysis for this study was conducted for preservice and in-service teachers separately. In the analysis of in-service teachers, it was seen that in terms of computer usage at home, the males had significantly higher averages than females. Similarly, the in-service group differed significantly in terms of computer competence; the second and third competence levels were higher for males than females. In terms of perceived barriers to technology integration,

males and females did not differ, meaning that the teachers equally felt hindered by the barriers. Finally, in terms of attitudes towards computers, the results for the in-service group showed that males had more positive attitudes towards computers than females.

Although conducted in different contexts, the previous studies generally confirm the findings of this research and claim that females tend to have lower competence and more negative attitudes towards computers (Albirini, 2004; Comber, Colley, Hargreaves, & Dorn, 1997; Durndell & Haag, 2002; Göktaş, 2006; Kay, 2006a; Lucas, 2005; Marcinkiewicz, 1993; Schumacher & Morahan-Martin, 2001; Whitley, 1997). A possible explanation for the gender differences in computer usage comes from Whitley (1997). Looking at the issue from a sociological perspective, he claims that traditional gender roles play a significant role in the difference between attitudes and competences of males and females. He puts forward that generally society portrays that computers are more appropriate to men than to women. Moreover, he adds that the youth grows up playing computer games that are dominantly designed for males and computer lessons in schools has been linked to traditionally "masculine" subjects such as science and mathematics but not to traditionally "feminine" subjects such as art and literature. In addition, it is argued that the mass media have portrayed computer use as a masculine domain. Thus, the gender differences found for the in-service teachers in this study could be explained by the traditional roles assigned to males and females.

However, for the preservice group the statistics were just the opposite. Females had higher home computer usage averages than males did. Moreover, the males and females in preservice group did not differ in terms of computer competence, attitudes towards computers and perceived barriers to technology integration. The results of the study conducted by Top (2003) to a similar population 5 years earlier also indicated that there were no significant differences between the technology perceptions of preservice male and female students. Within the framework of current study, this finding could be explained on two grounds. Firstly, the majority of preservice population was females and male averages might not have represented the general picture clearly for the males in general, although the results were statistically significant according to SPSS. Secondly, both the ICT courses offered to the new generations, which were not available to the older generation, and the fact that new generation is growing up using computers might be overriding the traditional gender differences in terms of computer usage in education.

5.2.3.2 Institution

The institution was considered as a factor that might affect technology integration for only the in-service group as the preservice group all belonged to the same institution. As one of

the first-order barriers to technology integration, institution was mentioned in the barriers section of this study, as the overall infrastructure level of the institution might constitute one of the biggest barriers to technology integration (Brickner, 1995; Ertmer, 1999; Wozney et al., 2006).

The computer usage hours of the in-service teachers significantly differed in accordance with the infrastructure level of the institutions. In terms of school computer usage, the teachers with high levels of technical infrastructure indicated significantly more frequent usage, whereas in the institutions with no infrastructure the computer usage level was moderately low. As for daily home computer usage, the frequencies did not differ as much as it did for school usage. The availability of computers, projectors and other technical infrastructure to the teachers could be considered as the main reason for the big difference in their school computer usage. As for the similarity between the home usages, it could be argued that this shows the overall eagerness and competence of the teachers toward technology usage, and again infrastructure could be considered as one of the main barriers to technology integration.

In terms of access places to technology, interestingly, TOBB University (the institution with the highest infrastructure level) had the lowest average for home access, while they had the highest school computer and the internet usage averages. This might be explained by the fact that as a university policy TOBB university makes its teachers use computers all the time during their daily work at school and when the teachers get home they do not feel like doing more work using computers. Similarly, Zhao and Frank (2003) argue that "Teachers who perceived their school as implementing many new innovations were less likely to introduce new student uses for computers and moderately less likely to use computers for their own immediate goals" (p. 826). Therefore, the teachers using computers largely at work might prefer not to use them at home, and thus the low home computer usage statistics of TOBB University's teachers could be explained.

As for usage purposes of computers, TOBB University had the highest average for instructional and communicative usage, while recreational usage did not yield any significant results, meaning that the groups used computers for personal reasons at similar amounts. It could be maintained that the availability of computers at TOBB University was the main factor that created the difference for instructional and communicative usages. Moreover, Çankaya University had the second highest average for the factors mentioned, and this again might be caused by the fact that apart from TOBB University, Çankaya University is the only school with a computer laboratory devoted language teaching, which might have played a role in increasing the access of teachers to computers at school, and thus their instructional usages.

The competence levels of the teachers also showed significant variance among the schools, and the highest averages belonged to TOBB and Çankaya University, confirming the fact that the availability of infrastructure had positive effect on competence levels of the teachers. The fact that lack of computers at school might lessen the exposure opportunities of the teachers to computers might explain lower competence levels of other institutions. Thus, it is not surprising to conclude that "classroom access to computers is a key factor to using computers instructionally" (Jaber, 1997, p. 46). In addition, the teachers of TOBB University and Çankaya University were two groups of teachers who had the most positive opinion about the barriers to technology integration in their schools. Therefore, in alignment with the previous findings, it could be argued that having decent facilities for technology integration, TOBB and Çankaya Universities' teachers felt better about their schools and confirmed the adequacy of the technical infrastructure.

In alignment with the theory of reasoned behavior (Fishbein & Ajzen, 1975), the teachers who worked at the schools with adequate infrastructure had more positive attitudes towards computers, according to the results of the analysis within the context of this study. The teachers of TOBB and Çankaya Universities had significantly more positive attitudes towards using computers than the teachers working at Atılım and Başkent Universities. High competence may, as suggested by Gardner et al. (1993) trigger more frequent usage, and more frequent usage eventually makes the attitudes more positive, and in this cycle the competence levels increase (Levine & Donitsa-Schmidt, 1998). Consequently, one could maintain that high levels of infrastructure at the institutions in a way helped the teachers increase their attitudes, competence and usage frequencies, which in turn reflected as higher attitudes, competence and usage levels.

It could be argued that the institutions constitute one of the biggest barriers to technology integration, if they lack infrastructure. It was seen in this study that the high competence and positive attitudes of teachers towards computers were fruitless, as they did not have any chances of putting their computer knowledge into practice. According to van Braak (2001) organizational factors could exert positive or negative influence on technology integration and the most important factor was the availability of hardware and software. TOBB University's teachers with their the high computer usage frequencies, computer competence levels, attitudes toward computers and positive attitudes about their institution's infrastructure levels showed that the availability of the technology resources and suitability of the curriculum for technology integration were substantial factors affecting their attitudes, competence and usage frequencies of computers for both instructional and personal purposes. Moreover, it may

also be maintained that the chances the teachers at TOBB University found to use computers in their lessons helped them improve their computer skills and outscore their peers who potentially graduated from the same universities and had the same ICT training. As it was mentioned before, keeping the high competence and attitude levels of teachers in mind, one would speculate that institutions themselves could be one of the biggest factors affecting technology integration.

5.3 Preservice vs. In-service teacher differences

As one of the most prominent agendas of this study, the difference between the preservice, the new generation of teachers, and the in-service teachers, the professionals, in terms of the computer usage frequencies, usage types, competence levels, perceived barriers to technology integration and attitude towards computers were analyzed.

Findings of this research affirm the fact that competence and attitude levels of senior teachers seem to lag behind when compared to those of new teachers. Similarly, the literature on the age and computer usage clearly shows that the older teachers tend to have less positive attitudes towards using computers and this is reflected upon their computer competence (Russell, Bebell, O'Dwyer et al., 2003).

