

ONLINE COMMUNICATION AND DISCUSSION ENVIRONMENT FOR THE
VISUALLY DISABLED STUDENTS AT A PUBLIC UNIVERSITY

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ABSTRACT

ONLINE COMMUNICATION AND DISCUSSION ENVIRONMENT FOR THE VISUALLY DISABLED STUDENTS AT A PUBLIC UNIVERSITY

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This study aims to discover the perceptions of the visually disabled students at a public university in Ankara, Turkey for attending and participating in an online communication and discussion environment on the Web to access information and establish social relationships with others. The purpose of this research is six folds: (1) to investigate the current status of the visually disabled university students at a public university in Ankara, Turkey for accessing and using computers and the Internet, (2) to learn the kind of web sites that those students prefer to visit on the Internet, (3) to discover the topics and subject they prefer to see in the Web forum that will be designed and developed for them, (4) to identify the topics and subjects in the Web forum that those visually disabled university students mostly visited for reading, replying and adding new titles under them, (5) to show the effects of the Web forum on the participants for accesing information and establishing social relationships with others, (6) to learn the views and opinions of those visually

disabled university students about that Web forum after actively participating and spending meaningful time in it.

In this study, mixed research method is used. The participants of this study were the visually disabled students of a public university in Ankara, Turkey and found by the researcher with the help of an academician colleague working in the Special Education Department under the Faculty of Education in that university. In that university, there were totally 39 visually disabled students and 36 of them accepted to be enrolled in this study on a voluntary basis.

Within the scope of the study, “EnabledForum - EngelsizForum” was designed and developed by the researcher as a communication and discussion environment for those visually disabled university students for enabling them to establish social relationships with others via submitted posts for the topics and subjects of the forum. Moreover, this forum helped those visually disabled university students for accessing up-to-date information from the Web based sources. Finally, the usage logs of the “EnabledForum - EngelsizForum” helped the researcher to analyse and report which topics and subjects were mostly interested by those visually disabled university students.

Keywords: Visually Disabled University Students, Technologies for the Visually Disabled Students, Visually Disabled Computer and Web Users, Online Communication and Discussion Environment, Web Forum for Visually Disabled University Students.

ÖZ

BİR DEVLET ÜNİVERSİTESİNDEKİ GÖRME ENGELLİ ÖĞRENCİLER İÇİN ÇEVİRİMİÇİ İLETİŞİM VE TARTIŞMA ORTAMI

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Bu çalışma, Ankara’da bir devlet üniversitesindeki görme engelli öğrencilerin bilgiye erişmek ve diğer öğrenciler ile sosyal ilişkiler kurmak için çevrimiçi iletişim ve tartışma ortamında yer alma ve katılım gösterme konusundaki algılarını ortaya çıkarmayı hedeflemektedir. Bu araştırmanın 6 amacı vardır, bunlar: (1) Ankara’da bir devlet üniversitesindeki görme engelli öğrencilerin bilgisayara ve Internet’e erişme ve kullanma konusunda varolan durumu inceleme, (2) Bu öğrencilerin ne tür Web sitelerini gezmeyi tercih ettiklerini öğrenme, (3) Bu öğrencilerin kendileri için tasarlanıp geliştirilecek olan Web forum’da görmek isteyecekleri konuları ortaya çıkarma, (4) Web forum’daki konulardan hangilerinin okuma, cevap yazma ve yeni başlık ekleme amacı ile bu öğrenciler tarafından daha çok ziyaret edildiğini belirleme, (5) Web forum’un bu öğrenciler üzerinde bilgiye erişim ve diğerleriyle sosyal ilişkiler kurma konularındaki etkilerini gösterme, (6) Bu öğrencilerin Web forum’da aktif kullanıcı olarak yer alıp anlamlı bir süre geçirdikten sonraki görüşlerini öğrenme.

Bu alıřmada karma arařtırma yntemi kullanılmıřtır. alıřmanın katılımcıları Ankara'da bir devlet niversitesindeki grme engelli ğrencilerdir ve arařtırmacının aynı niversitenin Eėitim Fakltesi altındaki zel Eėitim Blm'nde alıřan bir mestektařının yardımıyla bulunmuřlardır. O niversitede bulunan 39 grme engelli ğrencinin 36 sı gnll olarak bu alıřmada yer almayı kabul etmiřtir.

alıřmanın kapsamında, katılımcı grme engelli niversite ğrencilerinin, varolan konular zerinde grř paylařarak diėer ğrenciler ile sosyal iliřkiler kurmalarını saėlayacak evrimii iletiřim ve tartıřma ortamı olan "EngelsizForum" Web sitesi tasarlanıp geliřtirilmiřtir. Aynı zamanda bu forum, alıřmada yer alan grme engelli ğrencilerin Web tabanlı kaynaklardan saėlanan gncel bilgilere eriřmesine yardımcı olmuřtur. Son olarak, "EngelsizForum" sitesinin kullanıcı kayıtları ve istatistikleri, arařtırmacının hangi konu ve bařlıkların katılımcılar tarafından daha ok ziyaret edildiėi hakkında analiz ve raporlama yapmasına yardımcı olmuřtur.

Anahtar Kelimeler: Grme Engelli niversite ğrencileri, Grme Engelli ğrenciler iin Teknolojiler, Grme Engelli Bilgisayar ve Internet Kullanıcıları, evrimii İletiřim ve Tartıřma Ortamı, Grme Engelli niversite ğrencileri iin Web Forum.

to my Wife and Family...

to All who added value to my life...

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LIST OF ABBREVIATIONS

2D: Two dimensional

3D: Three dimensional

AFB: American Foundation for the Blind

ALT: Alternative Text

BMBF: German Federal Ministry for Education, Science, Research and Technology

BML: Blind Mark-up Language

BSCW: Basic Support for Cooperative Work

CEIT: Computer Education and Instructional Technology

EATT: Equal Access to Technology Training

ETI: Enhanced Text User Interface

EU: European Union

HCI: Human Computer Interaction

HTML: Hyper Text Mark-up Language

IT: Information Technology

ICT: Information and Communication Technologies

IIS: Internet Information Server

KAI: Kit for the Accessibility to the Internet

MSN: Microsoft Network

NoVA: Non-Visual Access to the Digital Library

PC: Personal Computer

PDA: Personal Digital Assistant

SeEBrowser: Semantically Enhanced Browser

SPSS: Statistical Program for Social Sciences

TAP: Think Aloud Protocol

TEDIS: Teleworking for Disabled People

TTS: Text-to-Speech

UK: United Kingdom

W3C: World Wide Web Consortium

WAB: Web Access for the Blind

WAI: Web Accessibility Initiative of the World Wide Web Consortium

WHO: World Health Organization

WWW: World Wide Web

CHAPTER 1

INTRODUCTION

1.1. BACKGROUND OF THE PROBLEM

Disabilities make it harder to take part in normal daily activities for disabled people. They may limit what people can do physically or mentally, or they can affect the senses that people need to conduct the compulsory tasks to continue their lives. The disabilities that people have may vary due to the problems resulted in the daily lives of them. Shepherd (2006) described the term ‘Visual impairment’ as a physical condition indicating a lower, poorer or reduced level of performance in the visual capability of a human. Similarly, ‘Visual disability’ is another term used to define the outcome of a variety of factors that affect the view of a human in an environment by using the power of sight. At this point, the terms ‘disability’ and ‘disabled’ recognizes that individuals are disabled by a combination of many factors including presumed normality of their visual apparatus or their visual information processing capability. On the other hand, ‘disabled’ appears to be the preferred term when discussing learning disabilities, perhaps because there is no obvious physical ‘defect’ that lies at the heart of this disability (Shepherd, 2006).

Analyzing and understanding complex information is particularly important for students. This includes visually disabled university students, who have similar education expectations as their sighted peers (Dimigen et al., 1992; Dimigen et al., 1993; Taylor & Dimigen, 1994) and whose numbers have more than tripled over the

last 10 years (Roy & Dimigen, 1994). To compete equally with sighted students, they must be able to access and use the same information (Dimigen et al., 1996). Improvements in access to information will lead directly to improvements in the quality of their educational life.

More specifically, when the education of the visually disabled comes to point, it can be stated that visually disabled students encounter several obstacles and barriers before they enter to the university and during their time in there as students. These obstacles and barriers are technical, organisational and social. Visually disabled students are able to finish their courses through their own determination to overcome the barriers they encounter on their way to graduation, through moral and practical support from others, and very often through a high level of creativity. In their studies and educational activities at the universities, visually disabled students use various aids to overcome the barriers caused by their visual disability and to gain access to the data and information which are required for their studies or work. Nowadays, these aids are generally based on computers and the related technology, both in hardware and software means. A computer may provide the information required to the students when needed.

Current techniques for displaying non-visual information rely mainly on speech synthesis and Braille. In those systems, students hear a line of digits read out or, if they read Braille, feel a row of digits. A visually disabled student would just hear rows of letters and numbers spoken, one after another. Properties of human short-term memory mean that listeners are unable to hold in mind enough information to make any non-trivial observations – they become overloaded (Baddeley, 1990; Brewster, 1997).

A visually disabled student will typically use a screen-reader and a voice synthesizer to get access to information on computers (Edwards, 1995). The screen reader extracts textual information from the computer's video memory and sends it to the speech synthesizer to speak it. The screen reader approach has a major problem in that it

contains nothing of the semantics of the information presented. Raman (1996) stated that “Since the screen-reading application has only the contents of the visual display to examine, it conveys little or no contextual information about what is being displayed”.

However, visually disabled university students are often expert users of computer software and hardware because an increasing amount of their support environment tends to be digital and electronic. Nevertheless, the needs of such students should be reconsidered in relation to the software they are required to use in their courses. The most common software they need to interact with the computers is the screen reader which enables them to hear all the text on the screen read aloud by the text-to-speech (TTS) application and allowing them to control the computer by using the keyboard. This software extracts text from the screen and passes it to a speech synthesizer device.

