USABILITY AND USER ACCEPTANCE OF WEB SITES OF TURKISH SOCIAL SECURITY INSTITUTIONS

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ABSTRACT

Zerrin Öndin, "Usability and User Acceptance of Web Site of Turkish Social Security Institutions"

The current study examined the usability features of web site of Turkish Social Security Institutions (SSK, Emekli Sandığı, and Bağ-Kur) and individual acceptance of these e-government applications, utilizing usability evaluation method. The participants were 45 adults who are members these social security institutions, and their ages, education levels, occupations and computer skills varied.

The usability study was conducted with each participant individually. It consisted of two sections. In the first section, the participants were allowed to move around web site of the social security institution and in the second section, four tasks were given them to complete. During the second section, the researcher filled an observation form. The participants' all operations on the computer and voices were recorded. After completion of the tasks, the participants were given the instruments. The instruments were Usability Test developed by the researcher to evaluate usability of web sites, Technology Acceptance Tool adapted from the original form developed by Davis (1989) to measure users' perceptions of usefulness and ease of use of web sites, After Scenario Questionnaire adapted from original form developed by Lewis (1991) to evaluate task specific usability of web sites, an Observation Form developed by the researcher to record the participants' operations on the web site and a Demographic Information and

Computer Experience form to gather information about the participants' personal information and computer usage.

The data analysis revealed that there is a significant relationship between Usability and Acceptance of the web sites. Also the results showed that genders of the participants do not have effect on Usability and Acceptance scores. On the other hand the participants' education level has a significant effect on their ASQ Task 1 scores. User Experience in using web sites has a significant effect on Learnability, Satisfaction, Errors, Usability, Perceived Usefulness, Perceived Ease of Use, ASQ Task 1 and ASQ Task 2. Further, users' computer experience has a significant effect on ASQ Task 1, ASQ Task 3, ASQ Task 4 for employee scores. Further Internet experience has a significant effect on ASQ Task 1 and ASQ Task 2 scores. Daily computer usage has a significant effect on ASQ Task 1 and ASQ Task 4 for employee scores and daily internet usage has effect on Learnability, Efficiency, Usability, ASQ Task 1, ASQ Task 2, ASQ Task 3, and ASQ Task 4 for employee scores. The observation form analysis revealed detailed information about subjects' operations and problems in web sites.

In the light of the results, usability is an important factor to make e-government services accessible for wide range of people. Administrators of e-government web sites should take into account the role of usability when making desing decision for these services.

KISA ÖZET

Zerrin Öndin, "Türk Sosyal Güvenlik Kurumlarının Web Sitelerinin Kullanılabilirliği ve Kullanıcı Kabulü"

Bu çalışma birer e-devlet uygulaması olan Türk Sosyal Güvenlik Kurumlarının (SSK, Emekli Sandığı, Bağ-Kur) ağ sitelerinin Kullanılabilirliği ve Kullanıcı Kabulünü kullanılabilirlik değerlendirmesi yöntemini kullanarak araştırmaktadır. Çalışmanın örneklemini bu üç sosyal güvenlik kurumundan birine dahil ve farklı yaş, eğitim düzeyi, meslek ve bilgisayar becerilerine sahip 45 yetişkin oluşturmaktadır.

Bu çalışma iki kısımdan oluşmaktadır. Birinci kısımda katılımcılar sosyal güvenlik kurumunun ağ sitesinde serbest olarak gezmiş, ikinci kısımda ise katılımcıya ağ sitesinde yapması için dört ayrı görev verilmiştir. Kullanılabilirlik çalışması her katılımcıyla birebir yürütülmüştür. Bu kısımda araştırmacı bir gözlem formu doldurmuştur. Katılımcıların ağ sitesindeki tüm işlemleri ve sesleri kaydedilmiştir. Katılımcılar görevleri tamamladıktan sonra veri toplama araçlarını doldurmuşlardır. Bu çalışmada ağ sitelerinin kullanılabilirliğini değerlendirmek için araştırmacı tarafından geliştirilen Kullanılabilirlik Testi, katılımcıların ağ siteleriyle ilgili yararlılık ve kullanım kolaylığı algılarını ölçmek için Davis (1989)'in geliştirdiği özgün formdan araştırmacı tarafından uyarlanan Teknoloji Kabul Ölçeği, göreve özel kullanılabilirliği değerlendirmek için Lewis (1991)'in geliştirdiği özgün formdan araştırmacı tarafından uyarlanan Senaryo Sonrası Anketi (SSA), katılımcıların ağ sitesindeki işlemlerini

kaydetmek için araştırmacı tarafından geliştirilen Gözlem Formu ve katılımcıların kişisel bilgileri ve bilgisayar kullanımları hakkında bilgi toplamak için Demografik Bilgiler ve Bilgisayar Deneyim Formu kullanılmıştır.

Veri analizleri sonucunda Kullanılabilirlik ve Kullanıcı Kabulü arasında anlamlı bir ilişki bulunmuştur. Ayrıca bulgular cinsiyetin Kullanılabilirlik ve Kullanıcı Kabulü üzerinde bir etkisi olmadığını göstermiştir. Bunun aksine eğitim seviyesinin SSA Görev 1'in ölçtüğü kullanılabilirlik üzerinde etkisinin olduğu görülmüştür. Ağ sitelerinin kullanımı Öğrenilebilirlik, Doyum, Hata, Kullanılabilirlik, Algılanan Yararlılık, Algılanan Kullanım Kolaylığı, SSA Görev 1 ve SSA Görev 2' nin ölçtüğü kullanılabilirlik üzerinde etkili olmuştur. Sonuçlar bilgisayar deneyiminin SSA Görev 1, SSA Görev 2, SSA Görev 3, SSA Görev 4 (çalışanlar için) ün ölçtüğü kullanılabilirlik puanlarına etki ettiğini göstermiştir. Internet deneyimi ise SSA Görev 1 ve SSA Görev 2' nin ölçtüğü kullanılabilirlik üzerinde etkili olmuştur. Günlük bilgisayar kullanımının SSA Görev 1 ve SSA Görev 4 (çalışanlar için) ün ölçtüğü kullanılabilirlik üzerinde etkisinin olduğu görülmüştür. Günlük Internet kullanımı ise Öğrenilebilirlik, Etkinlik, Kullanılabilirlik, SSA Görev 1, SSA Görev 2, SSA Görev 3 ve SSA Görev 4 (çalışanlar için) ün ölçtüğü kullanılabilirliğe etki etmiştir. Ayrıca, gözlem formu verilerinin analizi katılımcıların ağ sitesindeki tüm işlemleri ve karşılaştıkları problemler hakkında ayrıntılı bilgi sağlamıştır.

Araştırma bulguları ışığında, Kullanılabilirliğin e-devlet hizmetlerinin daha geniş kitlelere ulaştırılmasında önemli bir faktör olduğu sonucuna ulaşılmıştır. Çalışma, e-devlet ağ sitesi yöneticilerinin bu hizmetlerin tasarımına yönelik kararlar alırken Kullanılabilirlik faktörünü dikkate almalarının gerekli olduğunu önermektedir.

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I. INTRODUCTION

In today's world the Internet is an indispensable medium for communication and accessing information. It is used in many areas such as education, banking, advertising and commerce. When considering number and diversity of Internet users, it is important that design of web sites should be appropriate for target groups. Because some of adults who use web sites neither have education on Information Technologies (IT) nor experienced the Internet users. These web sites should be designed in a way that inexperienced adults can easily use them without any training. Determining how to design web sites for adult users that they could use them without any training is important factor for making the Internet available for everyone and increasing its usage rate.

There are various applications on World Wide Web (www), and electronic government (e-government) is one of them that appeals attention from researchers. E-government is the usage of information and communication technologies in public administration to improve public services and democratic processes (Biasiotti and Nannucci, 2006). According to Baker (2004), "e-government is the ability of governments to deliver services and information electronically to citizens 24 hours a day, seven days a week".

The main aim of e-government is to enhance citizens' awareness and democratic participation. According to Baker (2004) "understanding people who will be users of e-government service should extend to the way they understand computers and Internet, the ways in which they think about and carry out tasks, and the context in which they will do this". Biasiotti and Nannucci (2006) also stressed that the understanding of

people who will be using e-government services is critical for creating good added-value services.

For examining effectiveness of e-government applications, it is important to understand its context within human computer interaction (HCI) studies. The study of interaction between people and computers is an interdisciplinary subject known as human computer interaction. It relates computer science with many other fields of study and research (Dix, Finlay, Abowd and Beale, 1998). HCI involves the design, implementation and evaluation of interactive systems in the context of the user's tasks and domains (Helander, Landauer and Prabhu, 1997).

However, interaction between users and computers occurs at the user interface, which includes both hardware and software. Significant sub-discipline within the HCI is software usability. In International Organization for Standardization (ISO), usability is defined as "the effectiveness, efficiency and satisfaction with which specified users achieve specified goals in particular environments" (ISO, 1998). Here, effectiveness defines the extent to which the intended goals are achieved, efficiency describes the time, money and mental effort put into reaching goals and satisfaction relates to user judgments about system performance.

Nielsen (1993) defines usability as a quality attribute that assesses how easy user interfaces are to use. According to Nielsen it is important to realize that usability is not a single, one-dimensional property of user interface. Usability has multiple components and is traditionally associated with these five quality attributes: learnability, efficiency, memorability, errors, and satisfaction.

On the Internet, usability is a necessary condition to make a web site usable for a target group. According to Hebb (2004), "with a growing reliance upon the Internet and the pervasiveness of the www, usability of web sites is taking an increasingly important role for people trying to communicate or conduct transaction with others" (p. 38). Web sites with problems such as being difficult to use, failing clearly state what users can do, making users get lost, having information hard to read and not answering users' key questions are not preferred by users (Nielsen, 2003).

Apart from qualities of software or web site, there is another important factor that affects people's usage of these technologies, which is users' technology acceptance. Technology acceptance broadly refers to an individual's psychological state with regard to his or her voluntary and intentional use of a technology. An individual's acceptance of a technology can be explained by his or her underlying behavioral intention (Lin, Hu, Chen and Schroeder, 2002). There are several theories related with behavioral intention. These include the Theory of Planned Behavior (Ajzen, 1991), the Diffusion of Innovation Theory (Rogers, 1995), and the Technology Acceptance Model (Davis, 1989). Because of its frequent usage by prior studies, Technology Acceptance Model (TAM) has emerged as a predominant model for individual technology acceptance (Lin et al., 2002).

TAM is an adaptation of the Theory of Reasoned Action (Fishbein and Ajzen, 1975; Taylor and Todd, 1995) to the field of IT. TAM posits that perceived usefulness and perceived ease of use determine an individual's intention to use a system (Furneaux, 2003). Davis (1989), accepts these two construct as independent variables and IT usage as a dependent variable. Davis also defines perceived usefulness (PU) as "the degree to

which a person believes that using a particular system would enhance his or her job performance" and perceived ease of use (PEOU) as "the degree to which a person believes that using a particular system would be free from effort".

Researchers have attempted to extend TAM by introducing factors from related models, by introducing additional or alternative belief factors, and by examining antecedents and moderators of perceived usefulness and perceived ease of use (Wixom, and Todd, 2005). Several factors have been considered to extend the TAM and among these usability is one of the main factors (Flavian, Guinaliu and Gurrea, 2005). Researchers have examined the effects of usability on PU and PEOU and actual usage (Shih, 2004; Kougaris and Hampton, 2002).

Because system usability and user acceptance have been identified as fundamental challenges to organizational technology adoptions (Lin et al., 2002), in the field of e-government, investigation of system usability and user acceptance is essential. One of the commonly used e-government services is the Social Security Institutions which are generally used by people above 18 years old. That increases vulnerability of the services.

Significance of the Study

Usability and user acceptance of e-government web sites is an issue that must be addressed in order to make these services available for large number of citizens. Usability testing could be significant in the development of e-government as a means for determining problems that user have and increasing participation in e-government by revising web site. Usability testing can also help the designers better understand whether

the goals of usable web site and needs of users. Examining user acceptance provides information about users' perceptions of usefulness and ease of use of an e-government and help to understand user behavior. It completes usability studies by giving extra information about user.

This study included the perspective of real users regarding usability and acceptance of the web sites studied. The perspective of users is essential to gain an accurate measure of usability of web sites since usability is inherently user-centered. This study offers scientific analyses into design areas that deal with e-government web sites. The results of this study expand growing literature of usability and user acceptance and fill an important gap in the e-government literature by combining these two components. The findings might help designers make better plan for e-government web sites and might contribute to the solution of problems of users by explaining users' perceptions.

Statement of the Problem

In this study, as a set of e-government services, usability of Turkish Social Security Institutions' web sites and users' acceptance of these systems was examined. The main purpose of the study was to examine the usability features of web site of Turkish Social Security Institutions and to investigate individual acceptance of these e-government applications. To answer this question, the interaction between usability of those web sites and user acceptance were investigated. Further, comparison between usability of web site of different social security institutions and users' acceptance, and comparison between usability and acceptance of groups of people who have different

education level, gender, computer experience, Internet experience, daily computer usage, and daily Internet usage were analyzed. Also this study explored whether adults with different properties are able to use the Social Security Institutions' web sites and what may be the needs of modifications in those web sites which must be usable. The social security institutions were used in the study are *Emekli Sandığı* (The Pension Fund for Civil Servants of the Republic of Turkey), *SSK* (Social Security Institution), and *Bağ-Kur* (Tradespeole, and Artisan, and Other Independent Workers' Social Security Institution)

Research Questions

1. Is there any significant relationship between Usability properties (Learnability, Efficiency, Satisfaction, Errors, and Task Specific Usability) of web sites of social security institutions and their users' acceptance (PU, PEOU)?
    a. Is there any significant relationship between Usability of web sites of Social Security Institutions and PU?
    b. Is there any significant relationship between Learnability of web sites of Social Security Institutions and PU?
    c. Is there any significant relationship between Efficiency of web sites of Social Security Institutions and PU?
    d. Is there any significant relationship between Satisfaction of users about web sites of Social Security Institutions and PU?
    e. Is there any significant relationship between Errors of web sites of Social Security Institutions and PU?

f. Is there any significant relationship between Task Specific Usability of web sites of Social Security Institutions and PU?

g. Is there any significant relationship between Usability of web sites of Social Security Institutions and PEOU?

h. Is there any significant relationship between Learnability of web sites of Social Security Institutions and PEOU?

i. Is there any significant relationship between Efficiency of web sites of Social Security Institutions and PEOU?

j. Is there any significant relationship between Satisfaction of users about web sites of Social Security Institutions and PEOU?

k. Is there any significant relationship between Errors of web sites of Social Security Institutions and PEOU?

l. Is there any significant relationship between Task Specific Usability of web sites of Social Security Institutions and PEOU?

2. Is there any significant difference among web sites of social security institutions in terms of Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU?

3. Is there any significant difference between Usability and User Acceptance in terms of participants' demographic characteristics?

    a. Is there any significant difference between Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of participants' education levels?

b. Is there any significant difference between Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of participants' gender?

c. Is there any significant difference between Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of participants' experience in using web sites of social security institutions?

d. Is there any significant difference among Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of computer experience of participants?

e. Is there any significant difference among Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of Internet experience of participants?

f. Is there any significant difference among Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of participants' daily computer usage?

g. Is there any significant difference among Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of participants' daily Internet usage?

II. LITERATURE REVIEW

This chapter provides an overview of usability, acceptance of technology, e-government and adults' progress on web sites. Firstly, adults and their interaction with web based applications are discussed. The following section explores e-government services. Human computer interaction and usability literature focusing on web site usability issues are reviewed afterwards. Next section examines acceptance of technology and TAM. Finally studies related with usability of web sites and e-government applications and users' acceptance are presented.

Adults and Web Based Applications

Advances in technology have a direct impact on everyday life. It is known fact that youth of the current generation adapt new technology easily but adults have to compete with these youngsters that know more than them. New technologies require higher level of education and training that some adults do not have. How to effectively train and educate the adults that will have to use these new technologies is an important problem since lack of time and access to educational resource (Jones, 2003). Practitioners that teach Internet to novice users often report that adult learners are disappointed by their first experiences of the WWW. Recent survey on Internet use reveals that there is persistence among people who are non-users and dropouts who state reasons for giving up on Internet because of lack of interest, difficulties and bad experiences (Attar, 2005). So, it is important to design web sites that meet adult users' needs. In other words design of web sites should allow inexperienced adults easily operate without any training.

It is widely accepted that e-government offers an unprecedented opportunity to individuals for accessing lots of online services such as healthcare, social security, taxation, registration, housing, agriculture, education, childcare, social services, and aging. This is significant for those who suffer from chronic illness, live in rural or remote areas, and have to work long hours as they may have difficulty in accessing government services through traditional means. However, providing online access to government services and resources does not guarantee that individuals will be successful at getting information they seek. Poorly designed e-government web sites and complexity of government infrastructure may pose virtual barriers that prevent targeted adult users from attaining their goals (Becker and Nowak, 2003).

According to Shneiderman (2005):

> E-government successes depend on well designed web site that supports effective human performance. Every day millions of users benefit from the government services. However, often the user experience is filled with frustration, wasted time, and unsuccessful efforts. Researchers and practitioners in the still maturing field of human computer interaction are working hard to improve the user experience by providing validated guidelines, powerful tools, and theoretical models. As a result, innovative designs for web sites are accelerating user comprehension (p.7).

Electronic Government Services

Information technologies diffuse nearly every aspect of our lives and nearly every academic discipline. Public administration is one of these areas that give birth to electronic government (e-government) concept that draws attention from different disciplines. E-government basically aims to take advantage of the information and communication technologies to benefit government and all those who interact with it. E-

government is not only digitizing existing information and services, in order to make them available online. Instead, it is about reconstructing of government processes and internal administrative structures with the aim of structuring information and services appropriate for the needs of reel people (Avigdor, 2004).