In the comparison of preservice and in-service teachers in terms of computer ownership, it was seen that preservice teachers had less opportunities to use computers in their living places (dorms, homes, etc.), while a majority of the in-service teachers indicated that they had both computers and the internet available to them at their homes. However, later analysis showed that the preservice teachers tended to use computers at home more than in-service teachers did. Here, it might be argued that computer availability does not necessarily translate into usage, and the new generation tended to use computers more in their daily lives (Russell, Bebell, & O'Dwyer, 2003).

Interestingly, the in-service teachers had higher averages of classroom usage of computers than preservice teachers did. A similar case was come across in the USEiT study (Russell, Bebell, O'Dwyer et al., 2003) where the authors speculated that "whereas new teachers are more comfortable with computers and use them more outside of the classroom, the assumption that this higher level of comfort translates to increased instructional use in the classroom does not hold." (p. 306). Similarly, within the context of this study, it was mentioned that one of the main barriers to high levels of computer usage was institutional factors. Therefore, it may be asserted that the preservice teachers could have been negatively affected by lack of computers at their practice sites, which are mainly state K-12 schools, and this might have led them to use computers minimally, despite their higher levels of competence.

As for the ICT knowledge sources, the preservice teachers indicated that college/graduate work and computer literacy classes prepared them towards ICT usage more than they did for in-service teachers. However, the higher averages for computer literacy classes was contradicted by the preservice teachers' interviews, as all of the preservice teachers indicated that these courses helped them to a limited extent, due to their repetitive and theory based nature. The preservice teachers indicated their beliefs about the help of these courses in teaching them the basic usage of computers, but they complained that these theory driven courses would not teach them how to use computers in language teaching.

When closely analyzed, it can be seen that what these preservice teachers mainly complain about was not that these courses did not teach them anything, but these courses did not teach them "how to teach with technology." This tendency of ICT courses offered at teacher education programs has received criticism. It is claimed that teacher-preparation programs are not adequately preparing graduates to teach with technology (Snoeyink & Ertmer, 2001; Strudler & Wetzel, 1999). Yildirim (2001) stated similar opinions in his study claiming that the preservice teachers were still trained on "basic ICT applications", rather than "teaching with technology" or "advanced ICT applications". Thus, it could be argued that although these courses teach the preservice teachers the basic computing skills, the teachers still do not feel ready to use the technology in classroom, since it was not in the objectives of these courses to teach "how to teach with technology."

Similar findings were found by other researchers and they also came to the conclusion that the prospective teachers should be taught the ways to use computers as teaching tools (Braul, 2006; Cambre & Hawkes, 2004; Kiridis et al., 2006; Pope et al., 2002; Schrum, 1999). Likewise, during the interviews, teachers confirmed the fact that ICT courses taught them only the basics of computing and not "technology integration". Therefore, it may be maintained that the teachers tended to understand that knowing the basics of computing would not help them use technology effectively in their lessons and they saw the need for lessons that would teach them how to integrate technology into their language teaching practices. Similar results were also obtained in Göktaş's study (2006) where the preservice teachers indicated their disfavor of the repetitive and theory-driven nature of these courses and argued that ICT courses should teach them the specific ways of integrating technology into their lessons.

The computer usage types offered by preservice and in-service teachers were all supporting the fact that they lacked the knowledge as to make advanced-level computer usage. The teachers tended to mention that they used technology as teacher tools, to make their lessons more appealing for their students, rather than student tools that provide their students with

creative and meaningful uses of computers. This might again be explained by the fact that the ICT courses would not go beyond teaching basic uses of computers, and do not teach the teachers how to use technology in teaching (Wang, 2002). It is claimed by Cambre & Hawkes (2004) that "…technology training includes an instructional focus that helps teachers think about how technology can best be used to support instructional development, encourage interaction and collaboration, and link technology and learning objectives within multiple disciplinary areas" (p. 76). In other words, in order to provide the preservice teachers with a better idea on how to integrate technology into their teaching, the objectives of the ICT courses offered might be readjusted and both their value and their usefulness could be increased drastically.

Reiterating the fact that the younger generation is better equipped with ICT knowledge, computer competence and skills, in this study, it was seen that preservice teachers had more competence of using computers, and they used computers for all purposes (instructional and recreational) more than the in-service teachers did.

It was also seen that preservice teachers had more positive opinions about the barriers to technology integration than the in-service teachers did. This might be explained by the fact that the preservice teachers had chances to go to schools with sufficient technological infrastructure as a part of their teacher training program, whereas the majority of the in-service teachers worked at institutions where the infrastructure and access to computers were major problems. Moreover, the preservice teachers might find it easy to prepare a technology-integrated lesson once for the whole semesters as a part of their course requirement. However, the in-service teachers might find it difficult integrate technology into every lesson, due to possible exam and curriculum driven constraints, as stated before; thus the in-service teachers' less positive attitude towards their schools in terms of barriers could be explained.

Finally, it was seen that preservice teachers had more positive attitudes towards computers than in-service teachers did, even more than the youngest in-service group. This finding might suggest that before they start working, the teachers have more positive attitudes towards computers than after they have started working, which is also mentioned by Marcinkiewicz (1994). In his study, Marcinkiewicz observed that the preservice teachers showed an attitude decline once after they started actual teaching. According to the results of this study, it was seen that preservice teachers had more positive attitudes towards computers than in-service teachers of 1 to 5 years of experience, and this gap widens in the comparison between preservice teachers and the teachers of 16 years and above experience. Within the context of this study, this difference may be explained by the fact that the in-service teachers, once after they start teaching, may be restrained by the institutional factors, however much they might feel ready

to integrate technology into their lessons, and therefore they may feel less motivated toward using computers as the time progresses. Moreover, since the ICT courses they take does not provide them with practical knowledge as to how to use computers in language learning and this gap between the theory and practice might lead lessening usage of computers as the time goes by (Wang, 2002). Confirming this explanation, the preservice teachers agreed and were aware of the fact that their usage might drop once they start teaching depending on the infrastructural level of their prospective institutions. The preservice teachers mentioned that their technology integration highly depended on the schools they were going to work at, and they believed that working at a state school would mean no chances of using technology in their lessons.

Besides knowing that institutional factors will determine their future computer usage, it also seemed like the preservice teachers had a tendency to feel that private institutions could provide them with the technical infrastructure they aspire for. However, the results of this study make it clear that the fact that a school is private does not guarantee an inclination towards technology integrated modern education, which could be achieved by a school-wide policy, which in turn affects curriculum and exam system towards technology integration. Therefore, the higher-level competence of preservice teachers might not find a way to flourish even in private universities, unless supported by a school-wide policy towards integration, again making the importance of first-order barriers clearer for the context of this study. This conclusion is also supported by Kay (2006b) who claims that no matter how good the technological training and guidance for preservice candidates in a computer lab are, if there is limited access to computers at the university or in the K–12 schools, it is difficult to use the technology in an effective manner. Therefore, it could be speculated that, setting the baseline data, this study (within its unique context) manifests that both the contents of the ICT courses offered and the levels of infrastructure at schools, even at the private ones, stand out as the main factors that might potentially hinder the computer usages of preservice teachers, who in fact have positive attitudes and high computer competence.