As being sighted users, we use two main devices for the input to and interact with the computer, mouse and the keyboard. Visually disabled people (and students) find it impossible to use a mouse on the screen, and prefer to use the keyboard when using a computer. Most of the current operating systems provide a standard set of keyboard shortcuts for undertaking common screen-based tasks. Sreenivasan (1996) state that “The Internet has changed forever the lives of blind people, mainly because it provides independent access to information” (Sreenivasan, 1996). Similarly, when surfing the Web, visually disabled people use the TAB key on the keyboard to move from one link to another on a Web page. If ‘access key’ statements have been included within a Web document, it is also possible for the reader to move rapidly from one section of a page to another by using simple key combinations. The W3C consortium, through the WAI initiative, has taken the step of providing guidelines, in order to tell developers what they should (or should not) do in order to build “readable” pages. Unfortunately, few Web designers completely support keyboard navigation for Web pages. Because the ability of visually impaired students to access Web materials depends mainly on how designers created the Web pages, it is

indicated that some of the Web design principles and techniques should be adopted for the benefit of visually disabled Web surfers.

Due to the facilities they provide to the participants, the Internet and the Web are the mostly preferred environments for the online communication and discussion with the help of current developments in computer technology, both in hardware and software means. A Web page is inherently complex since it simultaneously conveys pieces of content and relationships among them, “links” to other pages, etc. The core of the communication lies in the content whereas many additional and fundamental semantics comes from visual features, such as graphics, layout, colors, fonts and positioning. Moreover, in most of the current Web presence, a large portion of the content is visual (Pictures, graphics, etc.), or based on visual perception (Tables, diagrams, etc.). As a result, accessing the Web for visually disabled people can be difficult in many senses.

As stated in the “Section 508” act of the United States of America, in order to ensure that its technology is accessible to its own employees and to the public, electronic and information technology developed, procured, maintained or used by the Federal government be accessible to people with disabilities. These regulations apply to all Federal purchases of technology. Requirements in Section 508 may also impact state colleges and universities, pending policy decisions from the Department of Education Office of Civil Rights.

Considering the existing case, the Web is a visually dominant tool for the students and learners in online environments. Because of this, university students with visual impairments are not able to attend and participate in the discussions on the forums and chats located on the Web. Additionally, the other resources for the visually disabled students on the Internet are limited and not organized according to the needs, expectations and requests of them.

1.2. PURPOSE OF THE STUDY

This research has six interlinked purposes: (1) to investigate the current status of the visually disabled university students at a public university in Ankara, Turkey for accessing and using computers and the Internet, (2) to learn the kind of web sites that those students prefer to visit on the Internet, (3) to discover the topics and subject they prefer to see in the Web forum that will be designed and developed for them, (4) to identify the topics and subjects in the Web forum that those visually disabled university students mostly visited for reading, replying and adding new titles under them, (5) to show the effects of the Web forum on the participants for gathering information and establishing social relationships with others, (6) to learn the views and opinions of those visually disabled university students about that Web forum after actively participating and spending meaningful time in it.

1.3. RATIONALE OF THE RESEARCH

As we already know, technology enhances the productivity of human beings and improves the quality of life. For many people with disabilities, technology is critical for functioning independently, without the help and support of others which is already and mostly refused or considered as a feeling of compassion by them. Wide range of technology resources provide access to people with visual disabilities for employment, accomplishing jobs and having greater freedom to live and socialize in the settings of their choice. To support people with visual disabilities, the governments of most of the countries all around the world has enacted laws to encourage development of, and access to, assistive technology for removing the barriers between them (Cohen and Spenciner, 2007).

Education is a key determinant of future success, and every people deserves equal access to education in any case. The opportunity for a quality education should not be denied on the basis of physical, mental or cognitive disability. Beginning with the “Individuals with Disabilities Education Act” of 1975 and most recently through the

“No Child Left Behind Act” of 2001, the government of the United States of America has maintained the rights of those people with disabilities and their families to get the most out of America's educational opportunities (Cohen and Spenciner, 2007). Similarly, in 2003, the European Commission presented a new action plan aimed at promoting equal opportunities for people with disabilities across the enlarged European Union (EU), in the form of a Commission Communication (Cohen and Spenciner, 2007). The Commission hopes that the action plan will provide a reference point and a framework for ensuring that disability rights and issues are fully taken on board in all relevant EU policies. It therefore intends to publish a report every two years on the overall situation of people with disabilities in the EU.

Communication and interaction play an important role at the higher education in universities, for both preparations for and enrollment in the courses. It is essential that all students should remain in contact with lecturers and advisors. At the same time, the student should think as far ahead as possible to be well-prepared and able to recognize problems and barriers in advance, so that they can be avoided. It is often the case that visually disabled students must make the first move to set up this communication process.

Communication with fellow students is especially important for visually disabled students. This is how they receive the latest messages and information on the announcement boards or learn the news about the courses. There is no limit to the things lecturers and other students can do to help visually disabled students and contribute to removing the barriers they encounter during their stay at university.

Considering these facts, it can be argued that if the available technologies about the Internet and Web can be used for the visually disabled students to enable them establishing communication with others in an effective manner, the social barriers in front of them can easily be removed and they can be integrated in the society for sharing the online information and documentation. Visually disabled students already using the Internet and Web for their daily needs including communication, education,

information gathering, discussion, shopping, entertainment and cultural activities, but there is no specific study about how they use the Internet and what they need on the Web. The existing Web forums on the Internet are designed and developed according to the people who don't have any visual disability and constructed with considering commercial concerns and popularity rankings supported with graphical aids to attract much more Web users to register and spend meaningful time within the site. It can be stated that this field lacks extensive research studies to determine the existing situation of visually disabled university students in Turkey about technology usage and their expectations from a Web forum to communicate with others around and discuss on the categorized topics and subject offered in that forum.

1.4. RESEARCH QUESTIONS

The research question that guides this study is listed below:

(1) To what extent do visually disabled students at a public university in Ankara, Turkey attend and participate in an online communication and discussion environment on the Web for gathering information and establishing social relationships?

(1.1) What are the initial opinions of visually disabled students at a public university in Ankara, Turkey for accessing and using computers and the Internet in their daily lives?

(1.2) What kind of national or international Web sites do visually disabled students at a public university in Ankara, Turkey visit on the Internet?

(1.3) What are the preferences of visually disabled students at a public university in Ankara, Turkey for the topics and subjects in a Web forum that will be specially designed and developed for them?

(1.4) What are the most popular topics and subjects in the Web forum according to the usage statistics of visually disabled students at a public university in Ankara, Turkey?

(1.5) What are the effects of the Web forum on visually disabled students at a public university in Ankara, Turkey for gathering information and establishing social relationships with others?

(1.6) What are the views and opinions of visually disabled students at a public university in Ankara, Turkey about the Web forum after using it?

1.5. SIGNIFICANCE OF THE STUDY

The research conducted within the context of this study enable other people to be informed about the social isolation of visually disabled students at a public university in Ankara, Turkey and focus on the design and development issues in the online systems (Web sites and Web based applications) by considering their special case for interaction. The online communication and discussion environment, “EnabledForum - EngelsizForum”, which was designed and developed as a result of this study helped the visually disabled students in this study to establish communication and relationships with others in the same situation like them. Moreover, by participating as an active user of this Web forum, visually disabled students at a public university in Ankara, Turkey got up-to-date information from the Web-based resources and discussed on topics and subjects for sharing their experiences and exchanging information with others.

1.6. ASSUMPTIONS OF THE STUDY

Within the scope of this study, it is assumed that all the data were collected and analyzed by scientific methods with the help of appropriate computer software and by considering the social and ethical issues of the special context that the researcher and

the participants were enrolled in. The instruments used in this study were valid and reliable and the visually disabled university students were honest in their responses.

Additionally, it was presumed that all the primary forerunners and participants have some thoughts and beliefs about this study for collecting data related with the computer and the Internet usage of visually disabled students at a public university in Ankara, Turkey. Moreover, “EnabledForum – EngelsizForum”, which was designed and developed for the participants of this study, played an important role for being an online communication and discussion environment for them to share information and discuss on the topics and subjects. Furthermore, the participants were supposed to respond accurately to all measures used in this study and the data were accurately recorded and analyzed. Furthermore, it is believed that validity and reliability of all the measures used in this study were accurate enough to allow these assumptions.

1.7. LIMITATIONS OF THE STUDY

The limitations of this study are the honesty of the visually disabled students of a public university in Ankara, Turkey and voluntarily active participation of them, available technology including computer hardware and software, performance and effectiveness of the Turkish screen reader software installed on the participants’ computers, reliability of the instruments, lack of generalization to the other visually disabled university students in Turkey.

The delimitation of this study is that the environment, “EnabledForum - EngelsizForum” which is an online communication and discussion environment for the visually disabled students of a public university in Ankara, Turkey.

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

- **Technology for the Visually Disabled University Students:** Assistive technologies that help visually disabled or visually impaired university students for conducting the tasks in their life easily and effectively. Include talking household goods, white stick, braille alphabet, keyboard and printer, computers, screen magnifiers, screen readers, voice-activated systems, etc. These tools and technologies enable visually disabled university students to carry on their life without the help of other people to a certain extend.
- **Web Based Systems for the Visual Disabled University Students:** Online systems on the Internet that having a text-based interface for the visually disabled university students for enabling them to benefit from the content which is read aloud by a screen reader for offering a service to them. Include online searching, messaging, news, announcements, education, banking, trade, governmental services, etc.
- **Text-To-Speech Systems:** Computer-based systems that convert the written text on the screen to a human voice. These systems are used in the environments where it is difficult for a human to see and read the text on a screen or for visually disabled people to enable them to understand what is on a screen. These systems function by converting the content on a screen to text and then read aloud it by using a sound card and a speaker.
- **Screen Reader Software:** Based on the text-to-speech systems, screen reader programs read aloud all the text appearing on a screen of a computer to inform the user (mostly a visuall disabled person) about what is shown on it. Mostly used for helping the visually disabled computer users to enable their interaction with the computers at their own pace without the help of sighted others. Freedom Scientific's screen reader, JAWS, is the most popular on the

World market with multi-language support and advanced reading skills for all levels of users.