Silcock (2001) defines e-government as "the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees" (p.1). Schneider (2000) defines e-government as "the relationship between governments, their customers (businesses, other governments and citizens) and their suppliers (again, business, other governments and citizens) by the use of electronic means" (p. 121). Yıldız (2004) defines e-government as "utilizing Internet and the www for delivering government information and services to citizens" (p. 10). According to Hernon (2000), e-government is using information technology to deliver government services directly to the customer 24/7. The customer can be a citizen, a business or even another government entity.

E-government covers broad area of automation; web site administrated by government for information purposes and network infrastructure that supply chain management, filling government form, paying a fee, doing tax returns online, voting electronically, providing input into policy issues, and employment kiosks (Poostchi, 2002).

As cited in Baker (2004):

> Moon (2002) notes that e-government encompasses at least four major aspects. First, a secured governmental intranet and central database are required to promote effective interchanges within governmental subunits. Second, some internet oriented service delivery. Third, some use of e-commerce concepts to support governmental transaction activities. Fourth, a transparency that promotes accountability and trust.

From a global perspective e-government has five primary principles: (a) citizen centered service orientation, (b) accessibility, (c) social inclusiveness, (d) responsible information (e.g., attentive to security, privacy, and legitimacy issues), and (e) use of information technology efficiently, economically, and effectively (Baker, 2004).

Human Computer Interaction and Usability

Human Computer Interaction is an interdisciplinary subject that examines interaction between people and computers. Several definitions have been developed for Human Computer Interaction (HCI). The Association for Computing Machinery's Special Interest Group in Computer Human Interaction (SIGCHI) defined HCI as "concerned with the design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them" (ACM SIGCHI Curricula for Human-Computer Interaction, 1992).

Carroll (2000) defines HCI as "it is about understanding and creating software and other technology that people will want to use, will be able to use, and will find effective when used" (p.18). HCI combines the theories and practices from cognitive and behavioral psychology, ergonomics, anthropology, sociology, computer science, engineering and graphic design (Green, 2005).

There are many different concepts in HCI research. Usability is the most traditional concept in HCI research. It can be defined as a "measurable characteristic of a product's user interface that is present to a greater or lesser degree" (Mayhew, 1999). In ISO 9241-11, usability is defined as "the effectiveness, efficiency and satisfaction with which specified users achieve specified goals in particular environments" (ISO, 1998).

In this definition, effectiveness defines the extent to which the intended goals are achieved, efficiency describes the time, money and mental effort put into reaching goals and satisfaction relates to user judgments about system performance (ISO, 1998). There is another definition that emphasizes effectiveness, user, task and environment. Shackel's (1991) definition of usability is "the capability in human functional term to be used easily and effectively by the specified range of users, given specified training and user support, to fulfill the specified range of tasks, within the specified range of environmental scenarios" (p.22). Usability also defined by the U.S. Department of Health and Human Services (HHS) as "the measure of the quality of a user's experience when interacting with a product or system". The system could be a web site, a software application, mobile technology, or any user-operated device (U.S. Department of Health & Human Services, 2004).

Further, Nielsen (1993) defines usability as a quality attribute that assesses how easy user interfaces are to use. According to Nielsen it is important to realize that usability is not a single, one-dimensional property of user interface. Usability has multiple components and is traditionally associated with these five quality attributes:

- *Learnability:* It refers to how easy is it for users to accomplish basic tasks the first time they encounter the design. The system should be easy to learn so that the user can rapidly start working with the system.
- *Efficiency:* It means once users have learned the design, how quickly can they perform tasks. The system should be efficient to use, so that after the user has learned the system, a high level of productivity is possible.

- *Memorability:* It is a question of when users return to the design after a period of not using it, how easily can they reestablish proficiency. The system should be easy to remember, so that the casual user is able to return to the system after some period of not having used it, without having to learn everything all over again.
- *Errors:* It refers how many errors do users make, how severe are these errors, and how easily can they recover from the errors. The system should have a low error rate, so that users make few errors when using the system and if they make errors, they could recover easily.
- *Satisfaction:* It refers how pleasant is it to use the design. The system should be pleasant to use, so that users are subjectively satisfied when using it.

There are three main schools of thought that contribute to the usability studies: engineering, cognitive psychology, and design (Bunz, 2002). These three main schools take different approaches to the usability. Examining these three approaches allow us gain better understanding about usability.

Engineering is the oldest of these schools, and some of the most quoted literature comes out of this area. Mayhew (1999) divides usability lifecycle into three steps: (a) requirement analysis, (b) design/testing/development, (c) installation. During the requirement analysis; usability engineer investigates user profiles, tasks, technical issues and general design principles. Based on this analysis, he or she defines usability goals. The second stage consists of creating the system or protocol, testing it, and making changes. Finally, the third, installation stage includes the system or software and incorporating user feedback (Mayhew, 1999). Mayhew's lifecycle is well known in the usability literature and relied upon in usability application. However, her approach and

similar engineering approaches focuses too much on technical issues, and too little on intrapersonal or human communication issues. In addition, this approach focus more on usability of system, and software interfaces, and less on web site usability (Bunz, 2002).

On the other hand, cognitive psychology approaches place much emphasis on the human and psychological side of the usability. It takes a user-centered approach. Norman (1986, p.42) offers a model of human-computer interaction which is based on execution and evaluation cycle. The model of interaction is as follows, where each stage is referring to the activity of user:

- Execution:

  establishing the goal

  forming the intention

  specifying the action sequence

  executing the action

- Evaluation:

  perceiving the system state

  interpreting the system state

  evaluating the system state with respect to the goals and intentions

Except for physically performing the task (execution the action), all steps in this model are considered mental activities. They focus on intrapersonal factors. Other researchers have developed other models, but in the cognitive psychological approach the focus is clearly on the individual; task or technical steps that have to be taken to accomplish the task are less emphasized (Bunz, 2002).

The usability design literature stands between engineering and cognitive psychology. In design-oriented perspective, the usability literature provides long but inconsistent lists (Bunz, 2002). According to Ravden and Johnson (1989), usability criteria fall into ten categories: visual clarity, consistency, compatibility, informative feedback, explicitness, appropriate functionality, flexibility and control, error prevention and correction, user guidance and support, and system usability problems. The international Standard (ISO 13407, 1999) on *human-centered design process for interactive systems* defines four activities that take place during a system development project, including web site development. These four activities are, to understand and specify the context of use, to specify the user and organizational requirements, to produce design solutions, to evaluate design against requirements.

Difference between these activities and the engineering lifecycle proposed by Mayhew (1999) that, there is no focus on technical requirements; instead the focus is on user needs and requirements in combination with design options.

Web Site and Usability

Web sites and software applications have much in common, but they are different significantly. Firstly, software applications are designed to run independently on computer system. Each one can be designed with a unique interface and screen structure and they are used by program specialists. On the other hand web pages are not independent. They require the use of a browser program such as Netscape or Internet Explorer in order to be rendered and they are used by wide range of users (Pace, 2003). Nielsen (2000) asserts that “unlike stand-alone software programs where users must follow the procedures established by the designer, a web user have unparalleled user

freedom to go where they wish on Internet in a matter of seconds" (p.32). Because of the fact that web sites and software applications differ by means of target group and practice area, it is necessary to define web site usability specifically.

The field of web site usability focuses on addressing the fundamental question of how easy is it for the users to use the web site (Pegoraro, 2006). In other words, the concept of usability gives insight about understanding of the users' strategies to navigate, read, or seek information on the web, and uses this understanding to build the principles of good web site design (Shum and Mcknight, 1997).

Web site design experts define usability and assert components of it. Clapsaddle (2004) defines web site usability as "the amount of success a user experiences while interacting with a website". And adds "in other words, it is the extent to which a user can achieve the desired goal during a visit to a particular website".

Usability is relating to how well users can employ the web site in order to accomplish their goals. A usable web site is one that helps users to accomplish their tasks, and is governed by five different attributes: learnability, efficiency, memorability, errors, and satisfaction (Nielsen, 1993). Most research on web site usability has been directly or indirectly affected by these five attributes, either when evaluating the usability of web site or when investigating the relationship between user interaction and the usability of a site (Elshair, 2002).

Website design experts (Spool, Scanlon, Schroeder and Synder, 1999; Krug, 2000; Nielsen, 2000; Brinck, Gergle and Wood, 2002; Koyani, Bailey and Nall, 2004) proposed web site usability factors. Spool et al. (1999) asserted ease of use, readability, content quality, fun, productivity, completeness, and relevance. Nielsen (2000)

suggested navigation, response time, credibility, and content. Koyani et al. (2004) reviewed all relevant literature to compile a comprehensive list of web site usability guidelines. These guidelines cover the main topics related to web site usability: navigation, design, layout, accessibility, and graphics. Krug (2000) focused on how people interact with web sites and developed a list of usability guidelines based on three main areas: navigation, content, and page design.

There are variety of web site usability factors and guidelines. However, the studies summarized above have different scope and propose different sets of web site usability guidelines or components hence; there is no consensus on how to measure web site usability. Possible reasons for such differences are that web site usability factors have been developed by researchers from different disciplines and often had different goals e.g. increase consumer retention, satisfaction, loyalty, positive attitude, purchase intention, trust, or e-business success (Ferre, Juristo, Windl and Constantine, 2001).

Usability Evaluation Methods

Usability evaluation is a process of determining what problems the user may have in using the system. Area of HCI includes variety of techniques, methods, and practices, each applied at different points in the product development process (Rubin, 1994). Reviewing the major methods can be helpful to understand the concept comprehensively.

There are wide ranges of techniques that are used to evaluate usability of system/interface. Although all techniques aim same goal, detecting usability problems, they are employed at different stages of product development process. Rubin (1994) and

Ling (2005) proposed two analytical techniques which are outlined bellow. Rubin (1994) suggests a model consisting of ten different stages (p. 18-23).

Participatory Design: In this technique, one or more representative users take part in design team. Users' reactions, comments are used to ensure that the product meets their needs.

Focus Group Research: This technique is used to evaluate preliminary concepts by using representative users. It is employed at early stages of a project. Also, in some circumstances it is used to identify and verify the characteristics of the representative user. The objective is to identify how acceptable the concepts are and how they might be more acceptable.

Surveys: Surveys are applied to determine the preferences of users about an existing or potential product. It can use large sample to generalize to an entire population. Surveys can be employed at any time in the development process, but are often used in the early stages to better understand to potential user.

Design Walk-Through or Structured Walk-Through: Design walk-through is conducted to understand the strengths and weaknesses of product during the prototype stage of development. This technique is performed early in the development process to validate initial design decisions. Design walk-through is accomplished by testing series of screenshots that depict how the intended navigational structure and process flow could appear. Usually the designer responsible for his or her colleagues' guidance, while another team member records difficulties encountered in the tasks or concern of the team. In a structured walk-through, the participants take specific roles (e. g., moderator, recorder) and follow explicit guidelines to ensure the effectiveness of the effort.

Paper and Pencil Evaluation: In this technique users are shown aspects of a product on paper and asked questions about it. With paper and pencil evaluation critical information can be collected easily and inexpensively.

Expert Evaluation: In this technique, usability specialist or human factor specialist examine the product or system. Evaluators judge system compliance with accepted usability principles. Expert evaluation is difficult for a single individual to do because one person will never be able to find all of the usability problems in system. Therefore, it is appropriate to having multiple evaluators to improve effectiveness of the method.

Usability Audit: In this technique, product or system is evaluated by comparing its design against checklists of standards. The standards could be taken from the HCI research and literature.

Usability Testing: In usability test, empirical data is collected through observation of representative end users while using the product to perform representative tasks. Usability testing is divided into four types: 1. exploratory, 2. assessment, 3. validation, 4. comparison.

Field Studies: It is a review of a product or system that has been placed in its natural setting, such as an office, home, or other type of realistic environment, just before the release. This technique usually conducted very late in the development stage. The information that gathered by this technique is rarely used to make significant changes but it is very important for future release.

Follow-up Studies: This technique is similar to the field study but it occurs after formal release of the product. It is used for obtaining data for next release. It can employ

surveys, interviews and observations. Rubin asserts that “follow-up studies are probably the truest and most accurate appraisals of usability, since the actual user, product, and an environment are all in place and interacting with each other”.

With the development of usability studies, usability evaluation methods have increased. Different authors have asserted different dimensions to classify these methods into categories. Ling (2005) summarized the descriptions of usability evaluation methods and techniques and put them into seven categories. Ling’s list may be summarized as; analytic theory-based methods, expert evaluation methods, observational evaluation methods, survey evaluation methods, experimental evaluation methods, psycho-physiological measures of satisfaction or workload, and automatic testing.

Acceptance of Technology

Research studies paid attention to technology acceptance and worked on it intensively. Davis (1989) associated IT performance with technology acceptance: “information technology offers the potential for improving white collar performance. But performance gains are often obstructed by users’ unwillingness to accept and use available systems” (p. 319). End-users are often reluctant to use available new technology. Understanding why people resist using new technologies is important to develop methods for evaluating systems, predict how users will respond to them, and improve user acceptance by altering the nature of systems (Davis, Bagozzi and Warshaw, 1989).

Researches that examine why people accept or reject computers have been the most challenging studies in information system research. Researchers have studied impact of users' internal beliefs and attitudes on their usage behavior and how these internal beliefs and attitudes are influenced by different external factors. Numerous individual, organizational, and technological variables have been investigated such as technical design of system, user involvement in system development, the type of system development process used, the nature of implementation process and cognitive style (Davis et al., 1989). To address this issue, various theoretical perspectives (e.g. Technology Acceptance Model, Theory of Reasoned Action, and Innovation Diffusion Theory) have been proposed.

The Technology Acceptance Model (TAM) advocated by Davis (1989) is widely accepted and proven to explain much of the variance in users' behavioral intention related to IT adoption and usage across a wide variety of contexts (Thong, Hong, and Tam, 2006). TAM is preferred over alternative models in various user contexts. In addition, substantial theoretical and empirical support has accumulated in favor of TAM, compared to alternative models such as the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (Venkatesh and Davis, 2000).

Technology Acceptance Model

Davis (1989) developed Technology Acceptance Model (TAM) which is an adoption of Theory of Reasoned Action (TRA) in order to explain computer usage behavior. Davis et al. (1989) explain goal of TAM as; "to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at

the same time being both parsimonious and theoretically justified" (p. 985). Providing a basis for finding the impact of external factors on internal beliefs, attitudes, and intention is the main purpose of TAM. TAM uses TRA as a theoretical base for identifying the casual relation between two key beliefs: perceived usefulness (PU) and perceived ease of use (PEOU), and users' attitudes, intentions and actual computer adoption behavior (Davis et al., 1989).

Davis (1989) asserts that previous research suggests two important determinants among several variables that may influence system usage. First, people tend to use an application to the extent they believe it will help to perform their job better. Davis refers to this first variable as perceived usefulness (PU). Second, although potential users think that given application is useful, they may also think the systems is too hard to use and the performance benefits of usage does not compensate the effort of using the application. That is perceived ease of use (PEOU) (p. 320). TAM is represented as in Figure 1.

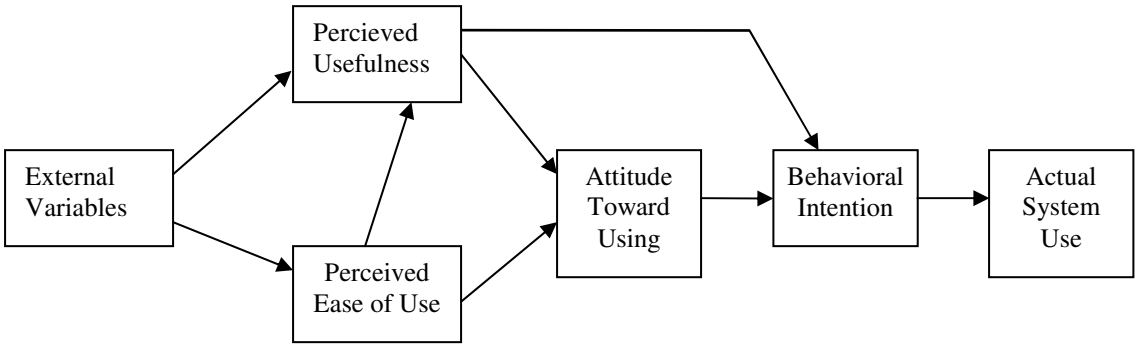

Fig. 1 Technology Acceptance Model, Davis (1989)

It is necessary to define core variables of TAM again;

Perceived usefulness (PU) is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989).

Perceived ease-of-use (PEOU) refers to "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989).

Davis used definition of these variables to develop scale items. He pretested a multi-item measurement scale for content validity and tested for reliability and construct validity in two separate empirical studies involving a total of 152 users and four application programs. The measures were refined and streamlined, resulting in two six-item scales. The reliability of usefulness was .98, and the reliability of ease of use was .94. The scales showed high convergent, discriminant, and factoral validity. Perceived usefulness was significantly correlated with both self reported current usage (r=.63, study 1) and self-predicted future usage (r=.85, study 2). Perceived ease of use was also significantly correlated with current usage (r=.45, study 1) and future usage (r=.59, study 2). In both studies, usefulness had significantly greater correlation with usage behavior than did ease of use. Regression analyses suggest that perceived ease of use may actually be a causal antecedent to perceived usefulness.

Researchers have simplified TAM by removing the attitude construct found in TRA from the current specification (Venkatesh, Morris, Davis and Davis, 2003). Attempts to extend TAM have generally taken one of three approaches: (1) by introducing factors from related models, (2) by introducing additional or alternative belief factors, and (3) by examining antecedents and moderators of perceived usefulness and perceived ease of use (Wixom and Todd, 2005).