5.4 Educational Value of Technology Integration for Language Teaching

5.4.1 Effect of technology integration on teaching style

Teaching styles, which stretch on a continuum from teacher-centered to student-centered practices, have been chosen by many teachers in their practices at varying levels. The teacher-centered approach, which assumes the teacher as the leader of the classroom, where the role of the teachers is transmitting knowledge and the role of the learners is to listen, learn and repeat is gradually being replaced by student-centered approach, which targets making students active and

responsible for their own learning, engaging students in divergent thinking and collaborative activities (Ertmer, Gopalakrishnan, & Ross, 2001; Mumtaz, 2000; Zhao & Frank, 2003). Therefore, student-centered activities are highly valued as they offer students a chance for individualized learning opportunities, where they manage their own learning and become active.

In this sense, the teachers interviewed shared similar visions as to technology making their instruction more student-centered. Teachers expressed that having computers at their disposal in their classrooms would help them make their lessons more student-centered by assigning them projects and authentic tasks. Moreover, the teachers mentioned that multimedia opportunities the computers provide would help the teachers to make their lessons more student-centered, as the teachers would be spending less time in front of the blackboard. Similarly, it is believed that lower-level computer usages are related to more teacher-centered teaching, while higher level tasks are linked with student-centered activities (Leftwich, 2007). In a similar vein, Ertmer (2005) claimed that "In general, low-level technology uses tend to be associated with teacher-centered practices while high-level uses tend to be associated with student-centered, or constructivist, practices (Becker, 1994; Becker & Riel, 1999)" (p. 26). Similarly, the research literature confirms that using technology in teaching results in a transformation of teaching style from teacher-centered to more student-centered (Matzen & Edmunds, 2007; Mumtaz, 2000; Snoeyink & Ertmer, 2001; Warschauer & Kern, 2000). Lee (2000) mentions that one of the advantages of using computers in language teaching is that you can individualize your instruction, making your lessons more student-centered. Therefore, it could be argued that the teachers were aware that in order to achieve better teaching and learning through student-centered activities, they could make use of the advantages technology provides in terms of language teaching.

The choice of teaching styles might also depend on the structure of the schools, namely curriculum, the exam systems, textbook driven lessons and teachers' rooted beliefs about traditional methods (Matzen & Edmunds, 2007; Mumtaz, 2000; Zhao & Frank, 2003). Within the context of this study, the interview data corroborated these claims. The teachers mentioned that the curriculum they had to follow made them follow their course books strictly and they thought they would not be able to find a place to integrate technology even if the infrastructure was sufficient, and therefore they mainly tended to be teacher-centered during their practices. One of the teachers who was working at TOBB University, and was previously working at language course, where they prepared students to a written grammar exam, made it clear that the TOEFL-IBT exam they give to their students was one of the main reasons why their technology integration was smooth and meaningful. Looking at the issue from the other side, the teachers,

especially the ones at Atılım and Başkent Universities, claimed that explaining grammar and reading strategies was making their lessons teacher-centered, and this could be changed with investment in technology and a change in the schools' education visions. All in all, it may be maintained that the teachers seemed to be aware of the fact that their choice of teaching styles were closely linked to the institutional policies and factors that surround their teaching environment.

Despite the fact that the teachers saw curriculum as a barrier to technology integration, some teachers gave credit to teachers' creativity in constructing ways to integrate computers in language teaching. They believed that the teachers could make a lesson technology integrated if they wanted to. In this sense, teachers commented that as long as a teacher has the tools to integrate technology, adjusting the curriculum to suit the needs would be an easier task to achieve. However, as it is mentioned earlier, the adjustment the teachers suggested in this sense was generally adding computers as teacher tools to their lessons, and therefore, the ease of adjustment they suggested would only be valid, should the integration aim only at adding computers to classrooms as peripherals, not integrating them into teaching. Therefore, it could be argued that technology usage types also carry high importance as to the overall effect of technology integration on teaching styles. It is believed that the usage of drill software is closely linked with teacher-centered activities, while constructive software is closely linked with student-centered activities (Niederhauser & Stoddart, 2001; Zhao & Frank, 2003). It is also believed that teachers supporting constructivist approaches tend to use content-free software, which helps the learners to be active, while teachers who are in favor of teacher-centered activities prefer drill and practice programs (Mumtaz, 2000).

Some of the teachers showed awareness as to the importance of using computers as student tools and mentioned that technology usage does not necessarily lead to student-centered activities, if they are used inefficiently. However, most of the teachers mentioned using multimedia features of the computers as methods of making their lessons more student-centered, which, in fact, would not necessarily lead to student-centeredness.

The interviews revealed two important conclusions. Firstly, the teachers were aware of the fact that technology usage did not necessarily mean student-centered activities, and thus fun for students. Secondly, some of the activity types mentioned by the teachers were actually not going beyond using technology in a teacher-centered fashion, although some teachers seemed to be knowledgeable about usages of technology that trigger student-centered teaching.

It could be concluded that the teachers seemed to be knowledgeable about the fact that using technology did not necessarily make one a student-centered, constructivist teacher.

However, what the teachers mentioned as effective usages of technology in language teaching tended to include the Internet being a source of authentic materials and computers' helping make student learning more enjoyable and longer lasting, which are indeed valuable advantages of using technology for teaching. However, what makes these activities more student-centered is directing the students towards their own meaningful and guided journeys and during the interviews this usage of technology mentioned by only one teacher, out of 12.

As for the rest of the teachers, even the preservice teachers considered using LCD projectors as student-centered activities. Preservice teachers mentioned that having a projector and PowerPoint presentations would help them achieve successful technology integration, which would fundamentally be teacher-centered. These usages of technology, although seems fine on the surface, do not lead to higher level thinking skills or more complex learning activities. Technology integration is believed to be taking learning and teaching to a higher level (Wang, 2002). Within the framework of this type of usage, O'Dwyer, Russell, Bebell, and Tucker-Seeley (2005) argued that "when technology is used effectively in the classroom, investments in technology lead to more highly developed critical thinking skills, stronger problem-solving skills, and higher-order levels of understanding" (p. 4). It could be argued within the context of this study that the teachers should be taught ways of using technology as student tools that lead to higher order thinking skills, as they seem to have limited knowledge about this type of computer usage.

5.4.2 Educational Value of Technology Integration in Language Learning

While investigating the educational value of technology integration in language learning, the teachers interviewed both analyzed the usage of computers in terms its influence on the overall quality of teachers, and mentioned the possible usages of technology in language teaching, namely the ways that technology can enhance language teaching.

As for the effect of computers on a teacher's overall quality, the teachers tended to believe that using technology itself would not necessarily make a teacher a good one. Some of the teachers argued that in their own student years technology was not present at all, and they all felt that their teachers had done just fine in terms of teaching them the necessary language skills. Concurring with the teachers of this study, Cambre and Hawkes (2004) state that

> Although we acknowledge that current technologies open up extraordinarily exciting new approaches to teaching and learning, we do not buy into the notion that everything "old" is bad. We were all educated the "old" way, and we did pretty well for ourselves. (p. 27)

Similarly, the teachers interviewed seemed to be aware of this fact that technology alone would not be enough to drastically change a teacher's overall teaching quality, as there were and will be teachers who without using any technology would be teaching efficiently.

The teachers interviewed also mentioned that what made teaching with technology more special was finding effective and meaningful usages for it. The teachers interviewed in general acknowledged the fact that using technology for the sake of using it would not bring any effectiveness to language teaching and the key point in using technology and making the teaching more effective was finding activities, the right time and the right place to use them. Similarly, giving meaningful tasks is considered as an indispensible component of effective technology usage by many researchers (Ertmer, 2005; Liu et al., 2002; Sime & Priestley, 2005). Therefore, it may be argued that the teachers overall were aware of the fact that technology usage in an effective way could make instruction more effective, otherwise it did not have any value when used just for the sake of using it.