- **Web Forum:** Web sites or online systems that give service to their registered users for information sharing, messaging, communication and discussion on specific areas organized under main topics and titles having related content, both textual and graphical. Web forums are very popular platforms for information sharing in a well-organized environment to enable their users to find what they are looking for in a short time. They also acts as a meeting point for the people interested in a specific topic to come together and share their experience and information with others.
- **Online Communication and Discussion Environment:** Internet or Web based systems that are used for communicating with other people by leaving messages or submitting a post and discussing on a specific topic with them to share their opinions and ideas. These environments are also used for announcements and declarations by governmental or non-governmental organizations to reach “online” people in a time and cost-effective manner.
- **Web Forum for Visually Disabled People:** Web forums that giving service to the visually disabled computer users by offering topics and subjects (selected according to their preferences) with a text-based interface in which all the content is read aloud by the screen reader already existing on their computers. The interfaces of these Web forums are designed according to the needs and user profiles of the visually disabled people for enabling them to interact with the Web site easily. The content and the links of these Web forums are all text-based for helping the screen reader software to read aloud more effectively.
- **EnabledForum – EngelsizForum:** A specially designed Web forum for visually disabled students at a public university in Ankara, Turkey to provide

them an online environment for communication with others and discussion on subjects and topics grouped under various categories. It is the first one in the domain of web sites in Turkey and other countries for giving services to a special group of users, visually disabled university students.

CHAPTER 2

LITERATURE REVIEW

This chapter provides a review of the related literature about the research, including; Education of disabled / visually disabled people, Online communication and collaboration in learning, Technology for computer usage of visually disabled people, Mental models of visually disabled people for using computers, Special interfaces and Web browsers for visually disabled people, Visually disabled people accessing and navigating on the Web, Accessing information on the Web by visually disabled people, Hypermedia and multimedia on the Web for visually disabled students, Web accessibility for visually disabled students, Problems of visually disabled users on browsing the Web, Studies for visually disabled university students in Turkey and Summary of the chapter.

2.1. EDUCATION OF DISABLED / VISUALLY DISABLED PEOPLE

In this part, the previous studies about the education of disabled (visually or other) people will be listed. Fuller et al. (2004) conducted a study about problems of disabled students at the universities in United Kingdom (UK) focused on students' experience of learning in higher education, and noticed that disabled students in higher education have some barriers to learning. The article reports both statistical data about the quality and variety of 173 students' experience of learning as well as qualitative comments from the students about learning and assessment. Analysis of the survey points to the need for attention to be paid to issues of parity and flexibility of

provision and to staff development in making the reasonable adjustments required by recent disability legislation in UK.

A solution to problems faced by the disabled students at the universities can be virtual learning environments. Fundamentally, it is the teaching and learning resources and activities offered to those visually disabled students accessible and usable. However, Cooper (2006) states that if a disabled student is to fully participate in a course and university life, accessibility must include all aspects of the interaction between the student and the institution. This includes registration, teaching and learning, examinations and other forms of assessment, instructional support, pastoral care and community building. Cooper (2006) expresses that "Good design for disabled people is good design for all". Considering the needs of disabled students facilitates reflection on the interactions that support the learning objectives, and addressing the accessibility agenda promotes usability for all. If the learning objective is to appreciate that non-verbal communication takes place, and the assessment requires the student to describe the body language, then an alternative activity and assessment should be devised for visually disabled students.

The underlying assumption in most discussions of Web-based learning seems to be that computer-based communications provide a transparent, or universally comprehensible and accessible, medium for learning, provided that the student is appropriately trained and skilled. There appears to be a notion of a "generic" or "universal" user (learner) behind the notion of a transparent medium. Bricout (2001) argues that the notion of a generic or universal user has led to the creation of both public and private facilities and services that have proven inaccessible to individuals with disabilities who do not fit in the form. In this respect, the accommodation of students with disabilities taking Internet based courses is at much the same stage as the accommodation of individuals with disabilities prior to the passage of legislation recognizing the discrimination inherent in public services designed without regard to disability-related impairments. Moreover, Bricout (2001) states that computer

technology promises to enhance the experience of student learning by using dynamic new interfaces with resources, instructors, student peers, and others.

More specifically, Cretu et al. (2006) conducted a comparative study reviewing the educational facilities available in the last decades of the 20th century for visually disabled children and young people in both Romania and the United Kingdom (UK). It is pointed out that Romania got an incentive to bring special educational philosophy and facilities quickly into line with other countries in the European Union. The authors state that similar problems about e-learning are encountered in both countries. Differentiating features are their different demographic characteristics and the educational resources and assets available at the time of the major changes. The UK has been able to develop and advance further than Romania in this sphere, but the legal framework is in place in Romania.

Similarly, Douglas (2001) documented a study about using Information and Communication Technologies (ICT) for visually disabled students, providing an overview of developments in the use of ICT in the education of children with a visual impairment. In the study, the context is set by summarizing the population of children with a visual impairment in this country, and presenting World Health Organization's classification of disability as a criterion by which the relevance of ICT can be measured. Case studies of the use of different types of educational and access technology are presented and it is argued that information and communications technology has a valuable role in providing opportunities for children with a visual disability to participate more fully in education. It would appear to be reasonable to expect educational material produced by staff and students to be accessible to disabled students whenever possible, and audiovisual material in particular can benefit from captioning. (Wald, 2006)

However, Corn and Wall (2002) state that students' educational placements may affect their readiness for business or further education life to use the type of computer systems. Moreover, Corn and Wall (2002) express that Personal Computer platforms

are more widely used in special schools for visually disabled students as it is difficult to use access technology in the Macintosh platform.

Arnim et al. (2007) conducted a study about science and engineering learning environments for visually disabled students to introduce design principles and guidelines for the development and improvement of universal access systems for the visually disabled students. Based on interviews and surveys with students and instructors at various visually disabled institutions, their study showed that there is an interest in using haptic technology to help the visually disabled and partially sighted students. They stated that the linear set-up would help the visually disabled users navigate through the system without trying to figure out a circular set-up and with the linear set-up the user would only need to be worried about left to right movement, or up and down. Furthermore, they state that, in dealing with sounds, the students and instructors felt that keeping verbal feedback for icons in conjunction with the gravitational force would be very helpful.

Additionally, Arnim et al. (2007) introduced a haptic virtual learning environment to help science learning for visually disabled students, demonstrating how these principles and guidelines have been applied. They suggest that haptic force and tactile perception, combined with hearing and more importantly additional thermal sense, can be a very important perceptual mechanism for the visually disabled student, because much of their world is mapped through their haptic senses. In their study, a haptic virtual learning environment was developed to help science learning for visually disabled students, a learning system in which science education could be made accessible to both them and their teachers.

Similarly, Sánchez (2007) proposed a model for creating virtual learning environments for students with visual disabilities. The modeling process starts with the definition of desired cognitive skills. Then, they created a virtual environment that includes a navigable world by using adequate modeling languages, dynamic scene objects and acting characters. In the study, scenic objects are characterized by graphic

and acoustic attributes; character's actions are based on deterministic and nondeterministic plans in the same way as in interactive hyper stories described by Lumbreras and Sánchez (1999). The learner explores the virtual world by interacting with appropriate interfaces and obtains interactive feedback. The learner's actions, such as sound reproductions, are collected, evaluated, and classified based on student modeling and diagnostic subsystems.

According to Colwell, Petrie and Kornbrot (1998) and Paciello (1998), there are several domains in which virtual learning environments can be used to build educational software for people with visual disabilities:

- (a) In education, a virtual laboratory may assist students with physical disabilities in learning scenarios. Possible applications concern issues about problem solving, strategic games, exploring spaces or structures and working with concrete materials. Special virtual learning environment interfaces, such as head-mounted devices, the space mouse and gloves are often included.
- (b) Training in virtual learning environments deals with mobility and cognitive skills in spatial or mental structures.
- (c) Rehabilitation is possible in the context of physical therapy - a recovery of manual skills or learning how to speak and listen to sound can be targeted.
- (d) Access to educational systems is facilitated via dual navigation elements such as earcons, icons, and haptic devices.

On the other hand, as a result of the research of unemployment statistics amongst people with disabilities across Europe conducted by Batusic et al. (2006), it is understood that graduates with disabilities have difficulty making the transition from the educational environment to the employment. Accordingly, an IT (Information Technology) training project is designed and developed which is focused on the needs

and requirements of disabled / visually disabled students who are about to complete their studies or have already graduated and have to prepare themselves for professional life. It is stated that long-term goal of the project is to increase the number of visually disabled and physically disabled students employed in the open labour market as well as to develop basic computer skills that will increase their skills and confidence in entering the open labour market. Furthermore, EATT (Equal Access to Technology Training) is an IT Training Programme delivered online and includes an online learning environment for visually disabled computer users, and was funded by the Leonardo Da Vinci Programme. The aim of the project was to increase the computer literacy of visually disabled computer users over the age of 35 however the principals of learning new computer skills that would be needed in a work environment. Within the program, an e-mailing list allowing students to communicate with both teachers and fellow students and a specialized teletutor to answer more detailed questions and to support the learning process were developed.

2.2. ONLINE COMMUNICATION AND COLLABORATION IN LEARNING

The effectiveness of online communication and collaboration in education has been proved by many studies in the literature. Jones and Cooke (2006) conducted a study about how students learn in online discussion. In their study, they state the potential offered by in-depth qualitative analysis of students' online discussion to enhance our understanding of how students learn in two case studies. Both cases were used to illustrate how the monitoring and moderation of online student group communication can open up a window into learning, providing us with new insights into complex problem-solving and thinking processes. Moreover, Jones and Cooke (2006) point out that an additional benefit from the use and analysis of these forums has been the opportunity opened up to them for enhancing their own practice through a better understanding of students' problem-solving processes and from an insight into their own "reflection-in-action" (Schön, 1982). The study of Jones and Cooke (2006) provides some ideas about this process of learning about students' learning, focusing

on how we can harness the power of collaborative communication tools to improve this knowledge.

On the other hand, Internet-based cooperation environment for the disabled people was studied in the research project (TEDIS – Teleworking for Disabled People) of Pieper and Hermsdorfb (1997) as an assistive technology contribution to the promotional program “Telecooperation - Value Added Services” of the German Federal Ministry for Education, Science, Research and Technology (BMBF). The general goal of the project was to implement a generic human computer interface for accessing Internet, which can be adapted to a variety of different needs of handicapped people. Within the project, the Internet-based cooperation environment BSCW (Basic Support for Cooperative Work) was installed to manage the teleworking process for two severely physically disabled teleworkers. BSCW was adjusted to the special needs of disabled people based upon data gained by structured usability-interviews, including accessibility by keyboard for visually disabled. Moreover, the approach of modifying HTML layout for the visually disabled has been realized in the WAB (Web Access for the Blind) project.