Several researchers have replicated Davis's original study (1989) with the aim of providing empirical evidence on the relationships between usefulness, ease of use and system use (Adams, Nelson and Todd, 1992; Hendrickson, Massey and Cronan, 1993; Segars and Grover, 1993; Subramanian, 1994; Szajna, 1994). Researchers have focused on testing the robustness and validity of the questionnaire instrument developed by Davis.

Adams et al. (1992) replicated Davis' work (1989) to demonstrate the validity and reliability of his measurement scales. They extended it to different settings and, used two different samples. They demonstrated the internal consistency and replication reliability of the two scales. Hendrickson et al (1993) found high test-retest reliability. Szajna (1994) found the instrument had predictive validity for intent to use, self-reported usage and attitude toward use. Most of research has confirmed the validity of the Davis' instrument, and to support its use with different populations of users and different software choices.

Segars and Grover (1993) examined Adams et al.'s (1992) replication. They were critical of the model of measurement, and claimed different model based on three constructs: usefulness, effectiveness, and ease-of-use. These findings have not been replicated.

For explaining perceived usefulness and usage intentions in terms of social influence and cognitive processes, Venkatesh and Davis (2000) extended the TAM. The extended model (TAM2) was tested in both voluntary and mandatory settings. The results strongly supported TAM2. Three years later, Venkatesh et al. (2003) formulated the Unified Theory of Acceptance and Use of Technology (UTAUT) to integrate the

main competing user acceptance models. This model was found to outperform each of the individual models.

Studies on Evaluation of Web Sites

Pace (2003) analyzed web sites of election campaign during the fall 2002 election in US. She asserted that when communicating through a web site, usability increases user engagement and positive attitude toward communicator so web site produced by politicians should be design with maximum usability. Content analysis of campaign web sites revealed that the level of usability of US Senatorial, Congressional and state campaign sites was moderate to poor. Significant correlation was found between increased usability and an increase in candidate's percentage of the vote also few differences were found between groups based on party and gender. Pace found some differences in usability based on region and incumbency.

Baker (2004) examined e-government web site usability of the 30 most populous counties nationally in US. He investigated the following questions: (1) are there some common user service variables that enhance users' abilities to benefit from e-government? (2) are there variations in these variables across the most populous counties? (3) are the most populous counties making efforts to bridge the other digital divide, or web site usability? (4) may some of the most populous counties serve as benchmarks for other counties to emulate? In his study usability was taken as aggregate measurement of discrete variables of manifest web site content. For determining common variables from existing e-government studies triangulation was used. He collected data through an online content analysis and recorded assessment of variables

dichotomously or by using constructed scales. To organize and analyze the data benchmarks were derived by using a composite usability index with equally weighted dimensions. Results of Baker's study indicated that six usability dimensions (online services, user-help, navigation, legitimacy, information architecture, and accessibility accommodations) enhance users' abilities to benefit from e-government. They were comprised of 37 discrete, common variables with variations across counties. Also, the most populous counties were making efforts to address web site usability although some counties are more successful than others.

In their study Hasan and Ahmed (2002) examined the effects of two interface styles (menu and command based) on the perceived ease of use, perceived usefulness, and behavioral intention of the user for using the system. System interface style was treated as an external factor for TAM to examine its direct and indirect effects on behavioral intention to acceptance of system. The results showed that the interface style had direct effects on perceived ease of use and perceived usefulness also it had significant effects on behavioral intention to use the system. They added that the results showed that perceptions of the menu-based interface were more favorable than perceptions of the command-based interface.

Henderson and Divett (2003) conducted research to test the applicability of the Technology Acceptance Model within an electronic commerce setting. They examined the relationship between perceived ease of use, perceived usefulness and three electronically recorded indicators of use within the context of an electronic supermarket. In this study, 247 participants completed the attitudinal measures. They recorded electronically indicators of use in the form of deliveries, purchase value and number of

log-ons to the system for the month the participants completed the questionnaire and 6 further months. They found that the Technology Acceptance Model could be successfully applied to a supermarket setting, providing empirical support for the ability of the Technology Acceptance Model to predict actual behavior. They claimed that the Technology Acceptance Model give explanation up to 15% of variance in the behavioral indicators through perceived ease of use and usefulness of the system. They also argued that the perceived ease of use of the system did not uniquely contribute to the prediction of behavior when usefulness was considered, indicating a mediation effect.

Lee, Kang and Kim (2007) examined web-based negotiation support systems from a user acceptance perspective by utilizing TAM. Influence of three constructs embedded in web-based negotiation support systems was explored. These constructs were playfulness, causality and subjective norm. Data were gathered through 174 valid questionnaires. Results showed that users consider web-based negotiation support systems' user interface more favorably when embedded with the three constructs.

Lederer et al. (2000) investigated TAM for work related tasks with the web sites. Data was gathered from 163 subjects through e-mail survey about web site they access often in their jobs. Results supported TAM and demonstrated that ease of understanding and ease of finding predict ease of use and information quality predicts usefulness for revisited web sites.

In his study, Heijden (2000) empirically investigated an extension of the Technology Acceptance Model to explain the individual acceptance and usage of a website. The study extended TAM with two web site construct: perceived entertainment value and perceived presentation attractiveness. A Dutch portal site was partnered to

validate their model. In the study, an online survey offered to every 20th subscriber that entered the portal. 887 subscribers responded on the online survey. The test result indicated that Entertainment Value is an equal partner to Usefulness, enjoying equally high or higher correlations with Website Usage and Ease of Use does not seem to influence Website Usage directly, but indirectly through Usefulness. Similarly, Attractiveness does not appear to influence Website Usage directly, but indirectly through Entertainment value.

Liaw and Huang (2003) developed and examined an individual attitude model for search engines that used for retrieving information. Their model included computer experience and perceptions. Also, in order to understand individual attitudes toward search engines their model combined perception theories such as TAM and motivation. The results indicated that computer experience, quality of search systems, motivation, and perceptions of technology acceptance were key factors that affect individual feelings to use search engines.

Thong, Hong and Tam (2002) conducted a research to investigate user acceptance of digital libraries by using the technology acceptance model. They identified three system interface characteristics, three organizational context variables and three individual differences as critical external variables which they claimed have effect on adoption intention through perceived ease of use and perceived usefulness of the digital library. Participants of the study are 397 users of an award –winning digital library. The results showed that both perceived ease of use and perceived usefulness are indicators of user acceptance of digital libraries. Furthermore, individual differences and interface characteristics had an effect on perceived ease of use, whereas organizational

context had effect on both perceived ease of use and perceived usefulness of digital library.

Ong and Lai (2006) explored gender differences in perceptions and relationships among dominants affecting e-learning acceptance. They conducted a survey with 67 female and 89 male employees taken from six international companies at the Hsin-Chu Science-based Industrial Park in Taiwan. Results showed that men's rating of computer self-efficacy, perceived usefulness, perceived ease of use, and behavioral intention to use e-learning are all higher than women's. Also they founded that women were more strongly influenced by perceptions of computer self-efficacy and ease of use while men's usage decisions were more significantly influenced by their perception of usefulness of e-learning.

Simon (2001) explored the perception and satisfaction levels of 160 subjects on four web sites by using adapted version of Hofstede's dimensions as a means of differentiation. Both graduate and undergraduate students from public university enrolled in study. The subjects randomly viewed four different web sites (Reebok Shoes, British Airways, CapEx Investments and Godiva Chocolates) in computer laboratory. After moving around each web site, subjects completed questionnaires that measure their perception and satisfaction with web sites. Results indicated that perception and satisfaction differences exist between the cultural clusters and gender groups within those cultures; Asia, Europe, Latin & South America, and North America. Perceptions of the Asian and Latin & South American were found to be similar also perceptions of the Europeans and North Americans were similar. Quantitative analysis indicated that

females within certain cultures have widely different preferences from their male counterparts regarding web site attributes.

The aim of Kressig and Echt's (2002) study was to find out if older adults are able and willing to interact with a computerized exercise promotion interface and determine to what extend they accept computer-generated exercise recommendations. 34 college-educated volunteers, equal numbers of men and women, ranging in age from 60-87, enrolled in this study. Time and request for assistance were recorded while participants interfaced with a health promotion tool. Participants rated the computerized exercise promotion tool's ease of use and the acceptability of the exercise recommendations. Their result indicated that on average, participants completed items on computer in 33 min and each participant made 3 requests for assistance, of which only 22% were mouse related. Ratings of the system's ease of use and the exercise prescription acceptability were high. Result indicated no relation between the system's ease of use and prior experience with computers

The literature studies show that usability components are critical for different user groups of web sites and other systems. As the e-government facilities increase in number and they are supposed to be used by millions whose properties change widely, e-government services must be usable enough.

III. METHOD

This study examined both usability and acceptance of web sites of Turkish Social Security Institutions, utilizing usability evaluation method. The participants were adults who are employee or retired and are members of the social security institutions (*Emekli Sandığı, SSK* and *Bağ-Kur*). Instruments used in this study were Usability Test developed by the researcher, Technology Acceptance Tool adapted from original form which is developed by Davis (1989), After Scenario Questionnaire adapted from original form developed by Lewis (1991), Observation Form developed by the researcher and Demographic Information and Computer Experience form. The study was conducted with each participant individually. The data from the surveys were analyzed by non-parametric tests because data did not show normal distribution. Details about sample, procedure, measures, data collection and analyses are provided in this chapter.

Participants

The population of the study is adults who are employee or retired and member of one of three social security institutions (*Emekli Sandığı, SSK,* and *Bağ-Kur*). The sample of the study consisted of forty-five adults whose ages, occupations and computer skills were varied. Because a heterogeneous group of e-government facility users were aimed to be covered in the study sample, subjects were selected by using convenient sampling technique. Fifteen participants were selected for each social security institutions web site usability study. Twenty-one of participants are female and twenty-four of them are male. Ages of subjects ranged from twenty-one to sixty-two. Classification of subjects in computer skills is based on the self rated questions in the demographic information and

computer experience form. The participants' education levels ranged from primary school to doctorate degree. Demographic characteristics of participants are given in Table 1.

Table 1. Demographic Characteristics of Participants

Characteristics		n	%
Gender	Female	21	46.7
	Male	24	53.3
Age	21-25	3	6.7
	26-30	13	28.9
	31-40	11	24.4
	41-50	13	28.9
	51-60	4	8.9
	61-62	1	2.2
Education	primary to high school	22	48.9
	vocational school to doctorate	23	51.1
Working status	Employee	39	86.7
	Retired	6	13.3

Design and Procedure

This study examines interaction between usability and acceptance of web sites of social security institutions, utilizing usability evaluation method. Variables of the study are given in Figure 2. Dependent variables of the study are PU and PEOU while independent variables of the study are Learnability, Efficiency, Satisfaction, Error and Task Specific Usability, and demographic characteristics of participants.

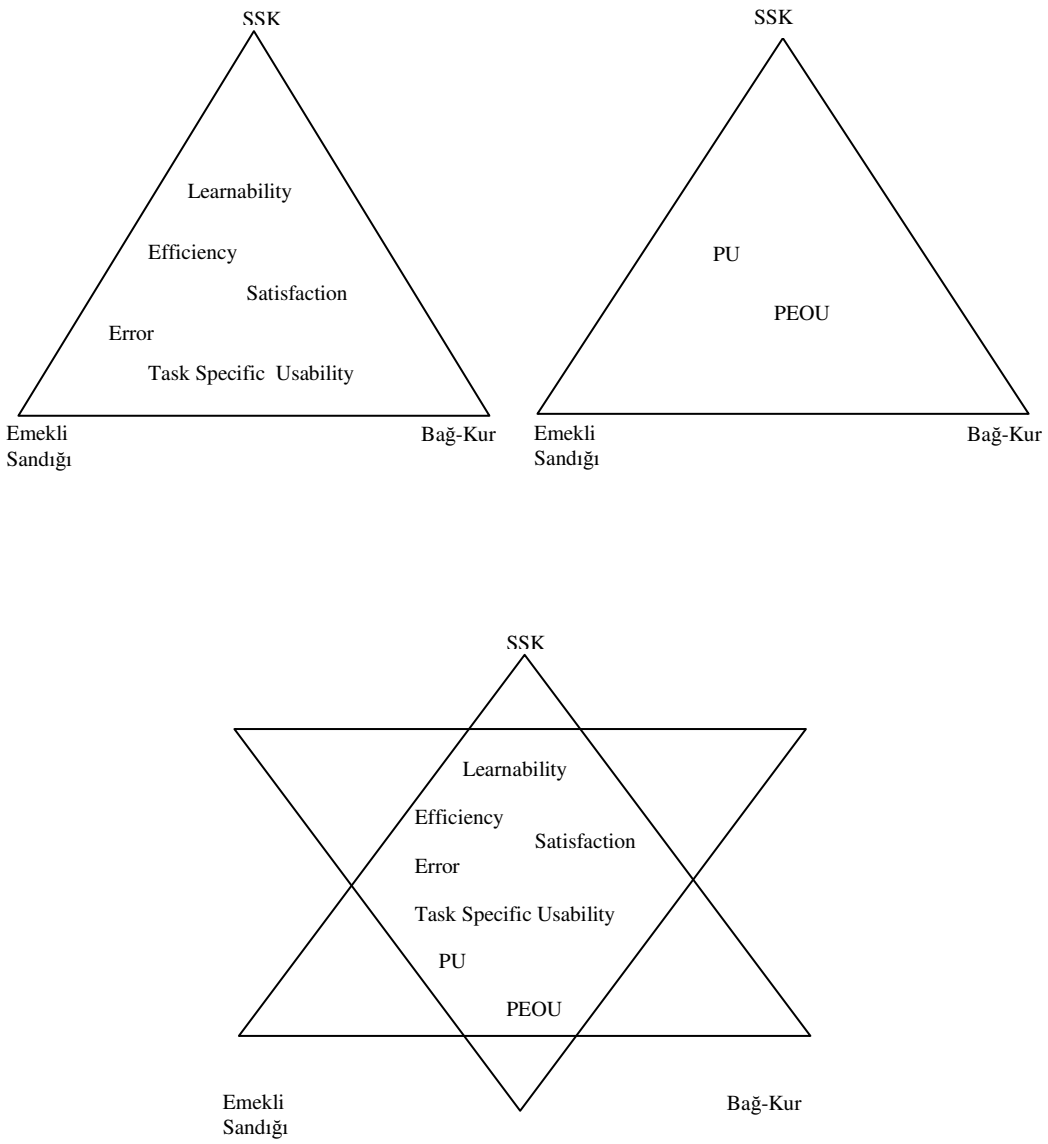

Fig. 2 Study Variables

The usability study was conducted with each participant individually. At the beginning of the session aim of the research and procedure were explained to the participants in detail. Study consisted of two sections. In first section participants were

given twenty minutes to move around web site of social security institution. All participants were given exactly the same amount of time in this session. In that period, they were free to do anything on the e-government web site. In second section, participants were asked to complete four tasks. These tasks were: (1) downloading petition form, (2) viewing employment record, (3) finding information about regulations, (4) viewing retirement payment (for retired); calculating when to be retired (for employee). There was no time limitation in that section, participants were allowed to finish the tasks in how much time they needed. Also they were free to skip whichever task they had a problem. During the second section, the researcher filled an observation form which included performance data of the participants. In both sections the participants were asked to think aloud. All of their operations on the computer and voices were recorded with the help of Camtasia ScreenCapture Software. They were not allowed to run any other computer program or visit any other web site. The researcher did not interfere the session and did not help the participants by answering questions related with the tasks. After completion of the tasks, the participants were given the instruments. Thirty five participants studied the web sites at the researcher's home and ten participants studied the web sites at their own offices because of convenience.

Instruments

In order to evaluate usability of the web sites a Usability Test developed by the researcher was used. For measuring users' acceptance of web site of social security institution, Technology Acceptance Tool (developed by Davis, 1981) was adapted by the researcher. With the purpose of evaluating task specific usability of web sites, After

Scenario Questionnaire (developed by Lewis, 1991) was adapted by the researcher was used. The Observation Form developed by the researcher was used to record the participants' operations on web sites. Finally, a Demographic Information and Computer Experience Form was used to gather information about the participants' personal information and computer usage.

Usability Test

In order to examine the usability features of web site of Turkish Social Security Institutions, a comprehensive usability measurement tool is needed. As there was no such tool during the study in Turkish, the researcher developed and pilot tested a web site usability test, for which the following procedure was realized.

To form a web site usability test, conceptual framework of usability is studied and suggested principles (Norman, 2003; Dix et al., 1993) were first outlined as learnabiliy, efficiency, satisfaction, and errors. Since memorability can not be evaluated in one session this component were not included in the usability test. Then other widely used (but in different languages) usability tests were inspected. First form of usability test contained items selected among different well known usability tests items according to their appropriateness for web sites and usability principles accepted in this study. These usability tests are SUMI (Kirakowski, 1993), Usability Test of American Institutes for Research (Hass, Jakobs and Tu, 2003), and BU-LCMS Usability test (Akpınar, Bal, Erkunt, and Şimşek, 2002). Items were then translated into Turkish by the researcher and this translation was reviewed by two bilingual English teachers. The test (See Appendix H) consisted of 71 Likert type items and its five point key is as follows: (1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly agree. 37 of the

items include “learnability” related statements, 7 of the items include “efficiency” related statements, 9 of the items include “errors” related statements, 9 of the items include “satisfaction” related statements and 9 of the items include statements about reliability and actuality of website. Some items measured the same trait in the test, but since the data analysis will reveal information about item performances, the poor items may be eliminated in the final form.