5.4.2.1 Educational Value of using technology for lesson preparation and organization

In addition to mentioning the fact that meaningful usages was necessary for effective technology integration, the teachers also mentioned some possible ways of using technology for preparing for lessons and usage of computers for organizing the teaching process.

The interview analysis showed that what fell under this category, namely usage of computers for lesson preparation and organization, were the teachers' usages of technology as "teacher tools" rather than "student tools". In this sense, usage of technology is generally considered as low-level usage and it is claimed that a greater majority of teachers tend to use this type of usage than usage of computers for constructive teaching tasks (Berkowitz, 2000; Goedde, 2006; Kesten, 2006; Wozney et al., 2006). However, the teachers' usage of computers for these purposes may not be criticized, as these are all making their teaching more effective in some ways. One possible explanation for this tendency to use computers for simpler tasks might be the fact that simpler technologies require little changes in teachers pedagogical beliefs and therefore cost less in terms of time and energy, so they are used more frequently (Zhao & Frank, 2003). Moreover, as mentioned before, since the teachers were complaining about theory-driven and "technology teaching" nature of college ICT courses, one of the reasons for their mentioning these usages largely without acknowledging would be due to the insufficiency of these courses in terms of teaching the prospective students "student tools."

For the usage value of computers in lesson preparation, the teachers generally mentioned the help of computers in material preparation, and they mentioned the fact that computers helped

them prepare materials easily and make them more appealing for the students. Teachers mentioned that using "fancy fonts" and preparing materials that way would both be more attractive to the students and time saving. The usage of computers in creation of classroom materials has a value in the sense that this practice saves the teachers a great amount of time (Cambre & Hawkes, 2004).

Moreover, the teachers also mentioned that these materials could last longer than hand-prepared materials. Both preservice and in-service teachers agreed that preparing a worksheet or a lesson plan on a computer would last quite longer than a handwritten material, which could only survive so long as the paper is not destroyed. Furthermore, the teachers also appreciated the fact that using computers would allow them greater editing skills, as once they write a worksheet using their hands, they cannot edit them without leaving marks of the editing, unlike computers where you can just delete, type in the new word and print it out, new and fresh. The teachers also mentioned that during their lesson planning, apart from the timesaving and editing capabilities, the computers also provide them with lots of materials that they can integrate into their lesson plans. In this sense, the preservice teachers seemed to be more dependent upon using computers for preparing lesson plans. Therefore, one could argue that the teachers, especially the new generation, seemed to appreciate greatly the fact that using computers for lesson preparation would enable them with easy editing and timesaving capabilities, and it could provide them with vast amounts of knowledge in a matter of seconds.

Apart from making lesson preparation easier for the teachers, the teachers also seemed to agree that the usage of computers could help increase the motivation of students towards their lessons with the help of the multimedia features of computers. In this respect, the teachers mentioned that with the help of computers they could easily find both audio and visual materials easily and use them both to enrich their lessons and to attract the students' attention easily. However, as is mentioned before, these usage purposes of computers might not be counted as effective technology integration practices, as they do not necessarily lead to higher-order thinking abilities in students.

Similarly, in the meta-analysis study conducted by Mumtaz (2000), the author pointed out that the teachers in previous studies as well appreciated technology's teacher tool usages, as they felt that technology was making the lessons more interesting, easier, more fun for them and their students. Moreover, the teachers also mentioned that technology helped them improve presentation of materials and gave more power and prestige to the teacher in the school. Thus, it could be concluded that the teachers in this study similarly thought of technology as something

that would make things easier for them and make their presence as teachers more effective with the help of multimedia tools computers provide.

In conclusion, it was seen that the teachers were aware of the fact that the computers could make the teachers work easier by helping them create longer lasting materials and attract the attention of students more easily; and they value it for that. However, as it is mentioned before, the usages mentioned are generally considered as lower level skills and it is believed that "teachers should use tools- not to do better what they have always done but to do better things" (Pea, 1998, cited in Cambre & Hawkes, 2004, p. 27). In other words, it may be claimed that especially for language learning, the internet and computers offers improvements that could not be achieved otherwise, hence making it clear that there are areas that usage of computers can lead to better things. Therefore, it might be suggested that as teachers in this context seemed to be knowledgeable about basic usages of computers, they should be directed towards usage types that would both help them integrate language skills, make their lessons more student-centered, and raise critical thinking skills of their students.

5.4.2.2 Educational value of computers for Language Teaching

The educational value of using computers in language teaching includes many improvements at different layers. Firstly, the interaction opportunities the internet brings help foster the communicative skills of the students with ease (Liu et al., 2002; Yang, 2001; Young, 2003). In this sense, it could be mentioned that online interaction tools, e.g. chat rooms, help improve the speaking skills of the students. During the interviews, the teachers acknowledged these usages of computers and the Internet. Few of the teachers mentioned the interaction opportunities the internet provided them with, and acknowledged that directing their students to using computers to foster their speaking skills was one of the best possible uses of technology. Here, it may also be added that this type of usage of computers could be considered as student tool usage, as the innovation the computers of could not be matched with any. According to Yang (2001) communication carriers a great deal of importance for second language study, and language-culture are inseparable and interdependent; understanding the culture of the target language enhances understanding of the language itself. Similarly, several teachers mentioned cultural awareness raising potential of internet in language teaching and they mentioned that their students would have chances to meet millions of people from all around the world and this would mean millions of different worldviews and cultures. Therefore, one could maintain that using the computers as student tools, the teachers, although a minority, believed they would

provide them with unique interaction opportunities and that would also raise culture awareness and make their language learning experience more meaningful and authentic.

In terms of fostering speaking skills, it was mentioned during the interviews that even if it was quite hard for the teachers to find opportunities for their students to interact with native speakers, they could provide them with authentic speaking examples, and therefore motivate their students towards speaking. They also added that the internet could provide their students with the right usages of language, in terms of both form and pronunciation. Therefore, as only a couple of teachers were aware of the fact that the internet could be used both to foster their students' speaking skills and give them more autonomy, it may be concluded again that the teachers might be given more knowledge and practice in terms of using computers as student tools.

In terms of listening skills, the majority of teachers believed that the internet provided them with a vast amount of resources which was never available before. One of the older in-service teachers compared the opportunities for listening activities of his own student years with the today's, and stated that it was fascinating to find authentic audio files with this ease, as in the past the only method was finding a British Council branch and renting audio/video cassettes. As for the opportunities the internet provides today, the teachers seemed to be knowledgeable about the opportunities, and agreed that finding authentic listening materials were never as easy.

The teachers also mentioned that the internet could be an invaluable tool in terms of providing the learners with authentic reading materials, and chances to integrate listening and reading activities. Similarly, Lee (2000) affirms that all students can use various resources to find authentic reading materials either at school or their home with the help of the opportunities the internet and computers provide. Those materials can be accessed 24 hours a day at a relatively low cost. To this end, the teachers interviewed stated that using the internet the teachers could find reading texts that were authentic, up-to-date and appealing to students' interests. In terms of integration, they mentioned the availability of audiobooks and claimed that listening to those would be invaluable for the language learners as they have chance to both read and listen at the same time. When closely analyzed, it may be seen that the usage types mentioned in this sense were also mainly teacher tools, where the teacher was actively providing the input for their students. Therefore, teaching the teachers ways of creating tasks that would enable their students to work on their own, collaborate and integrate their language skills could be considered as a priority in teacher education programs.