Similarly, collaboration between visually disabled and sighted Internet users may play an important role for establishing a social connection and interaction with others in their life. According to Kuber, Yu and McAllister (2007), visually disabled users often find the process of receiving directions from their sighted peers challenging, as it is difficult to locate or reach a particular target on an interface, using commands provided by an assistive device. To facilitate joint operation, the authors claim that visual and non-visual interfaces should ideally support the same model of the application interface, and their respective presentation should be synchronized.

Additionally, Kuber, Yu and McAllister (2007) state that developing a sense of coherence between both visual and non-visual Web interfaces would enable both groups to work together towards a common goal. It is thought that non-visual technologies can be used to assist visually disabled and sighted users when

performing a Web-based task. The study of Kuber, Yu and McAllister (2007) aimed to investigate whether both visually disabled and sighted users could work together towards a common goal or not.

2.3. TECHNOLOGY FOR COMPUTER USAGE OF VISUALLY DISABLED PEOPLE

There are some technologies for the visually disabled people enabling them to interact with the computers. Screen readers can be described as the fundamental technology for the visually disabled people to navigate on the Internet and the Web.

People who are visually disabled access to the Internet by using screen-reader software that reads aloud the text on a Web page. Schaefer (2003) states that screen reader software has three main components: First, the software provides keyboard equivalents for many commands that are normally performed with a mouse. Second, most screen-reader programs are compatible with and rely on generic Windows controls, such as file, edit, view, insert, and so on. Third and relevant to private Internet sites, screen-reader technology displays a text message in place of visual graphics on the screen if a text explanation is provided by the Web site.

On the other hand, Schaefer (2003) also points out the problem for screen readers by stating that inaccessible Web page designs either hiding the text within images, frames or animated graphic formats or rendering the text with the formats which are difficult to understand. Moreover, online forms (existing in the Web sites of e-banking or e-shopping) are also inaccessible, when designed to prevent keyboard navigation and input leading to significant barriers to participate in the digital economy. Wald (2006) argues that screen readers using speech synthesis can provide access to many materials and sometimes be helpful to provide real synchronized speech.

However, simply reading the text and converting it to speech will not solve the navigation problems of visually disabled people on the Internet. Loo, Lu and Bloor (2003) states that screen reading is usually done in a batch mode but for Internet navigation, a real time mode is required. They argue that “reading aloud every item on a Web page and asking the user to make subsequent choices constitutes a heavy burden on a human's short-term memory making it a poor HCI technique” (Loo, Lu and Bloor, 2003). It is pointed that “Innovative methods” should be developed for visually disabled people to allow them access to the Internet.

Lazar et al. (2007) conducted a study with 100 visually disabled Web users including implications for Web / screen reader developers and users by listing the problems as (a) page layout causing confusing screen reader feedback; (b) conflict between screen reader and application; (c) poorly designed/unlabeled forms; (d) no alt text for pictures; and (e) 3-way tie between misleading links, inaccessible PDF, and a screen reader crash.

However, Corn and Wall (2002) state that partially sighted students can use both PC (personal computer) and Macintosh platforms to benefit from assistive technology as well as specialized access technology (Screen readers and Braille displays). On the other hand, visually disabled students prefer to use the PC platform and are more focused on technology that is designed specifically for them. It can stated that the PC platform is more user friendly for visually disabled students to run the specialized programs which are critical for them to interact with the machine. Moreover, Corn and Wall (2002) express that access technology acts as a bridge from the visually disabled students to the information but teachers should not assume that the availability of access technology guarantee full access to the required information.

On the other hand, a study analyzing Web navigation on mobile devices for visually disabled people is conducted by Chen et al. (2006). The authors describe an interface built on a standard PDA (Personal Digital Assistant) and allow users to browse the stored information through a combination of screen touches coupled with auditory

feedback. It is stated that the system developed within the study also supports the storage and management of personal information which can be created instantly and then accessed anytime and anywhere by the PDA user.

2.4. MENTAL MODELS OF VISUALLY DISABLED PEOPLE FOR USING COMPUTERS

Kurniawan et al. (2002) analyzed the mental models of the visually disabled computer users in Microsoft Windows environments through interviews and user observation, stating that visually disabled users had similar and highly structured strategies and adopted three stages of strategy; exploration, task-action and configuration, as shown in Figure 1.1. In that study, it is pointed out that visually disabled users have three types of mental models of the Windows environment: structural, functional or a combination of these two models and have more problems in using a new application when there is a mismatch between the user's established mental model and the way the application works. They express that there are two mental models of the visually disabled users in Windows environment, one group thinking the desktop, windows applications and screen reader as an integral whole, whereas others don't have separate mental models for each like three different entities. It is observed that some users ask for help immediately when they have problems with interacting with Windows environment whereas some others look for alternatives to produce solutions. Moreover, visually disabled computers users can also be divided into two, according to their mental behavior for computer and screen reader use; expert and novice. Expert users can draw their own way for finding the solution for interaction but novice users need some help from others if possible, together with the reliability and flexibility of the task that should be accomplished in Windows environment.

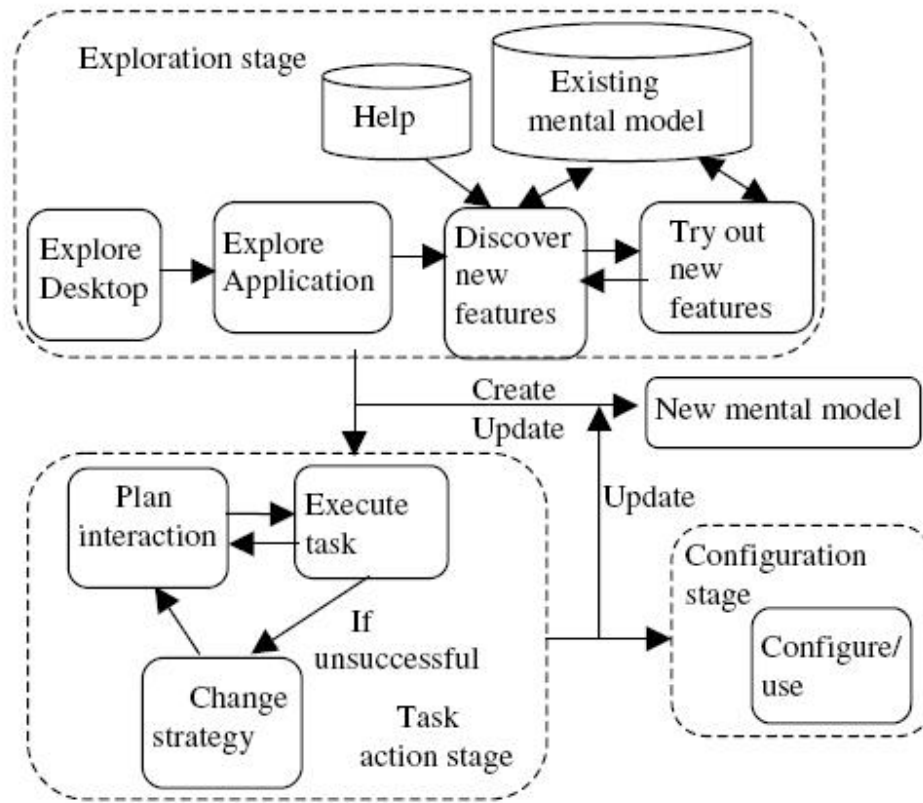


Figure 1.1 Flow diagram of strategy in coping with a new Microsoft Windows environment or application (Kurniawan, Sutcliffe, Miesenberger & Klaus, 2002)

2.5. SPECIAL INTERFACES AND WEB BROWSERS FOR VISUALLY DISABLED PEOPLE

There are some special interfaces and Web browsers for the visually disabled people for enabling them to interact with the computer and navigate on the Web sites, including text-based, semantic, tactile, audio-based, voice-driven and haptic technologies.

Salampasis and Kouroupetroglou (2007) conducted a study about semantic Web application framework which uses ontologies to create annotations related to content

and interface of Web pages and enabling visually disabled users to personalize their interaction with a Web page and allowing different applications to be designed and developed for improving Web accessibility. They developed a specialized voice Web browser for visually disabled people, called “SeEBrowser” (Semantically Enhanced Browser) which utilizes semantic annotations of Web pages and provides browsing shortcuts to enable interaction facilitating visually disabled people to move efficiently on a Web page during the information seeking process.

Rotard, Knödler and Ertl (2005) state that a tactile Web browser having bitmap and scalable vector graphics explored in a special mode may help visually disabled people to access to the Web in a two-dimensional rather than linear representation. It is pointed out that the two-dimensional structure and the exploration of graphical information is an advantage for visually disabled people in grasping the semantic meaning of Web pages and learning materials. Moreover, in their study, Rotard, Knödler and Ertl (2005) developed a tactile Web browser for the visually disabled users by using Java. In the study, a transformation schema opening a new way for visually disabled people to browse on Web pages is proposed by implementing a Web browser to render Web pages on tactile graphics display.

A similar study is done by Siekierska et al. (2003) discussing the various types of tactile / audio-tactile maps and sound-based computer interfaces for visually disabled people. In this study, they inform readers about the initiation of the interdepartmental tactile mapping project in Canada (the division of Information and Services for People with Disabilities Program), to share the results obtained thus far and to obtain feedback from others working in similar fields.

Correspondingly, McAllister, Staiano and Yu (2006) conducted a study about audio interfaces for the visually disabled people detailing an approach to create bitmapped graphs for them to access the Web and the Internet. In their study, the authors used a process including a combination of manual intervention from a Web developer, and novel automatic algorithms that are specific for graph-based images. It is argued that

their approach identifies the important regions of the graph and tags with meta-data and then exported to a Web page for exploration by the visually disabled user.

Loo, Lu and Bloor (2003) made a research about developing a new Human Computer Interaction (HCI) model and an associated computer system for visually impaired people so that they can browse the World Wide Web via Internet. Within their study, an Internet navigation tool for visually disabled people, namely “VocalSurf” was developed to assist them to understand the contents of Web pages through speech and using simple keyboard instructions, to interact with the various components of a Web page. Loo, Lu and Bloor (2003) state that “VocalSurf” would enhance the view of visually disabled users on the online environment by shortening the distance between sighted users and them.