The pilot sample of the web site usability test development was drawn from two Turkish Universities and some adults who may potentially use e-government facilities. A convenient sampling technique was used to find groups of people who would study web-site-visiting tasks and answer a pilot study test. A total of ninety participants, eighty university students and ten adults, constituted the sample for this part of the study. Students were drawn from education departments of Bahçeşehir University and Bogazici University. The Adults were selected according to their education level, occupation and age. Table 2 shows a detailed description of the pilot study sample.

Table 2. Description of the Pilot Study Sample

University students	Department	Class	N
Bahçeşehir Univ.	Computer Education And Educational Technology	1-4	37
Boğaziçi Univ.	Computer Education And Educational Technology	2-3	18
	Different education departments	3	25
Adults			
Education level	Age		N
University	27-35		3
High School	27-38		3
Elementary School	32-57		4
			Total 90

Following test development, a web site with interactive features and services was selected. Turkcell which is a communication company with wide range of consumer had such a website. Turkcell's web site was used for testing first form of usability questionnaire. Each participant was given thirty minutes for moving around the web site. After studying the web site, five tasks were given to participants to complete in fifthteen minutes. These tasks were: (1) finding details of DestekCell plan, (2) finding if Turkcell has translation services, (3) finding how to get information about weather report, (4) finding how to activate mobile phone for international roaming, (5) downloading form for subscriber's meter for HazırKart plan. After completion of the tasks, the participants were given the usability questionnaire.

For Bahçeşehir University student group, the study was conducted in a computer laboratory with thirty computers. All classes took part in the study, and their lesson hours were used. Test procedure was applied to students at the same time. For Boğaziçi University students group, study was conducted in a computer laboratory with twenty computers. Three different classes were used for the study, and their lesson hours were used. Procedure was administered students at the same time. The adult group was studied individually at the researcher's home. Requirements of this application were Internet connection and web browser program, and computers used in study had these.

To investigate item behaviors of the usability test, a series of statistical tests were conducted. First, factor analysis using the principal factors method with varimax rotations used to investigate the factor compositions of the usability test. Varimax rotated, factors that have eigenvalue over 2.30 were taken into consideration and items

that have factor loading over .40 were selected. Results of factor analysis are displayed in Table 3.

Table 3. Factor Analysis for the Pilot Test Development Studies

Factor I (Learnability)		Factor II (Satisfaction)		Factor III (Errors)		Factor IV (Efficiency)	
Item	Factor Loading	Item	Factor Loading	Item	Factor Loading	Item	Factor Loading
It17	,682	It41	,727	It52	,724	It25	,823
It13	,639	It43	,632	It51	,712	It26	,668
It34	,617	It61	,625	It48	,665	It11	,542
It33	,602	It60	,611	It50	,652	It20	,537
It14	,586	It53	,546	It47	,562	It15	,498
It35	,565	It56	,514	It23	,524	It27	,468
It19	,555	It42	,508	It49	,518	It32	,443
It22	,555	It58	,476	It55	,502	It31	,428
It36	,518	It6	,476	It44	,484		
It24	,511	It57	,449	It1	,448		
It2	,482			It54	,444		
It3	,479						
It39	,460						
It28	,452						
It38	,428						
It71	,417						
Eigenvalue 13,858		Eigenvalue 3,197		Eigenvalue 2,732		Eigenvalue 2,339	
% of Variance 14,240		% of Variance 11,187		% of Variance 0,021		% of Variance 9,708	
Cumulative % 14,240		Cumulative % 25,427		Cumulative % 5,448		Cumulative % 45,156	

As seen from Table 3, Factors I, II, III, and IV have sixteen, ten, eleven, and eight items respectively. Most items constituting Factor I come from learnability subscale. Items under Factor II come from satisfaction subscale. Factor III contains errors items. Items constituting Factor IV come from efficiency subscale. Twenty-six items were dropped from the questionnaire because of their low level of factor loadings.

The internal consistency of the usability questionnaire was determined by alpha coefficients. The alpha coefficients for the final form of the test which include fourty-five items and subtests were calculated. The alpha coefficient for the total test is 0.94. The highest alpha was found as 0.90 in "Learnability" subtest, followed by "Errors" subtest that has 0.85 alpha. For "Satisfaction" subtest alpha coefficient is 0.83 and finally "Efficiency" subtest has 0.80 alpha correlation coefficient. Table 4 shows the scores of alpha coefficient for the test and subtest. Item-remainder correlations were also computed for each subscale (See Appendix I).

Table 4. Alpha Coefficients for the Final Form of Usability Test and its Subscales

Name of Subscale	Cronbach's Alpha Based on Standardized Items	Number of Items
Learnability	,90	16
Satisfaction	,83	10
Errors	,85	11
Efficiency	,80	8
Usability test total	,94	45

The test (See Appendix D) consisted of fouty-five Likert type items. According to factor analysis results, Likert-type questions can be grouped in four categories. Sixteen of the items include "learnability" related statements, ten of the items include "satisfaction" related statements, eleven of the items include "errors" related statements, eight of the items include "efficiency" related statements.

Technology Acceptance Tool

The participants' perceptions about usefulness and ease of use of web sites of social security institutions were measured by Technology Acceptance Tool (TAT). TAT

has two subscales which are perceived usefulness and perceived ease of use, and both subscales have six items. Reliability of the scale is summarized bellow;

Table 5. Alpha Coefficients for Original TAT (Davis,1989)

	Reliability	Correlation with self-reported current usage	Correlation with self-predicted future usage
PEOU	.94	.45	.59
PU	.98	.63	.85

In this study, TAT was translated into Turkish by the researcher and this translation was reviewed by two bilingual English teachers. Since original form of TAT (see Appendix G) is so general, items were adapted to context of web sites of social security institutions. During this process, two items were dropped from perceived usefulness subscale. Because translation-back translation process revealed that these items could not applied context of web sites of social security institutions. Final form of Technology Acceptance Tool (See Appendix C) consisted of two subscales and ten Likert type items. Its key is as follows: (1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly agree.

After-Scenario Questionnaire

To assess user satisfaction during participation in scenario-based usability studies, after-scenario questionnaire (See Appendix F) was developed by Lewis (1991). It is administered after each scenario or task. Lewis selected three items regarding hypothesized components of usability: ease of task completion, time required to complete tasks, and satisfaction with support information would influence user's perception of system usability.

Lewis used three-item after-scenario questionnaire (ASQ) in three related usability tests. The studies had eight scenarios in common. After scenarios were finished, the participants completed ASQ. Factor analysis of the items revealed that an eight-factor solution explained 94 percent of the variability of the 24 (eight scenarios by three items per scenario) items. The varimax-rotated factor pattern showed that these eight factors were clearly associated with the eight scenarios.

The reliabilities of the scales created by summing the three items into scenario scales were assessed with coefficient alpha. All the coefficient alphas exceeded .90, indicating that the scales are acceptably reliable. Further, Lewis conducted ANOVA on the scale scores. There were 48 participants in the study but only 27 participants completed all the items in the ASQ. Only these 27 data were used in the ANOVA. The main effect of Scenario was highly significant. These results suggest that the ASQ scale score was a reasonably sensitive measure.

ASQ was translated into Turkish by the researcher and this translation was controlled by two bilingual English teachers. Its items adapted to tasks of current study. Final form of ASQ (See Appendix B) consists of fifteen Likert type items (three items per five tasks). Its key is as follows: (1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly agree. Tasks were named as Task 1, Task 2, Task 3, Task 4 for retired, and Task 4 for employee.

Observation Form

An observation form (See Appendix E) developed by the researcher was used in the study to record participants performances while they were completing the tasks. It includes information about time to finish the task, time to recover from error, ratio of

duration of reading versus doing task, number of errors, frequency of asking for help, number of steps and procedures that could not be done, and finally problems that users encounter with in a task.

Demographic Information and Computer Experience Form

Demographic information and computer experience was collected by a form (see Appendix A) developed by the researcher, which consists of questions related to participants' ages, gender, occupations, educational levels, social security institutions, working status, duration and frequency of computer and Internet usage, computer and Internet applications they used and their frequency of usage.

Data Analysis

Firstly descriptive statistics such as standard deviation and mean values are given. After analyzing the data it is decided to use non-parametric tests, because Skewness and Kurtosis tests showed that the data do not have normal distribution. For research questions addressing relations between variables, Spearman rank correlation coefficient was calculated. For research questions which examine difference between variables, Mann-Whitney U and Kruskal-Wallis tests were conducted.

IV. RESULTS

The results of the study are presented in four parts as follows: (1) reliability of the study instruments, (2) descriptive statistics of the study variables, (3) results of the research questions, (4) results of the data that obtained through observation form.

Reliability Estimates for the Study Instruments

Usability Test

After implementing the Usability test to the study participants, reliability coefficients for all subscales were calculated for the participants and for the groups of three social security institutions separately. The results of reliability analysis is given in Table 6.

Table 6. Alpha Coefficients for Usability Test and its Subscales

Usability	Cronbach's Alpha	N of Items
ALL	.96	45
SSK	.95	45
Emekli Sandığı	.96	45
Bag-kur	.96	45
Learnability		
ALL	.93	16
SSK	.93	16
Emekli Sandığı	.92	16
Bag-kur	.94	16
Satisfaction		
ALL	.86	10
SSK	.86	10
Emekli Sandığı	.91	10
Bag-kur	.73	10
Errors		
ALL	.85	11
SSK	.82	11
Emekli Sandığı	.89	11
Bag-kur	.85	11

Table 6 continued. Alpha Coefficients for Usability Test and its Subscales

Efficiency	Cronbach's Alpha	N of Items
ALL	.84	8
SSK	.85	8
Emekli Sandığı	.73	8
Bag-kur	.93	8

Technology Acceptance Tool

After implementing TAT to the study participants, a reliability coefficient was calculated for the participants and for the groups of social security institutions separately. The results of reliability analysis can be seen in Table 7.

Table 7. Alpha Coefficients for Final Form of TAT

PU	Cronbach's Alpha	N of Items
ALL	.91	4
SSK	.96	4
Emekli Sandığı	.89	4
Bag-kur	.75	4
PEOU	Cronbach's Alpha	N of Items
ALL	.94	6
SSK	.96	6
Emekli Sandığı	.91	6
Bag-kur	.93	6

After Scenario Questionnaire

After implementing ASQ to the study participants, a reliability coefficient was calculated for the participants and for the groups of social security institutions separately. The results of reliability analysis is given in Table 8.

Table 8. Alpha Coefficients for ASQ for All Tasks

ASQ tasks	Cronbach's Alpha	N of Items
Task 1		
ALL	.81	3
SSK	.84	3
Emekli Sandığı	.84	3
Bag-kur	.76	3
Task 2		
ALL	.90	3
SSK	.96	3
Emekli Sandığı	.90	3
Bag-kur	.80	3
Task 3		
ALL	.83	3
SSK	.87	3
Emekli Sandığı	.68	3
Bag-kur	.91	3
Task 4 for retired		
ALL	.87	3
Task 4 for employee		
ALL	.90	3
SSK	.93	3
Emekli Sandığı	.85	3
Bag-kur	.93	3

Descriptive Results of the Study Instruments

The mean scores and standard deviations of the participants from the measures of Usability (subscales: Learnability, Satisfaction, Errors, Efficiency), Perceived Usefulness (PU), Perceived Ease of Use (PEOU), After Scenario Questionnaire (ASQ)

for four tasks (ASQ Task 1, ASQ Task 2, ASQ Task 3, ASQ Task 4 for retired, ASQ Task 4 for employee) were estimated (See Appendix J). According to the results, the total mean score of the Usability for all participants is 148.47 and for *SSK*, *Emekli Sandığı* and *Bağ-Kur* were 147.33; 145.20 and 152.87, respectively. Also the minimum score of Usability is 106 whereas the maximum is 215. The total mean score of the Learnability for all participants is 54.87 and for *SSK, Emekli Sandığı* and *Bağ-Kur* are 54.40; 53.67 and 56.53, respectively. Also the minimum score of Learnability is 36 whereas the maximum is 78. The total mean score of the Satisfaction for all participants is 34.64 and for *SSK*, *Emekli Sandığı* and *Bağ-Kur* are 34.53; 33.87 and 35.53, respectively. Also the minimum score of Satisfaction is 23 whereas the maximum is 50. The total mean score of the Errors for all participants is 34.60 and for *SSK*, *Emekli Sandığı* and *Bağ-Kur* are 34.87; 33.13 and 35.80, respectively. Also the minimum score of Errors is 24 whereas the maximum is 51. The total mean score of the Efficiency for all participants is 24.36 and for *SSK, Emekli Sandığı* and *Bağ-Kur* are 23.53; 24.53 and 25.00, respectively. Also the minimum score of Efficiency is 13 whereas the maximum is 36.

The total mean score of the PU for all participants is 16.09 and for *SSK, Emekli Sandığı* and *Bağ-Kur* are 16.27; 15.73 and 16.27, respectively. Also the minimum score of PU is 8 whereas the maximum is 20. The total mean score of the PEOU for all participants is 22.58 and for *SSK, Emekli Sandığı* and *Bağ-Kur* are 21.27; 23.67 and 22.80, respectively. Also the minimum score of PEOU is 12 whereas the maximum is 30.

The total mean score of the ASQ Task 1 for all participants is 11.38 and for *SSK, Emekli Sandığı* and *Bağ-Kur* are 12.20; 11.00 and 10.93, respectively. Also the

minimum score of ASQ Task 1 is 3 whereas the maximum is 15. The total mean score of the ASQ Task 2 for all participants is 10.60 and for SSK, Emekli Sandığı and Bağ-Kur are 11.33; 9.67 and 10.80, respectively. Also the minimum score of ASQ Task 2 is 4 whereas the maximum is 15. The total mean score of the ASQ Task 3 for all participants is 10.22 and for *SSK, Emekli Sandığı* and *Bağ-Kur* are 9.53; 10.53 and 10.60, respectively. Also the minimum score of ASQ Task 3 is 5 whereas the maximum is 15. The total mean score of the ASQ Task 4 for retired for all participants is 10.33 and for *SSK, Emekli Sandığı* and *Bağ-Kur* are 6.00; 13.67 and 7.50, respectively. Also the minimum score of ASQ Task 4 for retired is 6 whereas the maximum is 15. The total mean score of the ASQ Task 4 for employee for all participants is 11.00 and for *SSK, Emekli Sandığı* and *Bağ-Kur* are 11.36; 10.50 and 11.08, respectively. Also the minimum score of ASQ Task 4 for employee is 3 whereas the maximum is 15.

Results of Research Questions

RQ1: Is there any significant relationship between Usability properties (Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability) of web sites of Social Security Institutions and their users' acceptance (PU, PEOU)?

The aim of the first research question is to investigate the relationships among study variables. For this purpose, Spearman's rho correlations coefficient among all variables were estimated. Significant positive relations were found between;

- Usability and PU ($r=.53$, $p<.01$)
- Learnability and PU ($r=.52$, $p<.01$)
- Efficiency and PU ($r=.39$, $p<.01$)

- Satisfaction and PU (r=.64, p<.01)
- Errors and PU (r=.37, p<.05)
- ASQ Task 1 and PU (r=.60, p<.01)
- ASQ Task 2 and PU (r=.49, p<.01)
- ASQ Task 3 and PU (r=.32, p<.05)
- ASQ Task 4 for employee and PU (r=.43, p<.01)

In addition to above finding, also significant positive relations were found between;

- Usability and PEOU (r=.73, p<.01)
- Learnability and PEOU (r=.75, p<.01)
- Efficiency and PEOU (r=.63, p<.01)
- Satisfaction and PEOU (r=.59, p<.01)
- Errors and PEOU (r=.55, p<.01)
- ASQ Task 1 and PEOU (r=.68, p<.01)
- ASQ Task 2 and PEOU (r=.58, p<.01)
- ASQ Task 3 and PEOU (r=.56, p<.01)
- ASQ Task 4 for employee and PEOU (r=.56, p<.01)

Since there are only 6 retired participants in the study, correlations for ASQ Task 4 for retired participants was not calculated. Finally a significant positive relationship was found between PU and PEOU (r=.61, p<.01). The correlations among study variables based on social security institutions is given in Table 9.

Tablo 9. Correlations among Study Variables

	ALL		SSK		Emekli Sandığı		Bag-kur	
	PU	PEUO	PU	PEUO	PU	PEUO	PU	PEUO
N	45	45	15	15	15	15	15	15
PU	1.00	.61**	1.00	.79**	1.00	.69**	1.00	.44
PEUO	.61**	1.00	.79**	1.00	.69**	1.00	.44	1.00
Learnability	.52**	.75**	.67**	.82**	.54*	.67**	.42	.72**
Satisfaction	.64**	.59**	.70**	.62*	.67**	.63*	.44	.51
Errors	.37*	.55**	.23	.46	.48	.63*	.26	.63*
Efficiency	.39**	.63**	.57*	.73**	.58*	.62*	.09	.62*
Usability	.53**	.73**	.65**	.80**	.68**	.70**	.38	.81**
ASQ task1	.60**	.68**	.62*	.79**	.74**	.64*	.39	.76**
ASQ task2	.49**	.58**	.57*	.64*	.43	.59*	.33	.76**
ASQ task3	.32*	.56**	.16	.45	.69**	.63*	.08	.58*
N	39	39	14	14	12	12	13	13
ASQ task4 employee	.43**	.56**	.43	.53	.51	.44	.39	.58*

*p<.05. **p<.01

RQ2: Is there any significant difference among web sites of Social Security Institutions in terms of Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU?

The aim of the second research question is to investigate the difference among web sites of social security institutions in terms of study variables. Kruskal-Wallis test was conducted (Table 10) for analyzing differences among social security institutions web sites. The results showed that there is no significant difference among web sites of

social security institutions in terms of Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability (ASQ), PU and PEOU.