Apart from believing that the internet provides opportunities for reading skill development, the teachers also mentioned that writing could be also fostered using the

computers and the writing activities conducted on the internet could get more meaningful and authentic. In this sense, only two in-service teachers mentioned using the Internet for such purposes. Therefore, it could be argued that the teachers were aware of meaningful computer integration strategies for fostering writing skills, and these ways added an authentic dimension that was hardly available before. It could be speculated that, although very few teachers mentioned these usages of computers, they acknowledged the meaningfulness of creating student-centered tasks.

Overall, it may be concluded that the teachers believed the power of the internet and computers in terms of language teaching. According to the teachers, the key benefits of using the internet in language learning were mainly using them for easing their lesson preparation progress and making their lessons more enjoyable for the students with the help of audiovisual materials. These usages of computers, or teacher tool usages, were mentioned heavily by the teachers (66 times), while the teachers only mentioned student tool usages minimally (12 times). Therefore, it could be argued that the ICT education in ELT should aim towards teaching the prospective teachers about the opportunities the internet and computers provide, the opportunities that were either not available or costly before. These key components can be listed as teaching the prospective ELT teachers that they can use the internet and computers to

- find authentic opportunities of communication
- find authentic language input
- find meaningful activities
- foster of all language skills
- integrate language skills meaningfully and authentically

These advantages of technology integration in language learning have also been highlighted by many researchers (Lee, 2000; Liu et al., 2002; Yang, 2001; Young, 2003), and it can be grounded that the teachers interviewed, being teachers of high computer usage and competence, seemed to have basic knowledge about these possibilities.

5.5 Summary of the Chapter

It was seen that teachers, both preservice and in-service, in general had high levels of computer competence and attitude toward computers. They also indicated higher levels of computer usage, although their school computer usage levels were significantly lower than their home computer usage levels. Regarding this, it was concluded that, by looking at the low infrastructure scores of the institutions, the institutions' infrastructure was one of the biggest

barriers to technology integration. As the data gathered from private universities, this drastic picture might gain more importance.

As for the knowledge of the teachers as to effective technology integration, both the preservice and in-service teachers seemed to lack necessary knowledge about using computers as student-tools. This fact was in a way admitted by the teachers, especially the preservice teachers, when they mentioned that their college ICT courses were teaching them "about technology" not "how to teach with technology."

It was also seen in this study that some factors were affecting computer competence, attitude toward computers and computer usage purposes/frequency, such as age, gender, being preservice or in-service, institutional infrastructure level and work experience.

Combining all these data, a clear picture of the condition of technology integration in Ankara, Turkey for private universities was depicted, and baseline data for the future research was provided.

In the next chapter, final remarks on the collected data and possible pedagogical implications will be presented.

CHAPTER 6
CONCLUSION

6.1 Overview of the Chapter

In this chapter, after briefly explaining the purpose and theory of this research, the findings discussed in the previous chapter are summarized, and conclusions and potential educational implications are presented. Moreover, recommendations for further studies and the limitations of this study are expressed at the end of the chapter.

6.2 Summary of study

As stated throughout this study, technology integration in education, and specifically in language teaching, could be considered as an example of educational change, and therefore the difficulties innate to change could be observed upon the process of integration of technology in education. It is an undeniable fact that our society and its needs are constantly changing (Waks, 2007) and the schools as organizations react to these changes in various ways at different layers, sometimes fast adaptation takes place, while sometimes the resistance comes to the changing practices.

Changes aim at fixing the deficiencies in the organizations' policies (Waks, 2007) and the schools might not have the same amount of reaction time to these changes due to their innate structure, as it was seen within the framework of this study. Moreover, the current situation of Turkey in terms of technology integration, as compared to developed countries, is still slow, and as it was observed in this study, even the private schools tend to be slow in taking necessary steps as to meet the changing needs of the day.

In this study, three aspects of technology integration in language learning within the context of private universities in Ankara, Turkey were explored. Firstly, with the help of quantitative data gathered by questionnaires the preservice and in-service teachers' computer usage frequencies/types, computer competence levels, perceived barriers to technology integration and attitudes towards computers were analyzed, and integrating quantitative and

qualitative data, the factors that might potentially affect the findings were examined. Then, the findings for preservice and in-service teachers were compared to depict the differences and similarities. Finally, the qualitative data was used to probe into the educational value the preservice and in-service teachers assigned to technology usage in their language teaching practices, and thus the extent of their technology knowledge in language learning was revealed. With its threefold structure (definition, comparison and exploration), this study sets the baseline data for preservice and in-service ELT teachers by revealing their computer competences, attitudes toward computers and computer usage purposes and frequencies. Moreover, in this study, the knowledge of teachers as to effective technology integration was revealed, which is another aspect that helps this study provide data beyond the coverage of the previous research within this context.

6.3 ELT Teachers' Overall Attitudes toward Computers

During the analysis, it was found out that a great majority of teachers had computers and internet access at their homes and had high home computer usage frequencies. Moreover, it was also seen that the teachers tended to use computers at moderate amounts for various purposes, ranging from a high frequency usage of computers for recreational activities to using them for instructional purposes, which included lower-level tasks, such as preparing worksheets using the internet. It was also supported by the interview data and the literature that the teachers' usages tended to be mainly at low-levels (Zhao & Frank, 2003), although they mentioned various usages of technology integration into language learning.

Combining low school computer usage, high frequency of instructional usage at low-levels and high levels of technology competence, it was concluded that the mutual presence of these three counterbalancing dimensions could be interpreted in two ways. Firstly, the low-level usage statistics at schools may be explained by the fact that the schools, even though all of them were private, lacked computer access to the point that the teachers had difficulty even to use computers for their personal purposes. The results of the questionnaire also revealed that the teachers thought the biggest barrier to integration was the condition of infrastructure at their schools. Although it is claimed that the personal barriers are more important to overcome than first-order barriers (Ertmer, 1999, 2005), the hardware level of schools in Turkey makes it clear that we are still at the stage of fighting with first-order barriers.

Secondly, the complementary explanation to the trio, low school computer usage, high teacher tool usage of computers and high levels of technology competence, could be found in the statement of Zhao and Frank (2003) claiming that the teachers prefer simpler technologies as

these technologies require little change and therefore cost less in terms of time and energy. It is further claimed that much simpler tasks that are easy to implement and do not involve students directly are generally favored by teachers as tasks that require student involvement necessitate teachers to reconfigure their teaching practices. Thus, the teachers' minimal usage of computers at school and their usage of them for low-level teacher-centered tasks could be explained by both the teachers' lack of knowledge as to proper usage of technology for language teaching purposes and the their unwillingness to change their preexisting methods of teaching. Moreover, it was seen during the interviews that the teachers did not clearly know the difference between using computers as teacher tools or student tools, and therefore, they heavily mentioned using computers as teacher tools when they were talking about the innovative aspects of computers in language learning. Thus, it could be claimed that their ICT knowledge as to effectively integrating technology in language learning seemed to minimal and training opportunities to this end could be suggested.

As for the attitudes of the teachers towards computers, it was observed that the teachers overall had positive attitudes towards computers. This finding could be explained within the theoretical framework by Fishbein and Ajzen (1975), who, according to the theory of reasoned action, argued that the increased usage leads to higher attitudes towards the object and higher competence in turn leads to higher usage. Having found high levels of usage, competence and attitudes, it could be concluded that providing computer usage opportunities would eventually end in higher competence and attitudes, and thus steps towards overcoming institutional barriers should be taken in order for a successful technology integration to happen.