Similarly, another voice-driven text-to-speech system, namely “HOMER II”, for visually disabled users is designed and developed by Pavesic et al. (2003). They state that the developed system, “HOMER II” consists of four main modules, first is the Internet communication module for saving text to disc and converting it to a standard form, second is the input interface module for keyboard entry and speech recognition, third is the output interface module for speech synthesis of a given text and printing it magnified to the screen, and the fourth is the user dialog module for interacting with the system in a user friendly manner.

In their study, Delic, Vujnovic and Secujski (2005) also mentioned about audio based interfaces for visually disabled people by reviewing speech applications and innovative systems in human-computer interaction applied in Serbian-speaking areas. They state that the “obstacles” for the visually disabled people can be classified in the non-existence of the three domains: input devices, output devices and black print information. Within the study, Delic, Vujnovic and Secujski (2005) described three examples in details: a text-to-speech synthesizer (screen reader), an audio library and a speech-enabled Web site. It is pointed that these are crucial for visually disabled

computer users especially for voice portals and interactive voice response telephone services.

Another audio-based voice browser for visually disabled people is developed by Watanabe, Okano, Asano and Ogawa (2007), “VoiceBlog”, which has a cascading user interface for aural presentation and with a hierarchic structure, and can well parse strictly structured Web content such as blogs. In the study, after observing the use of the “VoiceBlog” browser together with the interviews with visually disabled users, they state that it facilitated the tasks such as reading and following the Web content comparing the other existing browsers. Moreover, it is expressed that sighted and visually disabled users have different demands on browsing through Web pages and it is difficult to provide a universal solution to the problems of the users. Within the study, it is pointed out that the ease of using “VoiceBlog” depended on the visually disabled user’s experience with voice browsers on the Web.

Tzovaras, Moustakas, Nikolakis and Strintzis (2007) conducted a study presenting a mixed reality tool developed for the training of the visually disabled people based on haptic and auditory feedback by focusing on the development of an interactive and extensible “Haptic Mixed Reality” training system that allows visually disabled to navigate into real size “Virtual Reality” environments. Within the study, it is stated that the system is based on the use of the haptic device, namely “CyberGrasp™”. The authors state that developing “force feedback interfaces” allow visually disabled users to access not only two-dimensional (2D) graphic information, but also information presented in three dimensional (3D) virtual reality environments and this environments can be used in education, training and communication of general ideas and concepts.

Haptic technology was also mentioned in the study of Yu, Kangas and Brewster (2003). Within the study, a Web based multimodal tool with interactions has been developed to allow visually disabled people to create virtual graphs (including line

graphs, bar charts and pie charts.) independently by using a haptic device “WingMan Force Feedback Mouse” and audio.

However, Leuthold, Bargas-Avila and Opwis (2008) state that “Enhanced Text User Interface - ETI” can be an alternative to the graphical user interface for visually disabled computer users after conducting a study with 39 visually disabled participants executing a search and a navigation task on a Website. Their study showed that with the use of ETI, visually disabled users made faster search on the Web with fewer mistakes leading to significantly better performance comparing to graphical user interfaces they experienced with other Web sites before. But, on the other hand, the use of ETI system has no effect on the navigation performance due to the labeling problems on links, as argued in the study.

Another solution for the Web navigation problem of the visually disabled people is offered by Mukherjee, Ramakrishnan and Kifer (2004) by proposing “semantic bookmarking” for browsing Web pages. They state that the use of ontologies allows semantic bookmarks to span multiple Web sites covered by a common domain, which enables information retrieval and bookmark maintenance for the visually disabled. In the study, the authors describe highly automated techniques in a Web browser for creating and retrieving semantic bookmarks. It is pointed out that “a voice-driven personal information assistant for automatically retrieving content from diverse forces including those requiring access to the deep Web” (Mukherjee, Ramakrishnan & Kifer, 2004)

Similarly, Salampasis, Kouroupetroglou and Manitsaris (2005) discuss effective solutions for the problems related to the information seeking process on Web for visually disabled users by using semantic browsing based on metadata.

Another screen-reading Web browser is designed and developed in the study of Borodin et al. (2007). Namely “HearSay”, text-based audio Web browser, having context-directed flexible navigation and an extensible VoiceXML dialog interface

was implemented in the study. The “HearSay” browser is developed at the Stony Brook University in collaboration with the Helen Keller Services for the visually disabled in Hempstead, New York, USA. Within the study, it is stated that “HearSay” is a free open-source multi-platform having the underlying technologies such as content analysis, natural language processing and machine learning.

On the other hand, the attitudes of visually disabled people for interacting with a Web site are analyzed by using “Think Aloud Protocol - TAP” in an evaluation study conducted by Chandrashekar et al. (2006). The authors state that “TAP is a verbal protocol method used to gather usability data during system evaluation by asking the users to vocalize their thoughts, feelings and opinions concurrently while interacting with the system.” The study shows that using screen readers require a high cognitive effort from visually disabled users as it involves hearing the page content in a sequential order, hearing the repeating information on each page (such as banners and copyright information) and processing information in small portions as delivered by the screen reader. It is expressed that users must remember the whole page by forming connections in their mind between these small portions. The authors also point out that the synthetic speech of the screen reader lacks prosodic cues (emphasis and rhythm), which are important for parsing of speech. As a result, as stated in their study, all these put additional pressure on the cognitive resources of the visually disabled users affecting their ability to simultaneously accomplish any other tasks that require thinking on the Web. (Chandrashekar et al., 2006)

2.6. VISUALLY DISABLED PEOPLE ACCESSING AND NAVIGATING ON THE WEB

Accessing the Web and Web resources is a big problem for visually disabled users as the existing browsers having graphical user interface are all designed for sighted people. Walshe, McMullin and Miesenberger (2004) propose an approach to the design of a browser tailored for visually disabled users that can be achieved through maximal exploitation of structural HTML mark-up to support highly dynamic and

interactive user control of content rendering. In their study, Walshe, McMullin and Miesenberger (2004) propose a primary speech-based interface for Web browsing as an alternative to current approaches which layer a secondary screen reader interface over a primarily browser. They state that supplying additional navigational functions based on direct analysis of the structural mark-up of the page can be useful for visually disabled users. Moreover, the authors suggest that “incorporating the facility to directly navigate XHTML based tree-like structure should provide the user with a powerful method for establishing a mental model of the page structure and interacting with it”. (Walshe, McMullin & Miesenberger, 2004)

Similarly, Salamasis and Kouroupetroglou (2007) are also analyzed the Web accessibility problems of visually disabled users in their study. They discussed the problems of disorientation and cognitive overload (including task completion time, number of keystrokes, Web page reading times) on visually disabled users while browsing the Web and they described a semantic Web based framework as a solution to this problem. They propose “browsing shortcuts” with personalized user interface of a specialized voice Web browser as a mechanism which facilitates visually disabled people to move efficiently to various elements of a Web page (e.g. forms and links). Within their quantitative study, the authors measured the navigation performance and cognitive workload with and without the use of browsing shortcuts, and the results showed the statistically significant positive effect of browsing shortcuts on navigation performance of visually disabled Web users.

Correspondingly, Asakawa and Takagi (2000) developed an annotation-based transcoding system working between a Web server and a user to convert existing Web pages to be accessible for visually disabled people. They state that “Visually disabled users read the Web contents in tag order, but visually fragmented groupings are not accessible using tag order reading.” To do so, the system developed by Asakawa and Takagi (2000) had two components, one for structural annotations and one for commentary annotations. Within the study, the authors state that structural annotations

are used to recognize visually fragmented groupings whereas commentary annotations for giving useful description of each grouping.

However, Hoppestad (2007) states that there is no all-in-one “universal design” solution to the problems faced by visually disabled users for the use of Web browsers because of the diversity of needs. He express that this diversity should be taken into consideration whereas people with visual disabilities are seen as problematic with regard to computer and Web access.

Similarly, Corn and Wall (2002) confirm that the visual disability can be avoided with the help of assistive access technology for the students who need immediate access to the information by focusing on supporting and facilitating the movement toward “universal design”.

2.7 ACCESSING INFORMATION ON THE WEB BY VISUALLY DISABLED PEOPLE

The American Foundation for the Blind (AFB), in collaboration with the United States Bureau of the Census, has collected some statistics for the Internet access and regular computer use by visually disabled patients (Chiang et al., 2005). Four main points came to front in this study, as: First, visually disabled users are using computers rarely. Second, they have lower rates of Internet access than sighted ones. Third, they are elderly people who also have other disabilities such as physical or audio. Fourth, the employment type affects the rates of Internet access and regular computer use of visually disabled people. (Chiang et al., 2005)

Visually disabled people have too many difficulties for accessing the information and resources on the Web due to the nature of the Web as all sites are designed for sighted people and full of attractive graphics and animations for increasing the number of visits in site. As a solution to this problem, some studies exist on the literature. Craven (2003) implemented a project, namely “Non-Visual Access to the Digital Library -

NoVA” to develop further understanding of user behavior with Web based resources, with particular reference to retrieval of information by visually disabled people. Within the study, 20 sighted and 20 visually impaired people undertook a number of information seeking tasks by using four different electronic resources. Each step of the information seeking process was logged and pre-task and post-task questions were asked in order to gather qualitative data. The results of the study shows that visually disabled users spent more time for searching or browsing the Web with varying times depending on the design of the Web site.

As a starting point to search and access information on the Web, the search engines play an important role for visually disabled people. The accessibility of search engines has been analyzed by some studies in the literature. Oppenheim and Selby (1999) conducted a research for the accessibility of three search engines (AltaVista, Yahoo and Infoseek) by asking the visually disabled users for feedback on interface design at various stages of their search and any problems they encountered. The authors state that two main problems discovered for the visually disabled people are “lack of knowledge” and “page designers”. It is pointed out that visually disabled users will have the same opportunity to access information as sighted people when the Web page designers put some simple guidelines enabling them to access information more effectively.