Tablo 10 Effect of Web Sites of SSI on the Study Variables Kruskal-Wallis Test

	Learn.	Satis.	Err.	Eff.	Usa.	PU	PEOU	ASQ task1	ASQ task2	ASQ task3	ASQ task4_e
Chi-Square	.90	.60	2.06	.82	.98	.95	.95	2.07	1.69	1.41	.15
Df	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	.64	.74	.36	.66	.61	.62	.62	.36	.43	.50	.93

RQ3. Is there any significant difference between Usability and User Acceptance in terms of participants' demographic characteristics?

RQ3.a. Is there any significant difference between Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of participants' education levels?

Mann-Whitney U test was conducted for answering this research question. The results (Table 11) showed that there is a significant difference between ASQ Task 1 scores (U: 164.00, $p<.05$) of the participants in terms of education levels. ASQ Task 1 scores of the participants whose education level between vocational school to doctorate are significantly higher than the participants whose education level between primary school to high school.

Table 11. Effect of Education Level on Study Variables Mann-Whitney Test

	Learn.	Satis.	Err.	Eff.	Usa.	PU	PEUO	ASQ task1	ASQ task2	ASQ task3	ASQ task4_e
M-W U	216.0	240.5	191.5	212.5	232.5	205.5	227.0	164.0	231.5	240.5	153.5
Z	-.84	-.29	-1.40	-.92	-.47	-1.15	-.60	-2.07	-.50	-.29	-.98
Asymp. Sig. (2-tailed)	.399	.776	.162	.356	.641	.250	.551	.039	.620	.771	.327

RQ3.b. Is there any significant difference between Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of participants' gender?

Mann-Whitney U test was conducted for analyzing difference between genders. The results (Table 12) showed that there is no significant difference between Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability (ASQ), PU and PEOU scores in terms of participants' genders.

Table 12. Effect of Genders on the Study Variables Mann-Whitney Test

	Learn.	Satis.	Err.	Eff.	Usa.	PU	PEOU	ASQ task1	ASQ task2	ASQ task3	ASQ task4_e
M-W U	233.5	232.5	237.5	201.5	221.5	238.5	226.5	249.5	213.5	240.5	169.5
Z	-.42	-.45	-.33	-1.15	-.69	-.33	-.59	-.06	-.89	-.27	-.57
Asymp. Sig. (2-tailed)	.672	.656	.741	.249	.487	.743	.557	.954	.374	.788	.570

RQ3.c. Is there any significant difference between Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of participants' experience in using web sites of social security institutions?

Mann-Whitney U test was conducted for analyzing difference between experience in using web sites of social security institution (Table 13). There is a significant difference between Learnability (U= 134.5, p<.05), Satisfaction (U=145.5, p<.05), Errors (U=154.5, p<.05), Usability (U=160.5, p<.05), Perceived Usefulness (U=157.5, p<.05), Perceived Ease of Use (U=150.0, p<.05), ASQ Task 1 (U=134.5, p<.05) and ASQ Task 2 (U=87.5, p<.05) in terms of participants' experience in using web sites of social security institutions. The participants who have used these web sites before have significantly higher scores than the participants who have not used these web sites.

Table 13. Effect of Experience in Using Web Sites of SSI Mann-Whitney Test

	Learn.	Satis.	Err.	Eff.	Usa.	PU	PEOU	ASQ task1	ASQ task2	ASQ task3	ASQ task4_e
Mann-Whitney U	134.5	145.5	154.5	199.0	160.5	157.5	150.0	134.5	87.5	216.5	144.5
Z	-2.69	-2.43	-2.22	-1.21	-2.08	-2.29	-2.35	-2.73	-3.80	-.83	-1.32
Asymp. Sig. (2-tailed)	.007	.015	.026	.227	.037	.022	.019	.006	.000	.407	.186

RQ3.d. Is there any significant difference between Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of participants' computer experience?

Kruskal-Wallis test was conducted for this research question. The results (Table 14) showed that there is a significant difference between ASQ Task 1 (x^2=7.80, p<.05), ASQ Task 3 (x^2=6.41, p<.05), and ASQ Task 4 for employee (x^2=7.69, p<.05) scores in terms of computer experience of participants. In ASQ Task 1 and ASQ Task 4 for the employee the participants who have used computers 6 years and more rated significantly higher, whereas in ASQ Task 3 the participants who have use computer 2-5 years rated significantly higher.

Table 14. Effect of Computer Experience on the Study Variables Kruskal-Wallis Test

	Learn.	Satis.	Err.	Eff.	Usa.	PU	PEOU	ASQ task1	ASQ task2	ASQ task3	ASQ task4_e
Chi-Square	.41	.59	1.67	.61	.41	1.96	1.42	7.80	3.31	6.41	7.69
Df	2	2	2	2	2	2	2	2	2	2	2
Sig. (p)	.81	.74	.43	.74	.81	.375	.49	.02	.19	.04	.02

RQ3.e. Is there any significant difference among Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of participants' Internet experience?

Kruskal-Wallis test was conducted for this research question. The results (Table 15) showed that there is a significant difference between ASQ Task 1 (x^2=7.90, p<.05) and ASQ Task 2 (x^2=6.38, p<.05) in terms of participants' Internet experience. In ASQ

Task 1and ASQ Task 2 the participants who have used Internet 6 years and more rated significantly higher.

Table 15. Effect of Internet Experience on the Study Variables Kruskal-Wallis Test

	Learn.	Satis.	Err.	Eff.	Usa.	PU	PEOU	ASQ task1	ASQ task2	ASQ Task3	ASQ task4_e
Chi-Square	1.45	1.16	2.58	1.58	.97	3.94	2.42	7.90	6.38	3.69	5.09
Df	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	.48	.56	.28	.45	.62	.14	.30	.02	.04	.16	.08

RQ3.f. Is there any significant difference among Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of participants' daily computer usage?

Kruskal-Wallis test was conducted for this research question. The results (Table 16) showed that there is a significant difference between ASQ Task 1 (x^2=6.68, p<.05) and ASQ Task 4 for employee (x^2=8.94, p<.05) in terms of daily computer usage of the participants. In ASQ Task 1and ASQ Task 4 for the employee the participants who uses computer 4 and more hours a day rated significantly higher.

Table 16. Effect of Daily Computer Usage on the Study Variables Kruskal-Wallis Test

	Learn.	Satis.	Err.	Eff.	Usa.	PU	PEOU	ASQ task1	ASQ task2	ASQ task3	ASQ task4_e
Chi-Square	1.12	1.26	2.27	1.30	1.62	1.68	1.81	6.68	4.13	4.98	8.94
Df	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	.57	.53	.32	.52	.45	.43	.41	.04	.13	.08	.01

RQ3.g. Is there any significant difference among Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU in terms of the participants' daily Internet usage?

Kruskal-Wallis test was implemented for this research question. The results (Table 17) showed that there is a significant difference between Learnability (x^2=7.27, p<.05), Efficiency (x^2=9.55, p<.05); Usability (x^2=6.85, p<.05); ASQ Task 1 (x^2=12.78, p<.05), ASQ Task 2 (x^2=6.82, p<.05), ASQ Task 3 (x^2=6.86, p<.05), and ASQ Task 4 for employee (x^2=6.55, p<.05) scores in terms of daily Internet usage of the participants. In all scale the participants who use the Internet 0-3 hours a day rated significantly higher than both the participants who have never used the Internet and the participants who use the Internet 4 hours and more a day.

Table 17. Effect of Daily Internet Usage on the Study Variables Kruskal-Wallis Test

	Learn.	Satis.	Err.	Eff.	Usa.	PU	PEOU	ASQ task1	ASQ task2	ASQ task3	ASQ task4e
Chi-Square	7.27	2.70	5.85	9.55	6.85	3.78	4.83	12.78	6.82	6.86	6.55
Df	2	2	2	2	2	2	2	2	2	2	2
Asymp. Sig.	.03	.26	.05	.01	.03	.15	.09	.01	.03	.03	.038

Data that Obtained from Observation Form

The Observation Form was used to record the participants' performances while they were completing the tasks. Data about time to finish to task, number of tasks that

could not be accomplished successfully and problems users encounter within task were analyzed and the results are presented in this section.

Descriptive Statistics of Time Required to Accomplish Tasks

The minimum, maximum and mean values of time required to accomplish tasks could be seen in Table 18. Time values in the table are given as minutes. In the *SSK* group, the longest time required was in Task 3 that has 3.31 mean value and the shortest time required was in Task 1 that has 1.64 mean value. In the *Emekli Sandığı* group, the longest time required was in Task 2 that has 3.73 mean value and the shortest time required was in Task 3 that has 2.00 mean value. In the *Bağ-Kur* group the longest time required was in Task 4 for employee that has 3.38 mean value and the shortest time required was in Task 1 that has 2.20 mean value.

In Task 1 and Task 2 *SSK* group has the minimum mean value (1.64 and 2.07 respectively) while *Emekli Sandığı* group has the maximum mean value (2.47 and 3.73 respectively). In Task 3 *Emekli Sandığı* group has the minimum mean value (2.00) and *SSK* group has the maximum mean value (3.31). Finally in Task 4 for employee *Emekli Sandığı* group has the minimum mean value (2.20) while *Bağ-Kur* group has the maximum mean value (3.38).

It is important to note that people who were unsuccessful to complete tasks were dropped from analysis to not lead into error in analysis and also analysis for Task 4 for the retired participants (viewing retirement payment) could not be done because of limited number of participants.

Table 18. Time Required to Complete Tasks

Task	Social Security Institution	N	Min.	Max.	Mean
1. Downloading petition form	SSK	14	1	4	1.64
	Emekli Sandığı	15	1	10	2.47
	Bağ-Kur	10	1	4	2.20
2. Viewing employment record	SSK	14	1	5	2.07
	Emekli Sandığı	15	1	10	3.73
	Bağ-Kur	11	1	9	2.82
3. Finding information about regulations	SSK	13	1	8	3.31
	Emekli Sandığı	11	1	3	2.00
	Bağ-Kur	10	1	6	2.40
4. Calculating when to be retired by employee	SSK	14	1	12	2.86
	Emekli Sandığı	10	1	5	2.20
	Bağ-Kur	8	1	6	3.38

Descriptive Statistics and Frequency Analysis of Unsuccessful Tasks

In Table 19, minimum, maximum and mean values of number of unsuccessful task per person are given. The *Bağ-Kur* group has the maximum number of unsuccessful tasks (4) while *SSK* and *Emekli Sandığı* groups share the same value (2).

Table 19. Number of Unsuccessful Tasks

		N	Minimum	Maximum	Mean
Number of unsuccessful tasks	SSK	15	0	2	.27
	Emekli Sandığı	15	0	2	.47
	Bağ-Kur	15	0	4	1.33

In Table 20, frequency analysis of successful-unsuccessful tasks by social security institutions is given. *Bağ-Kur* group has maximum unsuccessful participant percents in all tasks. Additionally, in Task 1 and Task 2 *SSK* group has greater unsuccessful participant percent (6.7 and 6.7) than *Emekli Sandığı* group (0 and 0). In Task 3 and

Task 4 for employeee *Emekli Sandığı* group has greater unsuccessful participant percent (26.7 and 16.7 respectively) than *Bağ-Kur* group (13.3 and 0.00 respectively). It is important to note that in Task 1and Task 2 all participant was successful in *Emekli Sandığı* group and in Task 4 for employee all participant was successful in *SSK* group.

Table 20. Successful - Unsuccessful Tasks

SSK	Task 1		Task 2		Task 3		Task 4 for employee	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Successful	14	93.3	14	93.3	13	86.7	14	100.0
Unsuccessful	1	6.7	1	6.7	2	13.3	0	0
Total	15	100.0	15	100.0	15	100.0	14	100.0
E. SANDIĞI								
Successful	15	100.0	15	100.0	11	73.3	10	83.3
Unsuccessful	0	0	0	0	4	26.7	2	16.7
Total	15	100.0	15	100.0	15	100.0	15	100.0
BAĞ-KUR								
Successful	10	66.7	11	73.3	10	66.7	8	61.5
Unsuccessful	5	33.3	4	26.7	5	33.3	5	38.5
Total	15	100.0	15	100.0	15	100.0	13	100.0

Frequency Analysis of Problems that Users Have

To analyze problems that users encountered when using web site of social security institution, the researcher used observation forms and the participants' computer records. Problems that the users have while using web site and accomplishing tasks were first outlined and detailed list was created. Then, frequency analysis was carried out. In Table 21, 22 and 23 results of this analysis are given by social security institutions. Because each web sites of social security institution is a unique system, the problem

analysis was realized independently. Nevertheless, there are some problems in common such as “finding related hyperlink”.

In Table 21, problem analysis of web site of *SSK* is given. The *SSK* group has the maximum problem percent value in Task 3. For finding information about regulations the participants should find “SSK e-information” hyperlink and then select the right hyperlink section. Sixty percent of participants have problem in this task. Also they could use search properties with which 46.7 percent of them have problem. The group has minimum problem percent value in Task 2. For viewing employment record the participants should find related hyperlink, write their social security number and web site security number into textboxes and then click run button. In this part, 20 percent of them have problem.

Table 21. Problems that Users Have in Web Site of SSK

			Frequency	Percent
General Problems	Getting lost in web site	0	10	66.7
		1	5	33.3
Task 1 Downloading petition form	Finding related hyperlink	0	11	73.3
		1	4	26.7
	Coming up with unrelated pages when using search properties	0	12	80.0
		1	3	20.0
Task 2 Viewing employment record	Finding related hyperlink	0	12	80.0
		1	3	20.0
	Realizing security number that should be written in textbox	0	12	80.0
		1	3	20.0
	Understanding error message appearing after clicking the query button without writing security number in textbox	0	12	80.0
		1	3	20.0
	Understanding what to do after clicking the run (query) button	0	13	86.7
		1	2	13.3
Task 3 Finding information about regulations	Finding “SSK e-information” hyperlink that transfers users to web page which includes several links about regulations	0	6	40.0
		1	9	60.0
	After finding “SSK e-information” hyperlink, understanding which hyperlink section includes related information	0	6	40.0
		1	9	60.0
	Coming up with unrelated pages when using search properties	0	8	53.3
		1	7	46.7
Task 4 Calculating when to be retired by employee	Finding related hyperlink that is located in “interactive applications” sections page instead of homepage	0	11	78.6
		1	3	21.4
	Having difficulty and making mistakes when filling table that requires information abut user’s employment	0	11	78.6
		1	3	21.4
	After filling the table and clicking “send” button, understanding results table	0	10	71.4
		1	4	28.6

0: do not have problem; 1: have problem

In Table 22, problem analysis of web site of *Emekli Sandığı* is given. The *Emekli Sandığı* group has the maximum problem percent value in Task 3. For finding information about regulations, the participants should find related hyperlink that transfer users to web page that includes several links about regulations. 60 percent of the participants have problem in this part. Also they could use search properties with which 33.3% of them have problem. The *Emekli Sandığı* group has the minimum problem percent value in Task 4. For calculating when to be retired the participants should find related hyperlink, fill table that requires information abut user's employment and after clicking calculate button, realize result that appear bellow the table. They have problem percent value 33.3; 8.3 and 16.7 respectively in this section.

Table 22. Problems that Users Have in Web Site of Emekli Sandığı

Emekli Sandığı			Frequency	Percent
General Problems	Getting lost in web site	0	10	66.7
		1	5	33.3
Task 1 Downloading petition form	Finding related hyperlink	0	9	60.0
		1	6	40.0
	After finding the related hyperlink using menu system that created for petition forms	0	11	78.6
		1	3	21.4
Task 2 Viewing employment record	Finding related hyperlink	0	8	53.3
		1	7	46.7
	Having difficulty and making mistakes when filling table that requires information abut user's employment	0	8	53.3
		1	7	46.7
	After clicking calculate button, realizing result that appear bellow the table	0	11	73.3
		1	4	26.7
	Realizing error message that appear bellow the table	0	12	80.0
		1	3	20.0
Task 3 Finding information about regulations	Finding related hyperlinks that transfer users to web page that includes several links about regulations	0	6	40.0
		1	9	60.0
	Using search properties of web site that display results of search in new web page	0	10	66.7
		1	5	33.3
Task 4 for Calculating when to be retired by employee	Finding related hyperlink	0	8	66.7
		1	4	33.3
	Having difficulty and making mistakes when filling table that requires information abut user's employment	0	11	91.7
		1	1	8.3
	After clicking calculate button, realizing result that appear bellow the table	0	10	83.3
		1	2	16.7

0: do not have problem; 1: have problem

In Table 23, problem analysis of web site of *Bağ-Kur* is given. The *Bağ-Kur* group has the maximum problem percent value in Task 1. For downloading petition form the participants should find related hyperlink. 46.7 percent of participants have problem in this part. Then they should click Acrobat Reader icon to open petition forms. Also 46.7 percent of the participants have problem in this part. The *Bağ-Kur* group has the minimum problem percent value in Task 2. For viewing employment record the participants should find related hyperlink. They have problem percent value of 40.00 in this section. After finding the related page and writing their social security number into textbox, they could see the employment record. But there is another problem in here, 33.3 percent of participants have problem with realizing hyperlinks that include detailed information about employment that was located at the top of the page.

Table 23. Problems that Users Have in Web Site of Bağ-Kur

Bağ-Kur			Frequency	Percent
General Problems	Having problem with returning homepage because there is no hyperlink that is named "homepage"	0	8	53.3
		1	7	46.7
	Using menu system	0	4	26.7
		1	11	73.3
Task 1 Downloading petition form	Finding related hyperlink	0	8	53.3
		1	7	46.7
	Understanding to click acrobat reader icon to open petition forms	0	8	53.3
		1	7	46.7
Task 2 Viewing employment record	Finding related hyperlink	0	9	60.0
		1	6	40.0
	Realizing hyperlinks that include several information about employment that located above the page	0	10	66.7
		1	5	33.3
Task 3 Finding information about regulations	Finding related hyperlink	0	4	26.7
		1	11	73.3
	Using search properties of web site that uses google search engine	0	13	86.7
		1	2	13.3
Task 4 Calculating when to be retired by employee	Finding related hyperlink	0	5	38.5
		1	8	61.5
	Having difficulty and making mistakes when filling table that requires information abut user's employment	0	9	69.2
		1	4	30.8
	Understanding inconsistency in the results that occur because of making mistake when filling the table	0	10	76.9
		1	3	23.1

0: do not have problem; 1: have problem

It is noted that in Task 3, *SSK* and *Emekli Sandığı* groups encountered the most problem, and *SSK* and *Bağ-Kur* group encountered the least problem in Task 2.