6.4 Factors Affecting ELT Teachers' Attitudes toward Computers

It was seen during the analysis that institutions, gender, age (work experience) and being preservice and in-service were factors that affected the teachers' attitudes, competence levels and computer usage purposes and frequencies. An overall implication for the forthcoming explanations could be that ICT training seminars and preservice ICT coursework may be designed considering the differences found between individuals of different characteristics of the teachers.

6.4.1 Age, Work Experience and Gender

In terms of age, and work experience, it was seen that although all age groups had low computer usage frequency at school, due to institutional barriers; the home usage of computers were significantly different for the age groups, where the younger age group tended to use

computers more. This might indicate the general tendency of the society: the new generation grows up using technology tools, and therefore they use them significantly and comfortably more.

As for the ICT knowledge sources, overall, the teachers indicated that they learned through individual learning activities more than anything else. However, in the analysis of age groups it was seen that the younger group of teachers acknowledged the fact that they learned through ICT Courses and college/graduate work more than the older group. Even so, during the interviews the preservice teachers indicated that although they learned the basics of computing from these courses, they seemed to criticize these courses for them being repetitive and theory driven, and above all, not teaching them "how to use technology to teach." The stand-alone nature of these courses was also heavily attacked by researchers (C. M. Becker, 2007; Kay, 2006b; Mehlinger & Powers, 2002; NCES, 2000; Wang, 2002), and possible changes might be needed to improve the overall usefulness of these courses and thus the attitudes of preservice teachers towards them. Therefore, it could maintained that ICT courses that would teach the prospective teachers the ways that they can use computers as student tools should be offered in teacher preparation programs.

As for the usage types, computer competence, and attitudes of age groups, as was supported by literature, the young age group was observed to outscore the older group. Interestingly, *Thoughts on usefulness of computers for students* was found to be the only attitude factor the young group had lower than the older groups. This was explained by the fact that these new teachers, growing up with technology and knowing the potential negative aspects of it, tended to direct their students towards computer usage less than the older group, the same results were also found in USEiT study (Russell, Bebell, O'Dwyer et al., 2003) and similarly explicated. Therefore, in a similar vein, it may be concluded that in Turkey the young generation of teachers are growing up using computers and are aware of the negative effects of them on students. Although this awareness could be appreciated, as this might again be caused by lack of knowledge as to the proper use of computers and the internet in language learning, more emphasis on ICT courses could be suggested.

In terms of gender analysis, it was seen that the results generally tended to support literature, and the fact that socially computers are linked with males seemed to be proven for some aspects, especially for the older generation (Whitley, 1997). For the in-service analysis, it was seen that males had higher averages of computer usage, while it was seen that it was the opposite for the preservice group. As for competence, for the in-service group, it was seen that males had more competence for the more complex computer tasks, but again for the preservice

group no significant difference was found. In terms of attitudes, again in confirmation with the literature, the males had higher averages than the females, while similar to the previous findings, no significant difference between the genders was found for the preservice group. The homogeneity of the preservice group was explained by the fact that the population of the questionnaire was limited and the probability of ICT courses' effect on preservice teachers' competence and attitudes. Therefore, it could be concluded that this diminishing gap between males and females in terms of their approaches to computers might help overcome stereotypical gender roles and help the administrators of ELT departments see that their teachers in fact as one homogenous group are ready for using technology in language teaching, should they be given the tools and correct knowledge.

6.4.2 The effect of Institution and Being Preservice vs. In-service

Institutional factors, namely first-order barriers, have a major impact on technology integration. The institutions sampled in this study were all private universities, but only one of the schools had adequate technical infrastructure, and the rest lacked computers to a dramatic extent. Therefore, the analysis of results showed that the teachers at the university with high facilities of computer usage for language teaching purposes had the highest usage statistics, attitude levels and computer competence. To reiterate, in the analysis of institution as a factor, it was found that in terms of school computer usage, instructional and communicative usage of computers, competence levels and attitudes towards computers were all high for the teachers of the technologically adequate university. Therefore, it may be seen that having computers at their disposal, these teachers outscored their peers who potentially had the same undergraduate education as them. In this regard, it could be suggested that improving the infrastructure of the schools may have the highest priority. One side note to this conclusion may be that as even the teachers at this technologically well-off university mentioned highly using computers as teacher tools; a general awareness should be raised as to the genuine value of being able use the internet and computers in language teaching. This might also include school-wide policy and vision change, which might include changes in proficiency exams, helping them match real life language requirements.

Computer factors were also analyzed in terms of the teachers' being preservice or in-service. It was seen that although the in-service group tended to own computers at a higher percentage than the preservice group, the computer usage frequency of the new generation was higher than the in-service group, which shows the new generation's tendency to use computers

more than the senior teachers do. This might also indicate the positive effect of ICT courses on the new generation of teachers, at least for acquiring basic computer skills.

As stated earlier, although the preservice group believed that they learned the basics of computing from ICT courses, they indicated during the interviews that these courses had only a negligible effect on their learning how to use technology in their lessons. On the other hand, the in-service teachers highly valued the fact that they learned the basics of computing from these courses and they indicated this in their interviews. However, what the in-service teachers appreciated was the fact that they learned the basics of computing from these courses, and when it came to their knowledge about effective technology usage (student-tool usage of computers) both group indicated significant lack of knowledge in this respect.

In terms of competence, closely linked with the age analysis, it was seen that that preservice group had higher competence than the in-service group did. Similarly, it was observed that the preservice group had the higher averages attitudes levels than the in-service group did. An interesting detail to this finding was found when it was seen that the preservice group had higher averages than even the youngest preservice group (1 to 5 years of experience). This was explicated by the fact that starting teaching at schools with no infrastructure affected the attitudes of in-service teachers in a negative way. The hopes of preservice teachers towards finding chances to use technology in private institutions were revealed during the interviews, but the findings and computer-teacher, computer-student ratio of the private institutions casted shadow on the hopes of the prospective teachers.

6.5 Pedagogical Value of Using Computers in Language Learning

Pedagogical value of computer usage in language learning/teaching was explored through the analysis of the interviews, which were thematically analyzed during the analysis process. It was seen during the analysis that the teachers stated that although computers could improve their teaching, it was not a necessity for their teaching to be effective. In this resgard, the teachers mentioned that possible usages of computers in language learning, and they indicated that computers could foster language skills in an integrative fashion, while the colorful outlook of multimedia technologies would appeal to students, motivate them and make their learning longer lasting. However, directing students towards more autonomous, critical and higher-order thinking activities were rarely mentioned by the teachers, as they seemed to have limited knowledge as to those and were occupied with institutional barriers more.

The teachers seemed to disagree with the fact that ELT might pose problems as to technology integration due to its nature as a subject; on the contrary, they expressed their beliefs

as to ELT's being one of the most suitable areas for technology integration. Discrediting the subject culture, the teachers emphasized that institutional barriers were more of a problem and they might be in the form of lack of school support and training activities, the unsuitability of the curriculum and structure of the textbooks and the exams. These subcategories of institutional barriers were brought to light with the help of the interview data, and it was seen that the educational policies of the schools play the major role in determining the language objectives, selecting course materials and deciding on the components of the proficiency exams. It was also seen that for a successful integration of technology in language teaching suitability of these subcategories for technology integration was also carrying utmost importance. The ease of technology usage of the teachers at the institution with high technology infrastructure could be argued as one of the biggest proofs of this argument.