Similarly, Leporini, Andronico and Buzzi (2004) describe the main design issues affecting the user interface of a search engine when visually disabled users interact with a screen reader. In their paper, main differences between a visual layout and aural perception are discussed for proposing specific guidelines for improving the design of search engine interfaces for the benefit of visually disabled users. It is expressed that the main problems for visually disabled people using screen reader for browsing the Web pages are: “Lack of context”, “Information overload”, “Excessive sequencing in reading the information”, “Keyboard navigation” and “Screen reader interpretation”. (Leporini, Andronico & Buzzi, 2004) Correspondingly, another research project aimed at evaluating the accessibility and usability of search engines

to understand their limitations and drawbacks and propose improvements is conducted by Andronico, Buzzi, Castillo and Leporini (2006). The authors focused on the needs of visually disabled users browsing Web pages by screen reader with a voice synthesizer without any other assistive technology.

On the other hand, Williamson et al. (2001) made a qualitative research study with 15 visually disabled people and 16 professionals working with to explore the potential role of the Internet in “information provision” for everyday needs of this special group of users. This exploratory work including three case studies was conducted in Australia during 1999 to discover the benefits of online services perceived by visually disabled people dealing with the Internet. The authors aimed to use qualitative techniques to understand the perceptions of visually disabled people about the positive and negative aspects of the Internet together with the barriers to access it.

Correspondingly, Atinmo (2007) conducted a study about setting up a “computerized catalog” and distributed database of alternative materials for visually disabled people in Nigeria. The project within the study was about to provide facilities and opportunities for visually disabled users to access national and international information resources by identifying the location and availability in Nigeria through searching in a database.

Another study conducted by Wolffe (2005) describes a Web site for human resources, namely “CareerConnect”, which is supported by the American Foundation for the Blind and providing accessible Internet resource for visually disabled job seekers to assist them with career exploration and job seeking efforts. Within the study, the author states that “CareerConnect” Web site consists of the following divisions: “Careers (information about careers available in the general labor market), Mentors (access to successfully employed visually disabled and low vision adults willing to mentor job seekers or answer questions from those in the career exploration process), Tips (practical suggestions for job finding, getting hired and job keeping), MyCareerConnect (an interactive tool that enables visitors to develop personal data sheets and resumes, have access to an electronic calendar, and receive messages from

prospective mentors), Technology (timely information about assistive technology being used by people with visual disabilities and access to the evaluation of mainstream technology) and Resources (links to job listings, organizations in the United States and Canada that provide job training, and recommended readings).” (Wolffe, 2005)

2.8. HYPERMEDIA AND MULTIMEDIA ON THE WEB FOR VISUALLY DISABLED STUDENTS

Hypermedia can be defined as “a logical extension of the term hypertext, in which graphics, audio, video, plain text and hyperlinks combined to create a generally non-linear medium of information” (Ralston & Reilly, 2000). Similarly, multimedia can be defined as “a combination of text, audio, still images, animation, video, and interactivity content forms” (Ralston & Reilly, 2000). Hypermedia and multimedia are two critical keys for increasing the attractiveness of the Web for sighted users but they may create problems for visually disabled people. Hackett, Parmanto and Zeng (2005) state that “Many of the design technologies that pose barriers to persons with disabilities are those that allow multimedia to be included in the Website”. A person should use at least two senses, seeing and hearing, to understand the information presented through multimedia and this creates a problem for people with visual disabilities.

However, Corn and Wall (2002) conducted a study based on a survey about the use of technology and multimedia presentations with 410 teachers of visually disabled students. The authors state that the teachers adopted the general technology much more easily and comfortably comparing to special assistive technology for visually disabled students as it requires more training.

For facilitating the access to the digital libraries on Web by visually disabled students, Pun et al. (1998) made a research about the adaptation of a special browser, providing “1) Active user interaction, both for the macro analysis and micro-analysis of screen

objects of interest; 2) Use of a touch-sensitive screen to facilitate user interaction; 3) Generation of a virtual sound space into which the screen information is mapped; 4) Transcription into sounds not only of text, but also of images.” (Pun et al., 1998)

On the other hand, Morley et al. (1999) conducted a study presenting the design and evaluation of a hypermedia system for visually disabled students, making use of a nonvisual interface and non-speech sounds. Within the study, the authors express the important components of an effective auditory interface, together with the design of it as a hypermedia tool. Their study was part of a European Union (EA) funded ACCESS Project under NoVA (Non-Visual Access to the Digital Library) project, aiming to design and develop a stand-alone user-centered system for exploring the fundamental issues of auditory navigation for visually disabled students through hypermedia information.

Similarly, an accessible Internet browser for allowing visually disabled students to access multimedia content as an information resource was developed by Miyashita et al. (2007). The browser developed within the study had three main functions: 1) Audio control function to adjust the volume, play and stop, etc. 2) A metadata function to simplify complex pages having multimedia content 3) An audio description function to support online movies. However, as stated by the authors, there were two problems in that accessible browser: One is the conflict to control the volume between the screen reader’s sound to navigate and the sound of the multimedia to understand the content, and the other is the dynamically and independently changing parts of the multimedia-enhanced Web page resulting problems on the screen reader’s speech for the content.

2.9. WEB ACCESSIBILITY FOR VISUALLY DISABLED STUDENTS

Web accessibility for visually disabled users has been analyzed by many studies in the literature. Accessibility is one of the most critical aspects for identifying the quality of a Web site, as it guarantees access by everyone regardless of disabilities. The WAI

(Web Accessibility Initiative of the W3C - World Wide Web Consortium) working groups have published comprehensive reference materials for accessible Web sites. Through assistive technology tools like “Jaws” screen reader by Freedom Scientific and “Home Page Reader” by IBM, Web sites that meet the accessibility guidelines can be browsed by visually disabled users like sighted people. (Hofstader, 2004)

Martín et al. (2007) state that the lack of adequate accessibility of Web sites creates a problem for visually disabled users, especially in the domain of educational online systems for the students. Similarly, Web accessibility is studied by Gonzalez et al. (2003) with the development of an accessibility kit, namely “KAI - Kit for the Accessibility to the Internet”, for instant simultaneous accessibility check of the site browsed. The authors state that accessibility measurement module of KAI can be used to check the degree of accessibility of the visited Web pages both partially and as a whole for the visually disabled users. It is pointed out that KAI is based on a markup language, BML (Blind Markup Language) that helps authors develop better structured pages for visually disabled people and it includes an audio browser that enables selective reading and filtering of the contents within Web pages.

Bricout (2001) points out that for making the images in Web sites accessible to visually disabled students, “Alternative Text - ALT” should be provided for every image in each page. Similarly, Hofstader (2004) states that the most common accessibility problem for visually disabled students on the Web pages is “unlabeled graphics”. The ALT text providing a textual equivalent of a graphical element is the most common technique for enabling accessibility. It is stated that the ALT text should be well-described including meaningful punctuation and symbols to avoid confusion amongst side by side similar images. However, Fukuda et al. (2005) point out the difficulty of ALT text for Web authors to understand how they are read out from screen reader. Moreover, the authors claim that some of the accessibility evaluation tools check only the existence of the ALT text, not the content of it, leading to meaningless or redundant ALT texts added by the Web designers.

On the other hand, Leporini and Paternò (2008) argue that accessibility guidelines don't guarantee full success for the usability of a Web site, especially for visually disabled users but design criteria may affect their performance for navigation. Within their study, Leporini and Paternò (2008) have identified 15 design criteria of accessibility and usability for visually disabled users. In their paper, the authors present the results of a study investigating whether the application of such guidelines with a tool for visually disabled users can actually improve their task performance when accessing Web applications. The results of the study showed that the 15 design criteria improved Web site usability both quantitatively and qualitatively by reducing the navigation time needed to perform the assigned tasks and by making the Web sites easier to navigate for visually disabled users.

Fukuda et al. (2005) state that most of the current Web sites arrange information by using visual items to improve the density of information, increase the attractiveness and popularity of the site. But it is very difficult to access such visual information on audio-based browsers as they read the Web content according to the order of the HTML tags. To understand and solve the accessibility and usability problems of the Web sites, Fukuda et al. (2005) have developed the "aDesigner - Accessibility Designer" which visualizes the site's usability for the visually disabled by using colors and gradations. It is pointed out that the visualization results of "aDesigner" allow Web authors to recognize the accessibility levels of their pages. The authors offered two metrics, "navigability - how well structured the Web content is by using headings, intra-page links, labels, etc." and "listenability - how appropriate the ALT texts are", for evaluating the usability of a Web site for the use of visually disabled.

More specifically, Ross (2002) states the usability and accessibility guidelines for the Web designers as follows:

- Diagrams, images and video clips should have adequate text descriptions
- Clear, brief, meaningful descriptions without unnecessary repetition of instructions should be provided for the ease of navigation.

- Table formats (rows and columns) and content should be organised for the screen readers
- Background images should not be used,
- Blinking text should not be used.
- Punctuation should be done with text-formatting.
- Printer-friendly version of the site should be provided.

2.10. PROBLEMS OF VISUALLY DISABLED USERS ON BROWSING THE WEB

Harper, Goble and Stevens (2000) analyzed the problems that visually disabled users faced on the Web in details by providing solutions to them. They state that visually disabled users find navigation on the Web difficult because of the visual layout of the pages including hypermedia elements. Moreover, they have a number of difficulties when interacting with this visual representation. For example, sighted users are able to understand the structure of a Web page in a short time to decide the navigation way they will follow whereas visually disabled users should first listen to the screen reader for understanding the layout and structure of the page verbally. It is difficult to understand the overall layout at once as the screen readers read from left to right and from top to bottom which may lead to miss or forget the information presented, especially for the pages in Web sites which visually disabled users never visited before.

The W3C - WAI (World Wide Web Consortium - Web Accessibility Initiative) discusses the solutions for the problems that visually disabled users faced on browsing the pages in Web sites in two groups: First, the overall design and layout should be improved for making the recognition easy, second, presentation of the content within a page should be suitably and appropriately marked-up by user agents. User agents are defined as special browsers and assistive technologies (Screen readers, Braille displays, etc.) cooperate to represent the information to the user. The Web content accessibility guidelines are presented in two portions: One is the elegant

transformation of content, structure and layout and other is the making content understandable and navigable for the visually disabled users of the Web.