V. DISCUSSION AND CONCLUSION

The discussion chapter is presented in five sections: (1) restatement of the purpose of the study, (2) discussion and interpretation of the findings and data obtained through the observation form, (3) conclusion, (4) implications of the study, (5) limitation of the current study and recommendations for future research.

Purpose of the Study

The main purpose of the study was to examine the usability features of web site of Turkish Social Security Institutions and to investigate individual acceptance of these e-government applications. To answer this question, the interaction between usability of those web sites and user acceptance were investigated. Further, comparison between usability of the web site of different social security institutions and users' acceptance and comparison between usability and acceptance of groups of people who have different education level, gender, computer experience, Internet experience, daily computer usage, and daily Internet usage were analyzed. Also this study explored whether adults with different properties are able to use the social security institutions' web sites and what may be the needs of modifications in those web sites to be usable.

Review and Interpretation of Findings

Correlation between Study Variables

The first research question investigated relationship between usability properties (Learnability, Efficiency, Satisfaction, Errors, and Task Specific Usability) of web sites of social security institutions and their users' acceptance (PU, PEOU).

The analysis revealed that there is a significant positive relationship between Usability and PU, Learnability and PU, Efficiency and PU, Satisfaction and PU, Errors and PU, ASQ Task 1 and PU, ASQ Task 2 and PU, ASQ Task 3 and PU and ASQ Task 4 for employee and PU. This means that the users who have higher scores from Usability Test and ASQ perceive web site of social security institution more useful. It is important to note that there is a maximum correlation between Satisfaction and PU ($r=.64$, $p<.01$), showing that satisfaction is one of the most important factor that affects users' perceptions about usefulness of web site.

Also, there is a significant positive relationship between Usability and PEOU, Learnability and PEOU, Efficiency and PEOU, Satisfaction and PEOU, Errors and PEOU, ASQ Task 1 and PEOU, ASQ Task 2 and PEOU, ASQ Task 3 and PEOU, and ASQ Task 4 for employee and PEOU. This means that the users with higher scores in the Usability Test and ASQ perceive web site of social security institution easier to use. It is important to note that there is a maximum correlation between Learnability and PEOU ($r=.75$, $p<.01$), showing that Learnability is one of the most important factor that affects users' perceptions about ease of use of a web site.

With regard to previous research, Davis (1989) claimed that among the different system characteristics, interface style is one of the important factors that could affect

user perceptions about a new system. Further Hasan and Ahmed (2002) stated that the interface style had direct effects on perceived ease of use and perceived usefulness, and they added that it had significant effects on behavioral intention to use the system.

Thong, Hong and Tam (2002) asserted that both perceived usefulness and perceived ease of use are determinants of user acceptance of digital libraries and added that interface characteristics affects perceived ease of use. Wiedenbeck and Davis (1997) compared the influence of three types of interface styles: direct-manipulation interface, menu-driven interface, and command-driven interface. They found that interface style had significant effect on perceived ease of use and added it was a small effect. In addition, their results revealed that interface style had no significant effect on perceived usefulness. Davis (1993) investigated user perceptions of an electronic mail and text editor applications. The results showed that system characteristics had significant effect on perceived ease of use. The effect of system characteristics on perceived usefulness was negative and nonsignificant. Gururajan and Fink (2002) compared the impact of icons and menu interface styles on user acceptance and founded that perceived ease of use had no significant effect. Similarly, Davis and Bostrom (1992) investigated the impact of direct-manipulation and command-based interfaces and their results indicated that interface style had no significant effect on ease of use. Perceived usefulness was not examined in their studies

In the current study perceived usefulness was found significantly related with usability and this result corroborates the results reported in past studies (Davis, 1989; Hasan and Ahmed, 2002). Other studies (Davis, 1993; Wiedenbeck and Davis, 1997; Thong et al., 2002) found no significant relationship between interface style and

perceived usefulness. It may due to characteristics of examined systems. Davis (1989) asserted that perceptions of usefulness of a system are related with the functionality that the system offers its users to achieve their goals. Systems that offer more functionality are often perceived more useful than systems that offer less functionality. It is concluded that studying systems with different functionality may weaken impact of interface style on perceived usefulness.

Perceived ease of use in the current study was found significantly related with usability. Although this result confirms past studies (Davis, 1989; Wiedenbeck and Davis, 1997), it contrasts other research which found no significant relationship between interface style and perceived ease of use (Davis and Bostrom, 1992; Gururajan and Fink, 2002). The reason for these different results may be complexity of tasks that participants tried to accomplish. These studies analyzed different systems with different task characteristics and this may affects subjects' perception of ease of use. Hasan and Ahmed (2002) claimed that the system by itself was not a significant determinant of perceived ease of use. Rather, they found that the degree of fit between system and task had a significant effect on perceived ease of use.

Finally there is a significant positive relationship between PU and PEOU ($r=.610$, $p<.01$) conforming past studies that examine TAM (Davis, 1989; Davis et al., 1989; Hendrickson, Massey and Cronan, 1993; Segars and Grover, 1993; Subramanian, 1994; Szajna, 1994).

Difference among Web Site of Social Security Institutions

The second research question investigated differences among web sites of Social Security Institutions in terms of Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU.

The results showed that there is no significant difference among Social Security Institutions web sites in terms of those study variables. In other words, the participants in different social security institution assessed web sites similarly although they are unique systems that have their own design. A similar finding was obtained in a study with digital library use: Thong, Hong and Tam (2002) founded that both perceived ease of use and perceived usefulness are indicators of user acceptance of digital libraries. Furthermore, individual differences and interface characteristics had an effect on perceived ease of use, whereas organizational context had effect on both perceived ease of use and perceived usefulness of digital library. A plausible explanation for this result might be the sample of the study. They were the participants with heterogeneous properties. There were people who have different occupations, age and working status in three different groups. Because of convenient sampling that was used to cover heterogeneous group of e-government facility users. If only usability experts were included for evaluating the web sites, the results could have been different. Also there were fifteen participants in each group, increase in number of participant may affect the results.

Demographic Characteristics and the Study Variable

The third research question investigated participants' demographic characteristics' impacts on their level of Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability, PU and PEOU. As demographic characteristics education level, gender, usage of web site of social security institutions, computer experience, Internet experience, daily computer usage and daily Internet usage were selected for examination.

The analysis showed that education levels of participants created difference on participants ASQ Task 1 scores. ASQ Task 1 scores for the participants who have education from vocational school to doctorate are significantly higher than the participants who have education from primary school to high school. In usability literature, it is claimed that education levels of users do not affect their evaluation of usability because usability is not related with users' characteristics in fact it is related with the system's characteristics (Nielsen, 2000; Ling, 2005; Rubin, 1994). On the other hand, Porter and Donthu (2006) found that perceived ease of use associated with Internet is lower for individuals who are less educated. The result of the current study showed that education levels of the participants do not have significant effect on Usability and Acceptance of social security institutions web sites. It affected only ASQ Task 1 scores. This finding confirmed usability expert's claims e.g. Nielsen (1993), Mayhew (1999), Kirakowski and Corbett (1993). More studies are needed to gain better insights into the impact of education level on user perceptions of a web site.

Similarly, the participants' gender did not create a significant difference on Usability, Learnability, Efficiency, Satisfaction, Errors, Task Specific Usability (ASQ),

PU and PEOU scores. Ong and Lai (2006) explored gender differences in perceptions and relationships among dominants affecting e-learning acceptance and found that men's rating of computer self-efficacy, perceived usefulness, perceived ease of use, and behavioral intention to use e-learning are all higher than women's. Simon (2001) also explored the perception and satisfaction levels of participants based on four web sites and found that perception and satisfaction differences exist between the cultural clusters and gender groups within cultures. Their quantitative analysis indicated that females within certain cultures have widely different preferences from their male counterparts regarding web site attributes. Although majority of past studies stated that attitude toward computers affected by gender was in favor of males, there is no agreement on gender issue. In the current study, no significant differences are found between male and female participants' usability and acceptance of the web sites, this may because most of female participants in this study have jobs that require usage of computer. This experience could affect their evaluation of the web sites.

There is a significant difference between participants' usage of social security institutions web sites in terms of Learnability, Satisfaction, Errors, Usability, Perceived Usefulness, Perceived Ease of Use, ASQ Task 1and ASQ Task 2. The participants who have used these web sites before have significantly higher scores than the participants who have not used these web sites. It is observed that the participants who used web sites of social security institutions before, accomplished tasks more quickly and have less problems than inexperienced ones. However they are critical about design of the web sites. The reason for no differences in efficiency might be explained by the nature of the component. It refers once users have learned the design, they may quickly

perform tasks. It can be said that although experienced users found web sites of social security institutions more learnable, satisfying, and error free because of familiarity, they did not consider it efficient because of design weaknesses.

The results showed that the participants' computer experience affected their scores of ASQ Task 1, ASQ Task 3, and ASQ Task 4 for employee scores. In ASQ Task 1 and ASQ Task 4 for employee participants who have used computers 6 years and more rated significantly higher, whereas in ASQ Task 3 participants who have use computer 2-5 years rated significantly higher than others. Also, the tests that investigate difference between the participants' Internet experience showed that there is a significant difference between the participants' Internet experience in terms of ASQ Task 1 and ASQ Task 2. In ASQ Task 1 and ASQ Task 2 the participants who have used Internet 6 years and more rated significantly higher than others.

Bunz (2002) investigated factors that are associated with the evaluation and assessment of web sites. Web site usability, technological fluency, personal needs, the seeking of need gratification and social constructivist influences were some of the factors examined in this study. Bunz's study is multi-step. The first step of study investigated participants' computer-email-web fluency, technology expertise, and computer-mediated communication competence. The second step, through two usability pilot studies conducted separately with usability experts and usability non-experts, subjects' web site assessment was investigated. Also quantitative and open-ended questions were used in this part. Results indicated that perception of web site usability and user's web site evaluation depends on multiple factors, including audience needs, directed or undirected navigation, actual usability of the web sites, and technological

fluency. Factors such as gender or length of Internet use had no statistical effect on web site evaluation.

The results of current study showed that the participants with computer and Internet experience have higher scores than inexperienced participants in different ASQ subtests. In other words, experienced computer and Internet users could easily accomplish application tasks of the current study and perceived them easy. Usability and Acceptance evaluations were not affected by the users' computer and Internet experiences. This finding confirmed usability literature (Nielsen, 2000; Ling, 2005; Rubin, 1994) and Bunz' study that stated computer experience of users does not affect usability evaluation because it is related with system characteristics (Nielsen, 2000; Ling, 2005; Rubin, 1994).

The analysis showed that participants' daily computer usage affected ASQ Task 1 and ASQ Task 4 for employee. In ASQ Task 1and ASQ Task 4 for employee participants who uses computer 4 and more hours a day rated significantly higher than others. Also, results showed that there is a significant difference between Learnability, Efficiency; Usability; ASQ Task 1, ASQ Task 2, ASQ Task 3, and ASQ Task 4 for employee scores in terms of participants' daily Internet usage. In all scales, the participants who use Internet 0-3 hours a day rated significantly higher than both the participants who have never used Internet and the participants who use Internet 4 hours and more a day.

The results summarized above show that daily computer and Internet usage affect different ASQ subtests scores. But there is no consistency among tasks. Also daily internet usage affects Learnability, Efficiency and Usability scores and that is

unexpected. It may be due to number of web sites studied. In the current study there are three web sites which have different design and properties. For example Task 2 (viewing employment record) can be easily accomplished in one web site while it could be hardly done in other.

Data Obtained through Observation Form

The data for the time required to accomplish the tasks, revealed that in the *SSK* group the most time required task is Task 3 that has 3.31 mean value, in *Emekli Sandığı* group the most time required task is Task 2 that has 3.73 mean value and in *Bağ-Kur* group the most time required task is Task 4 for employee that has 3.38 mean value. This means that accomplishing these tasks is more difficult than others.

Analyzing number of unsuccessful task per person revealed that *Bağ-Kur* group has maximum number of unsuccessful tasks (4) while *SSK* and *Emekli Sandığı* groups share the same value (2). It may show that web site of *Bağ-Kur* needs more modifications to meet its users' needs.

Frequency of successful – unsuccessful tasks by social security institution is investigated and the results showed that *Bağ-Kur* group has maximum unsuccessful task percents. These results confirmed that web site of *Bağ-Kur* needs more modifications to meet needs of its users.

The analysis of problems that users encountered when using web sites of social security institution, demonstrated that *SSK* and *Emekli Sandığı* groups encountered maximum problems in Task 3. It is observed that most of participants had problem with finding related hyperlink. Design of web sites (*SSK* and *Emekli Sandığı*) do not make easy to find any information. Also the users who tried to use search property of web sites

again had problem because of unrelated result lists and word combinations. When analyzing the *Bağ-Kur* group, the results showed that users encountered maximum problems in Task 1. It is observed that most of the participants had problems with finding related hyperlink and even after finding they had problem with understanding to click Acrobat Reader icon to download forms. It may be because of the fact that *Bağ-Kur* group consisted of people who do not have or have very little computer and Internet experience.

Conclusion

In the current study, the usability features of web site of Turkish Social Security Institutions and individual acceptance of these e-government applications are examined. According to the findings, a significant relationship was found between Usability and Acceptance. Also the results revealed that there is no significant difference among web site of Turkish Social Security Institutions in terms of Usability and Acceptance.

After comparing the participants based on their demographic characteristics, the results showed that; there is no significant difference between Usability and Acceptance in terms of participants' genders. The participants' education level affected accomplishing ASQ Task 1. Earlier usage of web site of the social security institutions made difference in terms of Learnability, Satisfaction, Errors, Usability, Perceived Usefulness, ASQ Task 1 and ASQ Task 2. While the participants' computer experience affects ASQ Task 1, ASQ Task 3, and ASQ Task 4 for employee scores, the participants' Internet experience affects ASQ Task 1 and ASQ Task 2 scores. Finally, daily computer usage affected ASQ Task 1 and ASQ Task 4 for employee and daily

Internet usage affected Learnability, Efficiency, ASQ Task 1, ASQ Task 2, ASQ Task 3, and ASQ Task 4 for employee scores.

In the light of the results summarized above, usability affects peoples' acceptance of web technologies positively. In other words, users accept web technologies as long as they think that web site is usable. So, when considering e-government services' mission in society, usability is important to make e-government services accessible for wide range of people. Administrators of e-government web sites should take into account the role of usability when managing design of these services.

Implications

The result of the current study implied that usability is an important factor for users' acceptance of web sites of Turkish Social Security Institutions. It is necessary to design these web sites usable to increase usage rate of these e-government services.

Usable web sites allow users accomplish any tasks without concerning demographic characteristics such as education level or computer experience. This is not the case in the web sites of Turkish Social Security Institutions. The results showed that the users with higher level of education, and computer and Internet experience accomplished tasks more quickly and had less problems than others. It can be said that these e-government services do not meet the target group's needs. Also it is observed that although inexperienced Internet users had some problems in using the web sites, they found these services beneficial. It may indicate that institutions that have e-government applications should work to make these services accessible for every adult.

A suggestion may be collaboration of these institutions and adult education centers to train people about using these systems. Concerning the variety of e-government applications, these training programs should include instruction in Internet use. Also analyzing needs of target groups is beneficial for designing of both training programs and web sites. Another suggestion may be software training programs that located in e-government web sites. It provides detailed information and help for users whenever they need. Finally, it is important to state that design of web site of the Turkish Social Security Institutions should be changed according to target groups' needs, including real users in design process, and in usability studies.

Limitations of the Study and Recommendations for Further Research

The study provided information about Usability and Acceptance of web sites of the Turkish Social Security Institutions despite its limitations. Further research with in these web sites will confirm the findings of this study and will explore ways of providing e-government services which could be used without having any training on those sites. Such studies will also contribute to the design of other virtual services used by IT illiterate adult populations.

First of all, the study sample consisted of 45 participants (15 participants per each web site). The current study should be replicated with the same groups, and also with more participants in further research so that more information can be gathered.

Secondly, the current study does not include usability experts to evaluate web sites. Using experts' evaluation can be beneficial to gather detailed information about usability of web sites. So, further research could include usability experts.

Thirdly, the data of this study was collected in one session which took about 45 minutes. It would be better to have a second session to compare the time taken in the studies, and the effect of time spent may be examined.

Finally, based on the participants' demographic characteristics such as gender, occupation, age, computer experience, homogenous groups may be constituted to further investigate effects of demographic variables.