As regards the effect of technology integration on their teaching style, the teachers indicated that the teachers' creativity played a high importance in terms of teaching style, as the teacher might as well choose conducting teacher-centered lessons using technology in a teacher-directed way, namely as teacher tools. The teachers also mentioned their beliefs in the power of technology to make their lessons more student-centered, although the ideas they mentioned might not be successful in doing so, as they were mainly activities that helped teacher conduct their lessons but still be in charge of the classroom. This led the researcher to conclude that more knowledge and skills as to using technology in teaching should be given to both preservice and in-service teachers.

6.6 Pedagogical Implications

As is also confirmed by the findings of this study, increased access to computers means higher levels of competence, and in turn increased willingness to use computers for instructional purposes. Thus, although it was seen that the preservice teachers indicate that they learn the basics of computing from ICT courses at universities, providing the them with more exposure and showing them example usages of computers for instructional purposes could be another alternative to offering stand-alone computer literacy classes. Similar suggestions were also made by Russell, Bebell, O'Dwyer et al. (2003)

> … one approach to preparing teachers to teach with technology is to move away from focusing on teaching technology and instead focus on teaching with technology—rather than introducing technology as an available yet peripheral tool, emphasizing technology as an integral tool with diverse uses and inherent potential to enhance teaching and learning beyond what the traditional methods allow. (p. 309)

Thus, either the structure of the ICT courses offered may be reorganized so that they also teach the prospective teachers the ways they can integrate technology into their specific subject-areas, or alternative elective courses could be offered where the students learn the details of technology integration.

Similarly, the teachers generally saw computers and internet in language teaching as tools (teacher tools) that helped them make their lessons more colorful, namely tools that replace traditional overhead projectors or the blackboard and make the outlook of the materials prepared more appealing and motivating for the students. It was also seen distinctly that only a couple of teachers interviewed mentioned directing students to use computers, namely making their lessons student-centered with the help of technology. Instead, they generally mentioned the use types that would affect their teaching perspectives minimally, confirming that simpler technologies that require little change -and therefore cost less in terms of time and energy- are used more frequently. In this respect, the teachers, both in-service and preservice, should be taught about using computer as student tools, namely the ways computers are used to foster critical thinking, learner autonomy and skill integration in language learning. Thus, more awareness as to how technology can be integrated into writing, speaking, listening and reading can be given to preservice teachers with the help of these new additional ICT courses and these students can be asked to prepare lesson plans in which they need to integrate a technological component, that cannot be achieved without technology, in their lessons. This might help them broaden their vision in terms of integrating technology into classroom and possible uses of technology in ELT.

Moreover, the in-service and preservice teachers may also be given opportunities where they can observe and learn about possible usages of technology in language teaching. Especially, preservice teachers could be sent to institutions with high levels of technical infrastructure, and can be paired with mentor teachers who are competent and fluent in effective technology usage. A similar claim comes from Sime and Priestley (2005) indicating that by providing opportunities to preservice teachers to observe effective technology integration practices, educators and teachers can foster a medium in which preservice teachers may develop their practice and positive attitudes towards computers which are crucial in influencing teachers' decisions to use technologies in their future teaching. Similarly, it is also claimed that the advantage of providing real life opportunities and knowledgeable mentors is that that it transfers directly to the "real-world" classroom, unlike the single course and integrated strategies (Howland & Wedman, 2004; Marra, 2004 cited in Kay, 2006b). Therefore, in addition to providing ICT courses with

practical component, the prospective teachers should also be give chances to see and practice effective technology integration.

With regard to the in-service teachers, it was observed that their competence levels were actually at the levels that could possibly be enough for them to use computers in their classrooms, if they had sufficient infrastructure to do so. However, institutional factors, namely lack of infrastructure, were big barriers that affected their technology integration practices. Moreover, it was also seen that gender and age differences were still factors that should be taken into consideration while planning technology integration. Therefore, it may be suggested that after firstly improving the infrastructure levels of the schools, the institutions should organize in-service training activities that are divided into different difficulty levels in accordance with the needs and competence levels of different groups of teachers. Of course, teaching policy (curriculum, exam, etc.) should also be adjusted at a global level in order for these practices and investments to be meaningful, efficient and successful. Moreover, keeping the high competence levels of the new generation in mind, it may be suggested to design partnerships where new and senior teachers pair up and share both teaching experience and technology knowledge in a two-way fashion.

ELT can benefit from new technologies to change its outlook, and sociocognitive CALL activities that aim at "shifting the classroom dynamic from students' interaction with computers to interaction with other humans via the computer" (Warschauer & Kern, 2000, p. 11) can provide ELT with interaction opportunities that were never available before. Thus, while it should be aimed to improve infrastructure of the schools and take necessary steps to foster technology integration, the teachers should also be supplied with effective changes in the curriculum objectives and education policy that would help smooth and meaningful technology integration.

Apart from helping shape the preservice and in-service teachers' training activities, this study also shows that we can take effective steps in technology integration and prevent potential problems to it, which was seen to occur during previous attempts of several countries. The US, with its low students per computer ratio (almost 4 to 1), still suffers from ineffective technology integration practices, due to teacher and school policy related factors, now that they almost overcome infrastructure as a barrier. It was seen in this study that even the private universities in Turkey were far away from being close to that ratio, and lack of infrastructure was the most prominent problem within the context of this study. However, this can be turn into an advantage, as it is known from the examples like the US that the integration process should be conducted at two levels: institutional and personal. So, as we are still in the process of overcoming first-order

barriers, we can at the same time train our teachers for the best technology integration practices and solve a potential prospective problem, which would otherwise turn into an even bigger problem than lack of infrastructure.

The constant changing needs of the society make educational change inevitable, although it is not without its problems:

> Technology, particularly the computer and the Internet, not only provides solutions to existing problems; it changes the problems we have to solve every day. It also creates more problems that demand new solutions. In other words, technology innovations not only improve the means, but also change the ends. (Zhao, Tan, & Mishra, 2000, p. 352)

The problems that technology creates need constant attention and training. Thus, to keep up with the societal demands it might be required to look a step further and foresee potential problems by constantly watching similar examples.

In conclusion, this study may provide the future researchers and policy makers with the necessary baseline data on the ELT teachers' competence levels and attitudes toward computers in several different layers. Firstly, as this study defines the computer competence/ usage levels and attitudes toward computers of teachers the future researchers might find it useful to know the current competence/attitude/usage levels of the teachers. Secondly, as this study uniquely compares the preservice and in-service teachers, the investigations for these two different generations may be shaped in accordance with their difference and similarities. Moreover, as the factors that affect computer competence/usage/attitude levels of the teachers, researchers and policy makers may find it useful to plan their investments and training plans accordingly. Finally, as is seen during the interviews, despite having decent levels of competence and positive attitudes toward computers, both the preservice and in-service teachers lacked necessary knowledge as to how to "effectively" integrate (using computers as student-tools) computers in their language teaching practices. Therefore, the data provided might help the visionary better plan the course of investments and training activities.

6.7 Limitations of the Study

As it is stated by Hennessy et al. (2005, p. 161) "teachers are reluctant to adopt a technology that seems incompatible with the norms of a subject culture." As the target population of this study is only preservice and in-service English Language teachers, the findings might not be generalizable to teachers of other subjects, as the findings might be a result of the English subject culture.

Moreover, data were collected from teachers who are working at private universities. Thus, as institution specific policies might have a significant effect on the results of the study, the generalizability of results is limited to only this context.

Furthermore, the data for preservice teachers collected only from Middle East Technical University, which could differ from other universities in Turkey in terms of its ICT availability and students-per-computer ratio. Therefore, the results of this study should not be generalized on other Education faculties in Turkey, where the availability of the computers and therefore the students' computer competence and attitudes might be different.