2.11 VISUALLY DISABLED UNIVERSITY STUDENTS IN TURKEY

There are not so many studies in the domain of visually disabled university students' computer and the Internet usage in Turkey but some related studies were listed in this part.

Konur (2006) states that teaching to the disabled university students in compliance with public policy while maintaining the academic standards has become a crucial issue due to the increase in the number of disabled students enrolled in the higher education in Turkey. Moreover, Konur (2006) expresses that the access of disabled students to the education programs and to the curriculum are two separate but inter-linked features of such policies. Additionally, the author points out that the research priorities for the next three decades should include the attitudes of disabled students, attitudes of academic and other staff towards curriculum adjustments (including presentation format, response format, timing, and setting), effect of adjustments on the academic performance of disabled students, and finally the attitudes of non-disabled students. Moreover, Konur (2007) states that computer-assisted teaching and assessment has resulted in the 'digital divide' between the disabled students and others regarding their participation in computer-assisted courses. Konur (2007) points out that there has been a longstanding practice to ensure that disabled students could participate in these courses with a set of disability adjustments that are in line with their learning modalities under the headings of presentation format, response format, timing, and setting adjustments.

Ozgur and Gurcan (2004) conducted a study to develop an audio-book project for the visually disabled students in Open Education Faculty of Anadolu University, Turkey. In their project, available traditional books were converted into digital audio-books (e-books). Ozgur and Gurcan (2004) states that audio e-books for the visually disabled

students in the Open Education System of Anadolu University were quite important for enabling them to study at their own pace and place in a more productive and efficient way. It is also pointed out that it was the unique project in Turkey for the visually disabled university students to offer them audio versions of the e-books.

Similarly, Ozgur and Kiray (2007) conducted an audio-books project based on the individualized learning principles of the visually disabled students enrolled in the Anadolu University Open Education System. They state that audio books are the best learning tools for the visually disabled students with regards to sound quality, the accurateness of the information and accurate pronunciation. It is stated that audio-books project enabled visually disabled university students to study on their own, exempting them from the requirement of studying with someone else, and provides them with the opportunity to study any subjects in the books at their suitable convenience.

Consequently, Tuncer and Altunay (2006) states that visually disabled students need auditory materials in order to access information and listening comprehension skills are important to their academic success. Tuncer and Altunay (2006) conducted a study investigating the effectiveness of summarization-based cumulative retelling strategy on the listening comprehension of four visually impaired college students by using an adapted multiple-investigation design across subjects. The results of the study shows that the instructional procedures led to increased listening comprehension among the participants, and that these gains were maintained at follow-up 30 days later.

2.12. SUMMARY OF THE CHAPTER

There were not too many studies for the application of information and communication technologies (ICT) in the domain of online communication and discussion of visually disabled university students on the Web. Within this literature review section, the specific studies about the use of the computers and the Internet technologies for enabling visually disabled university students to integrate themselves

to the social life around by using appropriate tools were listed. However, as it can be comprehended from the literature review stated in different divisions above, an online communication and discussion environment for visually disabled university students does not exist like the one designed and developed as a result of this, “EnabledForum”.

CHAPTER 3

METHOD

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

3.1. DESIGN OF THE STUDY

The purpose of this research is six folds: (1) to investigate the current status of the visually disabled university students at a public university in Ankara, Turkey for accessing and using computers and the Internet, (2) to learn the kind of web sites that those students prefer to visit on the Internet, (3) to discover the topics and subject they prefer to see in the Web forum that will be designed and developed for them, (4) to identify the topics and subjects in the Web forum that those visually disabled university students mostly visited for reading, replying and adding new titles under them, (5) to show the effects of the Web forum on the participants for gathering information and establishing social relationships with others, (6) to learn the views and opinions of those visually disabled university students about that Web forum after actively participating and spending meaningful time in it.

The research questions that guide this study are listed below:

(1) To what extent do visually disabled students at a public university in Ankara, Turkey attend and participate in an online communication and discussion environment on the Web for gathering information and establishing social relationships?

(1.1) What are the preferences of visually disabled students at a public university in Ankara, Turkey for accessing and using computers and the Internet in their daily lives?

(1.2) What kind of national or international Web sites do visually disabled students at a public university in Ankara, Turkey visit on the Internet?

(1.3) What are the preferences of visually disabled students at a public university in Ankara, Turkey for the topics and subjects in a Web forum that will be specially designed and developed for them?

(1.4) What are the most popular topics and subjects in the Web forum according to the usage statistics of visually disabled students at a public university in Ankara, Turkey?

(1.5) What are the effects of the Web forum on visually disabled students at a public university in Ankara, Turkey for gathering information and establishing social relationships with others?

(1.6) What are the views and opinions of visually disabled students at a public university in Ankara, Turkey about the Web forum after using it?

In order to answer these research questions, mixed method combining both quantitative and qualitative approaches was used in this study. Explanatory mixed method was used in this research study as it includes the analysis of qualitative data after the analysis of quantitative data, collected from visually disabled students of a

public university in Ankara, Turkey. Tashakkori and Teddlle (2003) states that using both quantitative and qualitative research methods enhances their individual effectiveness reflected to the results of the study. Similarly, Creswell and Clark (2007) express that those two approaches can be used together to support their strengths and overcome the possible problems which may occur during their single approach design.

Mixed methods research offers great promise for practicing researchers who would like to see methodologists describe and develop techniques that are closer to what researchers actually use in practice. Mixed methods research as the third research paradigm can also help bridge the schism between quantitative and qualitative research (Johnson & Onwuegbuzie, 2004). Mixed methods research is formally defined here as the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study (Onwuegbuzie & Leech, 2004).

According to Creswell (2003), types of mixed method designs:

- Triangulation Mixed Method Design: Use both qualitative and quantitative data to interpret data
- Explanatory Mixed Method Design: Conduct a follow-up qualitative study after a quantitative study
- Exploratory Mixed Method Design: Build a quantitative study on the results from a qualitative study

According to Creswell (2003), key characteristics of mixed methods design:

- Justify mixed methods research,
- Collecting quantitative and qualitative data,
- Giving priority to quantitative or qualitative data,
- Sequencing quantitative and qualitative data,

- Analyzing data within design: an area still being developed,
- Visualizing the procedures: a table or figure to explain the methods used in a study.

Mixed research method was first introduced by Campbell and Fiske (1959) by using both qualitative and quantitative methods to study the validity of psychological traits (Creswell, 2003). Greene (1997) states that mixed method designs can produce richer, more valid and reliable findings than the evaluations based on either qualitative or quantitative method alone. Furthermore, a mixed method approach is likely to increase the acceptance of findings and conclusions by the diverse groups that have a stake in the evaluation (Greene, 1997). Johnson and Onwuegbuzie (2004) define mixed method research as “The class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study”.

However, Creswell (2003) points out that mixed method has become increasingly used and accepted in the social sciences and is presently viewed as a third research paradigm since 1990s. It is stated that researchers have also looked to mixed method to help developing or informing another method, and to provide insight into different levels of analysis, or to serve a transformative purpose in shaping the future research (Creswell, 2003). Therefore, some other researchers preferred to employ mixed method for verification purposes, corroborate findings, to gain a deeper understanding of the results of studies, to investigate a data set to determine its meaning, to select a better sample, to evaluate and construct instruments (Sechrest and Sidana, 1995).

Creswell (2003) lists the advantages and disadvantages of mixed method design as follows:

Advantages:

- A study based on the strength of both quantitative and qualitative research methods can be built,

- A complete picture of a research problem can be seen,

Disadvantages:

- Background information and training in both methods may be required,
- The cost of the research can be higher,
- Researchers may required to work in multiple teams.

The first (including the answers for the research questions 1.1, 1.2 and 1.3) and the second (including the answers for the research questions 1.4 and 1.5) part of this study was based on quantitative data collected with the questionnaire and the Web forum (EnabledForum - EngelsizForum). The third part (including the answers for the research question 1.6) of the study was based on qualitative data collected with interviews. Creswell (1994) defines qualitative study as an investigation of comprehending humanistic or social problems based on a complex phenomena formed with opinions and views of the participants by conducting the research in their natural setting. Moreover, Phipps & Merisotis (1999) states that the relationships to test quantitative procedures need to be identified through qualitative methods. Morgan (1998) express that an interview is a purposeful conversation between two or more people organized by one in order to get information from the others. For the final part of the study, semi-structured interviews with open-ended questions were conducted with the randomly selected participants of the study to gather in-depth views of those visually disabled students of a public university in Ankara, Turkey about the Web forum, "EnabledForum - EngelsizForum".

3.2. SELECTION OF PARTICIPANTS

According to "Turkey Disability Survey 2006" conducted by the Prime Minister Administration for Disabled People, there are around 400.000 visually disabled people in Turkey, and around 2000 visually disabled students at the universities, including both distance education programs in the Open Education Faculty and other universities with undergraduate and postgraduate programs. As living and

working in Ankara, Turkey, the researcher has contacted with the public universities in Ankara at the beginning of the spring term of 2005 - 2006, to learn the number of visually disabled students they have in their faculties and departments. According to the numbers gained from the Information and Computer Centers of all those universities in Ankara, the researcher has decided to work in Gazi University, as the number of visually disabled students in there is higher than in other universities and that university has a Teaching Visually Handicapped Children Program within the Department of Special Education under the Faculty of Education. Moreover, between the years 2005 and 2007, a colleague of the researcher was working in that department as an instructor and she offered help for finding participants to the study. The computer center of that university reported that in the academic term of 2005 – 2006 Spring, there were totally 39 students being registered as visually disabled in the database of the student information system. The researcher has contacted with his colleague who was working in the Department of Special Education to find the telephone numbers or e-mail addresses of those visually disabled students for accessing them to ask them whether they want to participate in this study or not. After getting the telephone numbers of all visually disabled students in that university, they have been contacted by the researcher. During telephone conversations with those visually disabled university students, the researcher has first asked them whether they use computers and the Internet or not. All students confirmed that they can use computers and the Internet. Then, the researcher has given brief information to those students about this research study and asked them whether they want to be enrolled in this study or not. 36 of the students agreed to be participated voluntarily in this study. Table 3.1 below represents the demographic characteristics of the participants in this study.