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APPENDICES

Appendix A: Demographic Information and Computer Experience Form

<table>
<tr><td colspan="6">Kişisel Bilgiler</td></tr>
<tr><td colspan="2">Cinsiyetiniz: 1. __ Kadın 2.__ Erkek</td><td colspan="4">Mesleğiniz:</td></tr>
<tr><td>Yaşınız:
1. __ 25 yaş ve altı
2. __ 26-30 yaş
3. __ 31-40 yaş
4. __ 41-50 yaş
5. __ 51-60 yaş
6. __ 61 yaş ve üstü</td><td>Eğitiminiz:
1. __ Okuryazar
2. __ İlkokul
3. __ Ortaokul
4. __ Lise
5. __ Üniversite
6. __ Yüksek Lisans
7. __ Doktora</td><td colspan="4">Bağlı olduğunuz sosyal güvenlik kurumu:
1.__ SSK
2.__ Emekli Sandığı
3.__ Bağkur

Statünüz:
1. __ Çalışan
2. __ Emekli</td></tr>
<tr><td colspan="6">Bilgisayar Kullanımı</td></tr>
<tr><td colspan="2">Ne kadar süredir bilgisayar kullanıyorsunuz?
1. __ hiç kullanmadım
2.__ 0-1 yıl arası
3.__ 2-3 yıl arası
4.__ 4-5 yıl arası
5. __ 6 yıl ve daha uzun</td><td colspan="4">Günlük ortalama bilgisayar kullanma süreniz
1.__ hiç
2.__ 0-1 saat
3.__ 2-3 saat
4.__ 4-5 saat
5.__ 6 saat ve üzeri</td></tr>
<tr><td>Kullandığınız yazılımlar ve kullanım sıklıkları</td><td>Hiç</td><td>Yılda birkaç kez</td><td>Ayda birkaç kez</td><td>Haftada birkaç kez</td><td>Hergün</td></tr>
<tr><td>Windows</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>MS Office Uygulamaları</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Dreamveaver</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Photoshop</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Flash</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>ASP/ .NET</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Visual Basic</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Diğerleri:</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="6">İnternet Kullanımı</td></tr>
<tr><td colspan="2">Ne kadar süredir internet kullanıyorsunuz?
1. __ hiç kullanmadım
2. __ 0-1 yıl arası
3. __ 2-3 yıl arası
4. __ 4-5 yıl arası
5. __ 6 yıl ve daha uzun</td><td colspan="4">Günlük ortalama internet kullanım süreniz
1. __ hiç
2. __ 0-1 saat
3. __ 2-3 saat
4. __ 4-5 saat
5. __ 6 saat ve üzeri</td></tr>
<tr><td>İnterneti kullanım amaçları ve bu işlemlerin yapılma sıklığı</td><td>Hiç</td><td>Yılda birkaç kez</td><td>Ayda birkaç kez</td><td>Haftada birkaç kez</td><td>Hergün</td></tr>
<tr><td>E-mail kullanımı</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Bilgi arama</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Bankacılık işlemleri</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Eğlence (müzik dinleme/video izleme)</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Dosya indirimi</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>İşle ilgili olarak</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Diğerleri:</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Sosyal Güvenlik Kurumunun Web sitesini kullanma sıklığı</td><td>Hiç</td><td>Yılda birkaç kez</td><td>Ayda birkaç kez</td><td>Haftada birkaç kez</td><td>Hergün</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Appendix B: After Scenario Questionnaire

İşlemlerle İlgili Sorular

1=Kesinlikle katılmıyorum 2=Katılmıyorum 3=Kararsızım 4=Katılıyorum 5=Kesinlikle katılıyorum

A. Dilekçe indirme		**1**	**2**	**3**	**4**	**5**
1	Sosyal güvenlik kurumunun web sitesinde bu işlemi yapmak kolaydır					
2	Sosyal güvenlik kurumunun web sitesinde bu işlem kısa sürede yapılabilir					
3	Sosyal güvenlik kurumunun web sitesinde bu işlemi yapabilmek için yeterli miktarda yardım bilgisi mevcuttur					
B. Hizmet dökümü alma		**1**	**2**	**3**	**4**	**5**
4	Sosyal güvenlik kurumunun web sitesinde bu işlemi yapmak kolaydır					
5	Sosyal güvenlik kurumunun web sitesinde bu işlem kısa sürede yapılabilir					
6	Sosyal güvenlik kurumunun web sitesinde bu işlemi yapabilmek için yeterli miktarda yardım bilgisi mevcuttur					
C. İstenilen konuda bilgiyi bulma		**1**	**2**	**3**	**4**	**5**
7	Sosyal güvenlik kurumunun web sitesinde bu işlemi yapmak kolaydır					
8	Sosyal güvenlik kurumunun web sitesinde bu işlem kısa sürede yapılabilir					
9	Sosyal güvenlik kurumunun web sitesinde bu işlemi yapabilmek için yeterli miktarda yardım bilgisi mevcuttur					
D. Emekli aylık bilgilerini görme (emekliler için)		**1**	**2**	**3**	**4**	**5**
10	Sosyal güvenlik kurumunun web sitesinde bu işlemi yapmak kolaydır					
11	Sosyal güvenlik kurumunun web sitesinde bu işlem kısa sürede yapılabilir					
12	Sosyal güvenlik kurumunun web sitesinde bu işlemi yapabilmek için yeterli miktarda yardım bilgisi mevcuttur					
E. Ne zaman emekli olacağını öğrenme (çalışanlar için)		**1**	**2**	**3**	**4**	**5**
13	Sosyal güvenlik kurumunun web sitesinde bu işlemi yapmak kolaydır					
14	Sosyal güvenlik kurumunun web sitesinde bu işlem kısa sürede yapılabilir					
15	Sosyal güvenlik kurumunun web sitesinde bu işlemi yapabilmek için yeterli miktarda yardım bilgisi mevcuttur					

Appendix C: Technology Acceptance Tool

Algılanan Yararlılık ve Algılanan Kullanım Kolaylığı

1=Kesinlikle katılmıyorum 2=Katılmıyorum 3=Kararsızım 4=Katılıyorum 5=Kesinlikle katılıyorum

Algılanan Yararlılık		**1**	**2**	**3**	**4**	**5**
1	Sosyal güvenlik kurumumla ilgili işlerimi yaparken kurumun web sitesini kullanmak işlerimi daha çabuk tamamlamamı sağlar					
2	Sosyal güvenlik kurumumun web sitesini kullanmak, kurumla ilgili işlerimi yürütme hızımı arttırır					
3	Sosyal güvenlik kurumumla ilgili işlerimi yaparken kurumun web sitesini kullanmak işimi yapmayı kolaylaştırır					
4	Sosyal güvenlik kurumumun web sitesini yararlı buluyorum					
Algılanan Kullanım Kolaylığı		**1**	**2**	**3**	**4**	**5**
1	Sosyal güvenlik kurumunun web sitesini tam olarak kullanmayı öğrenmek benim için kolay olurdu					
2	Kurumun web sitesinde yapmak istediklerimi kolayca yapabiliyorum					
3	Sosyal güvenlik kurumunun web sitesiyle etkileşimim açık ve anlaşılırdır					
4	Sosyal güvenlik kurumunun web sitesinin etkileşim kurmak için esnek ve uyumlu olduğunu düşünüyorum					
5	Sosyal güvenlik kurumunun web sitesini kullanma konusunda yetkin hale gelmek benim için kolay olurdu					
6	Sosyal güvenlik kurumunun web sitesini kullanmanın kolay olduğunu düşünüyorum					

Appendix D: Usability Test

1=Kesinlikle katılmıyorum 2=Katılmıyorum 3=Kararsızım 4=Katılıyorum 5=Kesinlikle katılıyorum

		1	**2**	**3**	**4**	**5**
1	Web sitesi yürüttüğü işlemler konusunda beni sürekli bilgilendirir					
2	Bu bilgilerin sunulma şekli açık ve anlaşılır değildir					
3	Web sitesinin içerdiği konular kolaylıkla anlaşılabilir					
4	Web sitesinde kullanılan dil kolay anlaşılabilir değildir					
5	Web sitesindeki karakterler kolaylıkla okunabilir					
6	Sitede dolaşmak için oluşturulmuş yapı karmaşıktır					
7	Sitenin kullanımına yönelik talimatlara kolaylıkla erişilebilir					
8	Talimat ve uyarılar siteyi kullanmada yardımcı değildir					
9	Web sitesinde nerede olduğumu hatırlamak zordur					
10	Web sitesindeki yardım bilgileri oldukça faydalıdır					
11	Yardım bilgilerine ulaşmak zordur					
12	Web sitesindeki açıklamalar daha basit olmalıdır					
13	Yardım bilgilerinin içeriği karmaşıktır					
14	Web sitesinin nasıl kullanılacağına dair açıklamalar yeterli değildir					
15	Ekrandaki yardım bilgileri açık ve anlaşılırdır					
16	Herhangi bir işlemi yapabilmek için çok fazla basamak vardır					
17	Web sitesinde çok fazla öğe vardır					
18	Web sitesinin yapısı basittir					
19	Ekranlarda gösterilen bilgi miktarı yeterlidir					
20	Web sitesini kullanırken birçok kez yardım aramak zorunda kaldım					
21	Web sitesinde gezinmek zordur					
22	Bu sitede istediğim herşeyi kolaylıkla bulabiliyorum					
23	Bu web sitesinde istediğim herhangi birşeyi kolaylıkla yapabiliyorum					
24	Web sitesinin kullanımını öğrenmek zordur					
25	Web sitesinde gezinmeyi öğrenmek zordur					
26	Bir önceki ekrana dönmek zordur					
27	Yanlışlıkla girdiğim uygulamadan kolaylıkla çıkabiliyorum					
28	Aranan içeriğe ait sayfaya birkaç farklı yolla erişilebilir					
29	Bu web sitesinde istenilen bilgiye ulaşmak için farklı arama özellikleri yoktur					
30	Bu web sitesinde bir işlemi yapmanın birden fazla yolu vardır					
31	Web sitesi işlemlerden önce kullanıcıdan onay almaktadır					

		1	2	3	4	5
32	Web sitesindeki uyarı mesajları açık ve anlaşılırdır					
33	Web sitesi karşılaştığım problemleri çözmede bana yardımcı oldu					
34	Bu web sitesinde hataları düzeltmek zordur					
35	Web sitesindeki hata mesajları problemin ne olduğunu açıklar					
36	Hata mesajları çözüm yollarını içermemektedir					
37	Hata mesajları anlaşılırdır					
38	Web sitesinin çok iyi olduğunu düşünüyorum					
39	Web sitesinin memnun edici olduğunu düşünüyorum					
40	Web sitesini kullanmanın çok kolay olduğunu düşünüyorum					
41	Web sitesinin esnek olduğunu düşünüyorum					
42	Bu web sitesini kullanmaktan hoşlanmadım					
43	Bu web sitesini kullanmak zaman kaybıdır					
44	Bu web sitesini tekrar kullanabilirim					
45	Bu web sitesi yararlıdır					

Appendix E: Observation Form

GÖREV TANIMI		
Görev no:1	Sosyal güvenlik kurumunun web sitesinden dilekçe formu indirme	
SÜRE		
Görevi tamamlama süresi:	Hatadan kurtulmak için kullanılan süre:	Okumak ve görevi gerçekleştirmek için geçen sürenin oranı:
SAYI VE ORANLAR		
Yapılan hataların sayısı:	Yardım isteme sıklığı:	Yapılmayan adımlar ve prosedürlerin sayısı:
GENEL		
Görevle ilgili yaşanan temel problemler:		

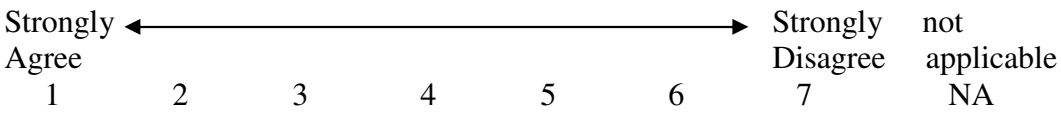
GÖREV TANIMI		
Görev no:2	Sosyal güvenlik kurumunun web sitesinden hizmet dökümü alma	
SÜRE		
Görevi tamamlama süresi:	Hatadan kurtulmak için kullanılan süre:	Okumak ve görevi gerçekleştirmek için geçen sürenin oranı:
SAYI VE ORANLAR		
Yapılan hataların sayısı:	Yardım isteme sıklığı:	Yapılmayan adımlar ve prosedürlerin sayısı:
GENEL		
Görevle ilgili yaşanan temel problemler:		

GÖREV TANIMI		
Görev no:3	Sosyal güvenlik kurumunun web sitesinden istenilen konuda bilgi bulma	
SÜRE		
Görevi tamamlama süresi:	Hatadan kurtulmak için kullanılan süre:	Okumak ve görevi gerçekleştirmek için geçen sürenin oranı:
SAYI VE ORANLAR		
Yapılan hataların sayısı:	Yardım isteme sıklığı:	Yapılmayan adımlar ve prosedürlerin sayısı:
GENEL		
Görevle ilgili yaşanan temel problemler:		

GÖREV TANIMI			
Görev no:4	**a**	Sosyal güvenlik kurumunun web sitesinden emekli aylık bilgilerini görme (emekliler)	
	b	Sosyal güvenlik kurumunun web sitesinden ne zaman emekli olacağını öğrenme (çalışanlar)	
SÜRE			
Görevi tamamlama süresi:	Hatadan kurtulmak için kullanılan süre:	Okumak ve görevi gerçekleştirmek için geçen sürenin oranı:	
SAYI VE ORANLAR			
Yapılan hataların sayısı:	Yardım isteme sıklığı:		Yapılmayan adımlar ve prosedürlerin sayısı:
GENEL			
Görevle ilgili yaşanan temel problemler:			

Appendix F: Original Form of ASQ

1. Overall, I am satisfied with the ease of completing the tasks in this scenario.
2. Overall, I am satisfied with the amount of time it took to complete the tasks in this scenario
3. Overall, I am satisfied with the support information (on-line help, messages, documentation) when completing the tasks.



Appendix G: Original Form of TAT

FINAL MEASUREMENT SCALES OF

PERCEIVED USEFULNESS AND PERCEIVED EASE OF USE

Perceived Usefulness

1) Using CHART-MASTER in my job would enable me to accomplish tasks more quickly.
2) Using CHART-MASTER would improve my job performance.
3) Using CHART-MASTER in my job would increase my productivity.
4) Using CHART-MASTER would enhance my effectiveness on the job.
5) Using CHART-MASTER would make it easier to do my job.
6) I would find CHART-MASTER useful in my job.

Perceived Ease of Use

1) Learning to operate CHART-MASTER would be easy for me.
2) I would find it easy to get CHART-MASTER to do what I want it to do.
3) My interaction with CHART-MASTER would be clear and understandable.
4) I would find CHART-MASTER to be flexible to interact with.
5) It would be easy for me to become skillful at using CHART-MASTER.
6) I would find CHART-MASTER easy to use.

Likely Unlikely

Extremely Quite Slightly Neither Slightly Quite Extremely

Appendix H: First Form of Usability Test

Kullanılabilirlik Testi

1-Kesinlikle katılmıyorum 2-Katılmıyorum 3-Kararsızım 4-Katılıyorum 5-Kesinlikle katılıyorum

	1	2	3	4	5
Web sitesi ne yaptığı konusunda beni sürekli bilgilendirdi					
Sistem bilgilerinin sunulma şekli açık ve anlaşılırdır					
Web sitesinin içerdiği konular kolaylıkla anlaşılabilir					
Web sitesindeki bilgilerin organizasyonu mantıklıdır					
Web sitesinde kullanılan dil yaptığım işle bağlantılıdır					
Web sitesinde kullanılan dil kolaylıkla anlaşılabilir					
İşlemler her zaman straight forward biçimde yürütülebilir					
Bir sonraki ekran tahmin edilebilir					
Linklerin üzerine tıkladığımda beklediğim şeyler olur					
Web sitesinin içindeki web sayfaları tutarlı biçimde tasarlanmıştır					
Navigasyonun yapısı anlaşılırdır					
Web sitesindeki terimlerin kullanımı tutarlıdır					
Sitenin kullanımına yönelik yönergelere kolaylıkla erişilebilir					
Yönerge ve uyarılar sistemi kullanmada yardımcıdır					
Web sitesinde nerede olduğumu hatırlamak zordur					
Web sayfasındaki unsurların çoğunu kısa sürede anlayabiliyorum					
Web sitesindeki yardım bilgileri oldukça yararlıdır					
Web sitesi ihtiyaç duyduğumda soru sormam için gerekli özelliklere sahiptir					
Yardım bilgilerine ulaşmak kolaydır					
Web sitesindeki açıklamalar biraz daha basit olmalıdır					
İhtiyaç duyduğumda ekranda her zaman yeterli bilgi vardır					
Web sitesinin nasıl kullanılacağına dair açıklamalar yeterlidir					
Yardım bigilerinin içeriği karmaşıktır					
Ekrandaki yardım bilgileri açıktır					
Herhangi bir işlemi yapabilmek için çok fazla basamak vardır					
Web sitesinde çok fazla unsur vardır					
Web sitesinin yapısı basittir					
Ekranda gösterilen bilginin miktarı yeterlidir					
Web sayfalarında gereksiz bilgiler içeren kısımlar mevcuttur					
Web sitesini ilk defa kullanmak kolaydır					
Web sitesini kullanırken birçok kez yardım aramak zorunda kaldım					
Web sitesinde gezinmek zordur					
Bu sitede istediğim herşeyi kolaylıkla bulabiliyorum					
Bu web sitesinde istediğim herhangi birşeyi yapmak kolaydır					
Sistemin kullanımını öğrenmek zordur					