The methodology implemented in this research study had limitations resulting from the innate nature of the data collection methods. However, with the help of the mixed-methods approach the disadvantages of qualitative and quantitative methods were able to be overcome. As the questionnaire was designed subjectively by the researcher, some valuable data may have slipped through, as the related questions were not included in the questionnaire. However, the fact that the data was gathered from a large sample helped increase the generalizability of the results.

The data which was otherwise hard to gather with the help of questionnaires was gathered with interviews. However, although it is a great way of gaining insight in the issues, as the population of the interviews is limited due to the difficulties innate to their analysis; their results may not be generalized to a larger population. Therefore, this limitation of the interviews was overcome with the questionnaire data, as the limitations of the latter was overcome with the interviews.

Furthermore, the schools were not analyzed in terms of their policies as to technology integration, and the reasons for their low infrastructure levels could not be explained. Therefore, the lack of this aspect might have prevented the researcher from making judgments about the availability of resources at the participating institutions.

6.8 Suggestions for Further Study

As this study's population was limited to only private institutions and one preservice institution, further studies could be conducted in which data from state/private universities and other ELT Departments in other parts of Turkey could be collected to see the overall situation in Turkey.

ICT Courses or computer literacy courses offered at universities could be source of investigation for another study. These courses could be analyzed in terms of their effectiveness as to technology integration and potential improvements or alternatives could be suggested.

In another study, potentially a case study, the school level policies and visions of administrators may be observed and analyzed in order to see effect of those on technology integration processes.

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APPENDICIES

APPENDIX 1

Questionnaire Sample

APPENDIX 2

Sample Interview Questions

The questionnaire will take only 10-15 minutes, and the subjects can leave at any time they feel uncomfortable.

CURRICULUM AND SUBJECT CULTURE RELATED QUESTIONS

- Can you use computers in your classroom? What advantages would it add?
    a. Is your curriculum suitable? Facilities?
- Does/would technology have any effect on your teaching style or vice versa?
- Do you think you would use technology more if you were teaching another subject (e.g., science) the effect of *Subject Culture*? (Hennessy et al., 2005; Hew & Brush, 2007)
    a. What are the best skills in ELT technology can help foster?

PERCEIVED BARRIERS RELATED QUESTIONS

- What are the main factors that enable you or prevent you from technology usage in classroom?

PRE-SERVICE AND IN-SERVICE TRAINING ICT COURSES RELATED QUESTIONS

- Do you think preservice ICT course had any effect on your technology competencies/attitude?
- Is there a conflict between your expected usage and your current usage?
- *(What are the preservice teacher's opinions on expected technology usage?)*
- *(What were in-service teachers expected usage? Is there a conflict?)*
- *What is the ideal role for preservice teachers' mentor in relation to supporting their use of ICT? What is the role of the university based courses in relation to ICT?*

VALUE GIVE TO TECHNOLOGY INTEGRATION PERCEPTION

- Is there (would there be) any potential improvement in ELT in terms of skills teaching with the technology integration?
- How important is it for you to be able to use technology in your lessons?
    a. Are there things that can only be achieved through using technology?
- Does (would) teaching with technology make you a better teacher or your teaching better?

APPENDIX 3

Factor Analysis of the Questionnaire

Part 2

Rotated Component Matrix

	Component		
	1	2	3
Part2.8 To gather information for planning lessons	,894		
Part2.7 To create instructional materials (i.e., handouts, tests, etc.)	,770		
Part2.10 To prepare multimedia presentations to use in my lessons	,634	,410	
Part2.12 To communicate with colleagues/other professionals (email, facebook, etc.)		,762	
Part2.15 To store/edit photos		,719	
Part2.14 To listen to music/watch movies		,696	
Part2.13 To play games			,822
Part2.11 For administrative record keeping (i.e., grades, attendance, etc.)			,766
Part2.9 To access model lesson plans through the Internet	,508		,528

Part 3

Rotated Component Matrix

	Component			
	1	2	3	4
Part3.5 I can operate a presentation program (e.g., PowerPoint).	,922			
Part3.4 I can operate a word processing program (e.g., Word).	,903			
Part3.9 I can use the Internet to access different types of information.	,844			
Part3.3 I can use a computer keyboard	,696			
Part3.8 I can use the Internet for communication (e.g., email, chat, etc.)	,676			
Part3.14 I can create and organize computer files and folders.	,592			
Part3.10 I can solve simple problems related to computers.		,676		
Part3.12 I can use computers for grade keeping.		,673		
Part3.17 I can add new hardware to a computer.		,654		
Part3.1 I can install new software on my computer.			,792	
Part3.2 I can use a printer			,758	
Part3.15 I can remove computer viruses			,610	
Part3.13 I can select and evaluate educational software.			,548	
Part3.16 I am comfortable changing (installing/upgrading) computer software.			,533	
Part3.7 I can operate a database program (e.g., Access)				,811
Part3.11 I can use a graphics program (e.g., Photoshop).				,777
Part3.6 I can operate a spreadsheet program (e.g., Excel).				,622

Part 4

Rotated Component Matrix

	Component		
	1	2	3
Part4.1 There are enough computers at school to use for personal/academic use.	,854		
Part4.2 The computers at my institution are new and fast.	,759		
Part4.3 At school the Internet is easily accessible.	,751		
Part4.4 We have user friendly instructional software.	,700		
Part4.11 Funding on educational technology is enough.	,593		
Part4.10 I have enough time in schedule for students to use computers in class		,829	
Part4.9 I have enough technical support or advice.		,776	
Part4.7 Administrative support is enough.		,656	
Part4.8 I have enough support regarding ways to integrate technology into the curriculum		,481	
Part4.6 Release time for teachers to learn / practice / plan ways to use computers or the internet is enough			,839
Part4.5 Training opportunities are adequate.			,774

Part 5

Rotated Component Matrix

	Component					
	1	2	3	4	5	6
Part5.1 Computers do NOT scare me at all.	,796					
Part5.2 Computers don't make me feel uncomfortable.	,796					
Part5.25 Overall, I feel that I know how to use a computer.	,753					
Part5.24 When I use a computer, I am NOT afraid that I will damage it.	,743					
Part5.26 When using a computer, generally I DON't lose data.	,634					
Part5.18 I try to make use of computers as much as possible.	,501					
Part5.15 Computers are useful		,724				
Part5.20 I intent to use computers in the near future.		,657				
Part5.19 I would like to learn more about computers.		,557				
Part5.12 Computers are a fast and efficient means of getting information.		,537				
Part5.13 I think I would always need a computer in my classroom.		,517				
Part5.10 Learning about computers is NOT a waste of time.		,504				
Part5.22 Being able to use a computer is important to me.		,469				
Part5.6 I (would) like using computers in my classroom teaching.		,416				
Part5.5 Using computers is enjoyable.			,710			
Part5.21 Using a computer is entertaining.			,647			
Part5.3 I like talking to others about computers.			,624			
Part5.4 I am glad there are more computers these days.			,624			
Part5.23 Computers are beneficial because they save people time.				,782		
Part5.7 Computers save time and energy.				,684		
Part5.16 I would rather do things on a computer than by hand.				,574		
Part5.8 Schools would be a better place with computers.				,554		
Part5.17 I like spending money on computer related things.			,489	,553		
Part5.11 Computers would motivate students study more efficiently.					,705	
Part5.9 Students must use computers in all subject matters.					,696	
Part5.14 Computers can enhance students' learning						,761