	1	2	3	4	5
Web sitesinde gezinmeyi öğrenmek problemlidir					
Bu web sitesini kullanırken konrolü elimde tuttuğumu hissediyorum					
Bir önceki ekrana dönmek kolaydır					
Yanlışlıkla girdiğim uygulamadan kolaylıkla çıkabiliyorum					
Deneyimli olanlar sitedeki kısa yolları kolaylıkla kullanabilir					
Aranan web sayfasına birkaç farklı yolla erişilebilir					
Bu web sitesi istenilen bilgiye ulaşmak için çeşitli arama özellikleri içerir					
Bu web sitesinde bir işlemi yapmanın birden fazla yolu vardır					
Web sitesi seçimlerden once kullanıcıdan onay alır					
Web sitesi kullancıyı olası sonuçlar hakkında uyarır					
Web sitesindeki uyarı mesajları yeterli değildir					
Web sitesindeki uyarı mesajları açık ve anlaşılırdır					
Web sitesi karşılaştığım herhangi bir problemi çözmede bana yardımcı oldu					
Bu websitesinde hataları düzeltmek kolaydır					
Hata mesajları problemin ne olduğunu açıklar					
Hata mesajları çözüm yollarını içerir					
Hata mesajları anlaşılırdır					
Sisteme nihai tepki					
çok kötü – çok iyi					
hayal kırıcı – memnun edici					
zor – kolay					
katı – esnek					
Bu web sitesini kullanmaktan hoşlanmadım					
Bu web sitesini kullanmak zaman kaybıdır					
Web sitesinde kullanıcı ihtiyaçlarının dikkate alındığı çok açık					
Bu web sitesini tekrar kullanabilirim					
Bu web sitesi yararlıdır					
Bu websitesi güvenilirdir					
Web sitesinin yöneticilerine kişisel bilgilerimi kötüye kullanmayacaklarına dair güveniyorum					
Kişisel bilgilerimin korunması konusunda bu web sitesine güveniyorum					
Bu web sitesi ayrıntılı bilgiler içeriyor					
Bu web sitesi güncel bilgiler içeriyor					
Web sitesinin içerdiği bilgiler alakalıdır					
Web sitesinin içerdiği bilgiler doğrudur					
Web sitesinde kullanılan renkler ve unsurlar gözü yormaz					
Bu web sitesi yeterli oranda interaktif özellikler içermektedir					
Bu web sitesi kullanıcı ve site yöneticileri arasında interaktif iletişime yönelik özellikler içermektedir					
Web sitesinin sayfalarındaki karakterler kolaylıkla okunabilir					

Appendix I: Item-Total Statistics of Usability Test

Name of Subscale	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Learnability					
It2	50,99	114,50	,507	,439	,897
It3	50,94	114,90	,565	,478	,896
It13	51,22	115,72	,507	,435	,897
It14	51,04	115,82	,512	,479	,897
It17	51,22	110,13	,683	,610	,891
It19	50,96	114,74	,483	,375	,898
It22	51,46	111,06	,665	,611	,892
It24	51,20	111,78	,654	,594	,892
It28	51,10	115,37	,509	,446	,897
It33	51,68	111,32	,625	,694	,893
It34	51,53	111,13	,650	,703	,892
It35	51,20	110,68	,657	,704	,892
It36	51,11	112,23	,647	,697	,893
It38	50,80	112,79	,536	,475	,897
It39	50,81	116,78	,456	,404	,899
It71	50,73	116,13	,468	,336	,899
Satisfaction					
It6	31,86	36,12	,426	,250	,825
It41	32,26	35,181	,475	,406	,820
It42	32,33	33,461	,486	,406	,821
It43	32,32	35,457	,477	,503	,820
It53	32,34	35,936	,536	,448	,817
It56	32,41	36,852	,388	,363	,828
It57	32,73	30,849	,573	,538	,813
It58	32,32	31,929	,625	,563	,805
It60	32,07	33,569	,616	,663	,807
It61	32,16	33,728	,660	,671	,804
Errors					
It1	30,33	47,820	,555	,441	,844
It23	30,70	45,403	,584	,440	,842
It44	30,89	49,358	,332	,242	,863
It47	30,68	47,367	,585	,392	,842
It48	30,84	46,380	,636	,466	,838
It49	30,74	46,777	,574	,388	,843
It50	30,92	48,162	,539	,490	,845
It51	31,03	47,403	,565	,511	,843
It52	31,00	45,034	,659	,604	,835
It54	30,22	49,591	,505	,408	,848
It55	30,63	48,302	,524	,512	,846

Name of Subscale	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Efficiency					
It11	19,54	32,745	,534	,320	,782
It15	19,38	34,058	,477	,287	,790
It20	19,77	33,956	,474	,306	,791
It25	20,04	33,032	,605	,440	,772
It26	20,53	34,724	,443	,334	,795
It27	20,29	34,320	,533	,346	,783
It31	19,39	31,791	,554	,394	,779
It32	19,57	33,057	,535	,389	,781

Appendix J: Descriptive Statistics for the Study Instruments

		N	Min.	Max.	Mean	Std. Dev.
Learnability	All	45	36	78	54.87	10.621
	SSK	15	36	70	54.40	11.038
	Emekli Sandıgı	15	42	78	53.67	11.223
	Bag-kur	15	37	64	56.53	10.099
Satisfaction	All	45	23	50	34.64	5.855
	SSK	15	25	43	34.53	5.303
	Emekli Sandıgı	15	23	50	33.87	7.827
	Bag-kur	15	28	44	35.53	4.103
Errors	All	45	24	51	34.60	6.820
	SSK	15	28	51	34.87	6.300
	Emekli Sandıgı	15	24	51	33.13	8.374
	Bag-kur	15	24	42	35.80	5.697
Efficiency	All	45	13	36	24.36	5.993
	SSK	15	13	32	23.53	5.914
	Emekli Sandıgı	15	15	36	24.53	5.617
	Bag-kur	15	13	32	25.00	6.719
Usability	All	45	106	215	148.47	26.414
	SSK	15	110	192	147.33	25.013
	Emekli Sandıgı	15	111	215	145.20	30.869
	Bag-kur	15	106	179	152.87	24.098
Perceived Usefulness	All	45	8	20	16.09	2.512
	SSK	15	8	20	16.27	3.150
	Emekli Sandıgı	15	10	20	15.73	2.915
	Bag-kur	15	15	20	16.27	1.100
Perceived Ease of Use	All	45	12	30	22.58	4.779
	SSK	15	12	30	21.27	5.625
	Emekli Sandıgı	15	18	30	23.67	3.994
	Bag-kur	15	12	30	22.80	4.586
ASQ task1	All	45	3	15	11.38	2.489
	SSK	15	9	15	12.20	1.971
	Emekli Sandıgı	15	3	15	11.00	3.000
	Bag-kur	15	6	15	10.93	2.344
ASQ task2	All	45	4	15	10.60	3.271
	SSK	15	5	15	11.33	3.478
	Emekli Sandıgı	15	4	15	9.67	3.539
	Bag-kur	15	6	15	10.80	2.731
ASQ task3	All	45	5	15	10.22	2.636
	SSK	15	5	12	9.53	2.416
	Emekli Sandıgı	15	6	15	10.53	2.588
	Bag-kur	15	6	15	10.60	2.923
ASQ task4 retired	All	6	6	15	10.33	3.983
	SSK	1	6	6	6.00	.
	Emekli Sandıgı	3	11	15	13.67	2.309
	Bag-kur	2	7	8	7.50	.707
ASQ task4 employee	All	39	3	15	11.00	3.017
	SSK	14	6	15	11.36	2.872
	Emekli Sandıgı	12	3	15	10.50	3.398
	Bag-kur	13	6	15	11.08	2.985

Appendix K: Effect of Web Sites of SSI on the Study Variables

Kruskal-Wallis Test Ranks

	Social Security	N	Mean Rank
Learnability	SSK	15	22.93
	Emekli Sandığı	15	20.77
	Bag-kur	15	25.30
	Total	45	
Satisfaction	SSK	15	23.47
	Emekli Sandığı	15	20.97
	Bag-kur	15	24.57
	Total	45	
Errors	SSK	15	22.93
	Emekli Sandığı	15	19.60
	Bag-kur	15	26.47
	Total	45	
Efficiency	SSK	15	21.27
	Emekli Sandığı	15	22.30
	Bag-kur	15	25.43
	Total	45	
Usability	SSK	15	22.03
	Emekli Sandığı	15	21.27
	Bag-kur	15	25.70
	Total	45	
Perceived Usefulness	SSK	15	24.70
	Emekli Sandığı	15	20.53
	Bag-kur	15	23.77
	Total	45	
Perceived Ease of Use	SSK	15	20.40
	Emekli Sandığı	15	24.83
	Bag-kur	15	23.77
	Total	45	
ASQ task1	SSK	15	26.80
	Emekli Sandığı	15	21.83
	Bag-kur	15	20.37
	Total	45	
ASQ task2	SSK	15	25.83
	Emekli Sandığı	15	19.73
	Bag-kur	15	23.43
	Total	45	
ASQ task3	SSK	15	19.83
	Emekli Sandığı	15	25.00
	Bag-kur	15	24.17
	Total	45	
ASQ task4 employee	SSK	14	20.68
	Emekli Sandığı	12	19.04
	Bag-kur	13	20.15
	Total	39	

Appendix L: Effect of Education Level on Study Variables

Mann-Whitney Test Ranks

	Education	N	Mean Rank
Learnability	primary through high school	22	21.32
	vocational through doctorate	23	24.61
	Total	45	
Satisfaction	primary through high school	22	22.43
	vocational through doctorate	23	23.54
	Total	45	
Errors	primary through high school	22	25.80
	vocational through doctorate	23	20.33
	Total	45	
Efficiency	primary through high school	22	21.16
	vocational through doctorate	23	24.76
	Total	45	
Usability	primary through high school	22	22.07
	vocational through doctorate	23	23.89
	Total	45	
Perceived Usefulness	primary through high school	22	20.84
	vocational through doctorate	23	25.07
	Total	45	
Perceived Ease Of use	primary through high school	22	21.82
	vocational through doctorate	23	24.13
	Total	45	
ASQ task1	primary through high school	22	18.95
	vocational through doctorate	23	26.87
	Total	45	
ASQ task2	primary through high school	22	22.02
	vocational through doctorate	23	23.93
	Total	45	
ASQ_task3	primary through high school	22	22.43
	vocational through doctorate	23	23.54
	Total	45	
ASQ task4 employee	primary through high school	17	18.03
	vocational through doctorate	22	21.52
	Total	39	

Appendix M: Effect of Genders on the Study Variables

Mann-Whitney Test Ranks

	Gender	N	Mean Rank
Learnability	female	21	22.12
	male	24	23.77
	Total	45	
Satisfaction	female	21	22.07
	male	24	23.81
	Total	45	
Errors	female	21	22.31
	male	24	23.60
	Total	45	
Efficiency	female	21	20.60
	male	24	25.10
	Total	45	
Usability	female	21	21.55
	male	24	24.27
	Total	45	
Perceived Usefulness	female	21	22.36
	male	24	23.56
	Total	45	
Perceived Ease Of Use	female	21	21.79
	male	24	24.06
	Total	45	
ASQ task1	female	21	22.88
	male	24	23.10
	Total	45	
ASQ task2	female	21	24.83
	male	24	21.40
	Total	45	
ASQ task3	female	21	22.45
	male	24	23.48
	Total	45	
ASQ task4 employee	female	18	21.08
	male	21	19.07
	Total	39	

Appendix N: Effect of Experience in Using Web Sites of SSI

Mann-Whitney Test Ranks

	Usage of SSI	N	Mean Rank
Learnability	No	24	18.10
	Yes	21	28.60
	Total	45	
Satisfaction	No	24	18.56
	yes	21	28.07
	Total	45	
Errors	no	24	18.94
	yes	21	27.64
	Total	45	
Efficiency	no	24	20.79
	yes	21	25.52
	Total	45	
Usability	no	24	19.19
	yes	21	27.36
	Total	45	
Perceived Usefulness	no	24	19.06
	yes	21	27.50
	Total	45	
Perceived Ease Of Use	no	24	18.75
	yes	21	27.86
	Total	45	
ASQ task1	no	24	18.10
	yes	21	28.60
	Total	45	
ASQ task2	no	24	16.15
	yes	21	30.83
	Total	45	
ASQ_task3	no	24	21.52
	yes	21	24.69
	Total	45	
ASQ_task4_employee	no	20	17.73
	yes	19	22.39
	Total	39	

Appendix O: Effect of Computer Experience on the Study Variables

Kruskal-Wallis Test Ranks

	Computer Experience	N	Mean Rank
Learnability	none-1 years	11	20.86
	2-5 years	8	23.06
	6 years and more	26	23.88
	Total	45	
Satisfaction	none-1 years	11	20.36
	2-5 years	8	23.94
	6 years and more	26	23.83
	Total	45	
Errors	none-1 years	11	22.41
	2-5 years	8	28.38
	6 years and more	26	21.60
	Total	45	
Efficiency	none-1 years	11	21.32
	2-5 years	8	26.00
	6 years and more	26	22.79
	Total	45	
Usability	none-1 years	11	21.09
	2-5 years	8	24.94
	6 years and more	26	23.21
	Total	45	
Perceived Usefulness	none-1 years	11	19.00
	2-5 years	8	21.81
	6 years and more	26	25.06
	Total	45	
Perceived Ease of Use	none-1 years	11	19.00
	2-5 years	8	23.50
	6 years and more	26	24.54
	Total	45	
ASQ task1	none-1 years	11	14.95
	2-5 years	8	19.88
	6 years and more	26	27.37
	Total	45	
ASQ task2	none-1 years	11	17.23
	2-5 years	8	27.44
	6 years and more	26	24.08
	Total	45	
ASQ task3	none-1 years	11	16.82
	2-5 years	8	31.88
	6 years and more	26	22.88
	Total	45	
ASQ task4 employee	none-1 years	9	11.11
	2-5 years	6	21.42
	6 years and more	24	22.98
	Total	39	

Appendix P: Effect of Internet Experience on the Study Variables

Kruskal-Wallis Test Ranks

	Internet Experience	N	Mean Rank
Learnability	none-1 years	15	20.03
	2-5 years	13	25.96
	6 years and more	17	23.35
	Total	45	
Satisfaction	none-1 years	15	20.33
	2-5 years	13	25.62
	6 years and more	17	23.35
	Total	45	
Errors	none-1 years	15	23.50
	2-5 years	13	27.12
	6 years and more	17	19.41
	Total	45	
Efficiency	none-1 years	15	19.80
	2-5 years	13	25.92
	6 years and more	17	23.59
	Total	45	
Usability	none-1 years	15	20.80
	2-5 years	13	25.69
	6 years and more	17	22.88
	Total	45	
Perceived Usefulness	none-1 years	15	18.47
	2-5 years	13	27.69
	6 years and more	17	23.41
	Total	45	
Perceived Ease of Use	none-1 years	15	19.10
	2-5 years	13	26.65
	6 years and more	17	23.65
	Total	45	
ASQ task1	none-1 years	15	15.40
	2-5 years	13	26.38
	6 years and more	17	27.12
	Total	45	
ASQ task2	none-1 years	15	18.93
	2-5 years	13	30.54
	6 years and more	17	20.82
	Total	45	
ASQ task3	none-1 years	15	18.77
	2-5 years	13	28.08
	6 years and more	17	22.85
	Total	45	
ASQ task4 employee	none-1 years	12	14.42
	2-5 years	11	24.55
	6 years and more	16	21.06
	Total	39	

Appendix R: Effect of Daily Computer Usage on the Study Variables

Kruskal-Wallis Test Ranks

	Daily Computer Usage	N	Mean Rank
Learnability	none	10	19.25
	0-3 hours	17	24.62
	4-more hours	18	23.56
	Total	45	
Satisfaction	none	10	19.00
	0-3 hours	17	24.71
	4-more hours	18	23.61
	Total	45	
Errors	none	10	21.05
	0-3 hours	17	26.76
	4-more hours	18	20.53
	Total	45	
Efficiency	none	10	19.50
	0-3 hours	17	25.41
	4-more hours	18	22.67
	Total	45	
Usability	none	10	19.20
	0-3 hours	17	25.76
	4-more hours	18	22.50
	Total	45	
Perceived Usefulness	none	10	18.65
	0-3 hours	17	23.68
	4-more hours	18	24.78
	Total	45	
Perceived Ease of Use	none	10	18.25
	0-3 hours	17	25.03
	4-more hours	18	23.72
	Total	45	
ASQ_task1	none	10	13.85
	0-3 hours	17	24.74
	4-more hours	18	26.44
	Total	45	
ASQ_task2	none	10	16.00
	0-3 hours	17	26.35
	4-more hours	18	23.72
	Total	45	
ASQ_task3	none	10	15.25
	0-3 hours	17	24.06
	4-more hours	18	26.31
	Total	45	
ASQ_task4_employee	none	8	9.63
	0-3 hours	13	23.15
	4-more hours	18	22.33
	Total	39	

Appendix S: Effect of Daily Internet Usage on the Study Variables

Kruskal-Wallis Test Ranks

	Daily Internet Usage	N	Mean Rank
Learnability	none	10	14.20
	0-3 hours	19	27.95
	4-more hours	16	22.63
	Total	45	
Satisfaction	None	10	18.15
	0-3 hours	19	26.34
	4-more hours	16	22.06
	Total	45	
Errors	None	10	18.90
	0-3 hours	19	28.53
	4-more hours	16	19.00
	Total	45	
Efficiency	None	10	13.25
	0-3 hours	19	28.95
	4-more hours	16	22.03
	Total	45	
Usability	None	10	15.35
	0-3 hours	19	28.39
	4-more hours	16	21.38
	Total	45	
Perceived Usefulness	None	10	16.50
	0-3 hours	19	25.71
	4-more hours	16	23.84
	Total	45	
Perceived Ease of Use	None	10	15.50
	0-3 hours	19	26.63
	4-more hours	16	23.38
	Total	45	
ASQ task1	None	10	10.20
	0-3 hours	19	26.79
	4-more hours	16	26.50
	Total	45	
ASQ task2	None	10	14.80
	0-3 hours	19	27.92
	4-more hours	16	22.28
	Total	45	
ASQ task3	None	10	13.65
	0-3 hours	19	25.79
	4-more hours	16	25.53
	Total	45	
ASQ task4 employee	none	7	10.43
	0-3 hours	16	22.78
	4-more hours	16	21.41
	Total	39	