Table 3.1: Demographic information of the Visually Disabled University Students in the study

Sex	Number	% - Percentage
Male	28	77.8
Female	8	22.2
Marital Status		
Married	2	5.6
Single	34	94.4
Age		
16-18	3	8.3
19-23	33	91.7
Education		
Undergraduate	34	94.4
Postgraduate	2	5.6

3.3. INSTRUMENTS OF THE STUDY

In this study, data were collected through three different instruments which consisted of the questionnaire (see Appendix A), the Web forum (EnabledForum – EngelsizForum, see Appendix B) and the interviews (see Appendix C and Appendix D). The questionnaire was used to answer the research questions 1.1, 1.2 and 1.3; to investigate the current status of the visually disabled university students at a public university in Ankara, Turkey for accessing and using computers and the Internet, to learn the kind of web sites that those students prefer to visit on the Internet, and to discover the topics and subject they prefer to see in the Web forum that will be designed and developed for them. The Web forum, namely “EnabledForum - EngelsizForum”, was used to answer the research questions 1.4 and 1.5; to identify the topics and subjects in the Web forum that those visually disabled university students mostly visited for reading, replying and adding new

titles under them, and to show the effects of the Web forum on the participants for gathering information and establishing social relationships with others. Finally, the interviews were used to answer the research question 1.6; to learn the views and opinions of those visually disabled university students about that Web forum after actively participating and spending meaningful time in it.

3.3.1. Questionnaire

A questionnaire is a research instrument consisting of a series of questions and other items for the purpose of gathering information from participants of a research study. Although they are often designed for statistical analysis of the responses of the participant, in some cases, they may be used for general purposes such as marketing or human resources. Questionnaires have some advantages according to other types of surveys by means of cost, time and effort of the researcher. Moreover, it is an easy form of collecting and analyzing data as the questionnaires often have standardized questions and answers enabling to compile easily. However, such standardized questions and answers may frustrate users and limited to gather the trivial information about the subject searched.

In this study, the questionnaire (see Appendix A) was used to answer the research questions 1.1, 1.2 and 1.3; to investigate the current status of the visually disabled university students at a public university in Ankara, Turkey for accessing and using computers and the Internet, to learn the kind of web sites that those students prefer to visit on the Internet, and to discover the topics and subject they prefer to see in the Web forum that will be designed and developed for them. The questionnaire was prepared by the researcher with the help and guidance of the thesis follow-up committee members and the experts from the Special Education Department of the public university studied. All items in the questionnaire were also checked by domain experts for appropriateness to the participants. As seen in Appendix A, the questionnaire was composed of three parts; (1) Personal Information, (2) Computer and the Internet Usage (3) Web Forum Subjects / Topics Selection. The

first part, “Personal Information”, including 6 items; 2 open-ended and 4 multiple choice, aims to collect and record the demographic information about the participants. The second part, “Computer and the Internet Usage”, was including 10 items; 2 multiple choice, 5 “yes / no” type and remaining 3 were open ended type. The third part, “Web Forum Subjects / Topics Selection”, was including 17 multiple choice items, designed to identify the topics and subjects that participants want to see in the Web forum that will be designed and developed as a result of this study.

Questionnaires were filled by 36 visually disabled students at a public university in Ankara, Turkey with the help of the researcher during the 2nd and the 3rd week of February, 2006. The researcher contacted with each participant on the phone for arranging the date, time and place to fill the questionnaire. They all preferred to fill the questionnaire in the Department of Special Education under the Faculty of Education as they all familiar with the physical conditions (building and roads leading to it) and the people (instructors) working in there. For questionnaire filling process, the researcher has met with every participant, read all the items and marked their responses on the questionnaire form. The researcher has spent around 10-15 minutes for every participant for this process.

For establishing internal validity of the questionnaire; all the procedures for data collection and analysis has been standardized, questionnaire was applied in the natural environment of its occurrence, factors that may have effects on the results were minimized. Similarly, for external validity, the results of this questionnaire can not be generalized to all visually disabled university students in Turkey as this study was conducted in a public university in Ankara, Turkey with 36 visually disabled students of 39 students total. However, the results can be used for similar studies for visually disabled students in other public or private universities of Turkey.

For establishing reliability of the questionnaire; the researcher, participants and the natural environment of the questionnaire did not change throughout the study, items

were selected with the help of the domain experts, items were designed and developed after analyzing the specific case of the study with the consultancy of the domain experts, questionnaire was designed in Turkish as it was the native tongue of the participants, English translation of all the items in the questionnaire was checked by two experts, who are bilingual instructors of this special domain, data collection with questionnaire followed each other continuously without any break amongst them provided continuous process for the participants to eliminate the risks about reliability.

The validity and reliability analysis were conducted with the domain experts and academicians in their offices by face-to-face meetings with the researcher. According to the feedback provided by them, corrections and changes for the related items of the questionnaire was applied by the researcher.

3.3.2 Web Forum - “EnabledForum - EngelsizForum”

In this study, the Web forum (see Appendix B), “EnabledForum - EngelsizForum” was used to answer the research questions 1.4 and 1.5; to identify the topics and subjects in the Web forum that those visually disabled university students mostly visited for reading, replying and adding new titles under them, and to show the effects of the Web forum on the participants for gathering information and establishing social relationships with others. The screen shots of the “EnabledForum - EngelsizForum” is shown in Appendix B.

“EnabledForum - EngelsizForum” was an important instrument for collecting data about whether a specially designed and developed Web forum can be useful for providing an online communication and discussion environment for the visually disabled students at a public university in Ankara, Turkey to enhance their activities on the Internet or not. The Web forum was published on the Web (<http://engelsizforum.ceit.metu.edu.tr/>) at the date 03.04.2006.

“EnabledForum - EngelsizForum” was designed and developed by the researcher and his colleague at the Middle East Technical University by using the current Internet technologies. As it would be a Web forum, it was structured to allow the change of users and subjects dynamically. It was developed with Microsoft Active Server Pages technology, which constructs the content of Web pages according to the dynamically changing data read from the database. This property provided to reflect all the changes done in the database simultaneously to the interface of the Web pages within a site for the users who were browsing at that moment. At the background, a database, which was designed and developed with Microsoft Access for keeping all the content of the Web forum together with the user accounts and daily activity logs, was running. This “EnabledForum - EngelsizForum” was live on the Web with the help of Microsoft Internet Information Server (IIS).

In “EnabledForum - EngelsizForum”, the main topics, subject titles and text were listed hierarchically according to the relationships amongst them. This hierarchical structure of the Web forum helped to those visually disabled students in this study for navigating within the site easily and effectively. All existing topics, subject titles and text were recorded in the database and the system was recording the new titles and text added by the forum users to the database for showing the changes simultaneously on the pages of the Web forum. The main subjects of the Web forum could only be modified or removed by the administrators of the site; the users (visually disabled university students in this study) could not modify or remove those 17 main subjects listed in the Web forum. However, forum users may add new titles with text and open a new title for discussion or information exchange under the existing main subjects.

All items and content of the “EnabledForum - EngelsizForum” were designed text-based as this Web forum will serve to the visually disabled university students. This text-based structure of the Web forum helped the screen reader programs to easily recognize and read aloud all the text in an order within the site. As it is known that visually disabled computer users should have screen reader program which was setup

in their computers, the Web forum is designed according to the commonly used screen readers (Jaws by Freedom Scientific, NetOkur by GVZ, OKU by Bilkent University, etc.) in Turkey.

In “EnabledForum - EngelsizForum”, there were two types of user groups: administrators and standard users. The administrators can modify or remove any subjects, topics and titles in this Web forum, or they may add new subjects and topics when needed. Moreover, the administrators can change the status of a user from “standard” to “administrator” by just marking him/her on the administration screen of the Web forum. Moreover, the researcher was designed the administration module in text based structure, for enabling those visually disabled university students to work as the administrators of the site after this study was finished. This property enhanced the management of the Web forum as the required time and effort for the management might bring too much load for one or two administrators.

For benefiting the facilities offered by the “EnabledForum - EngelsizForum”, the only thing that a visually disabled student should do was to become a member of the Web forum by filling the related forms in the registration part. The registration can be done by selecting the related link on the entrance page of the Web forum which directs the user to the registration page. The registration page included a couple of text areas required to be filled by a visually disabled student with related personal information. In the registration page, the user also creates the username and password that will be used for the entrance.

“EnabledForum - EngelsizForum” is the first Web forum which is specially designed and constructed for visually disabled university students. During the data collection period between the dates 03.04.2006 – 30.06.2006, all the content presented in the “EnabledForum - EngelsizForum” was collected from other Web forums in Turkey daily by the researcher. That content has been filtered and organized according to the categories, topics and subjects and converted into text-

only format. The researcher has tested all the content of the Web forum with the popular screen readers so that Web forum users (visually disabled students in this study) would not have any problems during their visits in “EnabledForum - EngelsizForum”.

“EnabledForum - EngelsizForum” had many advantages comparing to the existing forums on the Web. First of all, the registration process for being a member of the forum was very easy, only requiring form filling for username, password, name, surname, e-mail, telephone, city and country. As seen on the screen shots of the “EnabledForum - EngelsizForum” in Appendix B, there were no graphical items which creates frustration for the visually disabled users. Moreover, all the links of the topics and subjects are numbered hierarchically (for example: 4, 4.1, 4.1.1) to help those students for navigation. Similarly, every topic of the Web forum included a number in parenthesis at the end of its link, representing the number of subject titles under that topic. It helped the user to decide a starting point in the site to plan his/her time that he/she will spend in the Web forum. Additionally, as all items in the Web forum were text-based, it worked very fast and without any loading problems in any Internet browser. Besides, every page had a link to a higher location within the Web forum (for example: moving from the subject 4.1.1 to the subject 4.1). Furthermore, different than the existing forums on the Web, “EnabledForum - EngelsizForum” didn’t have any advertisements or pop-up windows which creates problems for the screen readers. Moreover, for every subject title and text, information about the owner (the user who submitted that content), date and time of submission of the post is shown to the visitors.

Finally, within the “EnabledForum - EngelsizForum”, the researcher didn’t plan a development of a screen reader that would work automatically when the Web forum was loaded on the screen of the visually disabled students, because if those visually disabled university students were already using computers and the Internet, it means that they already had a screen reader installed on their computers. Moreover, there would be a possible conflict between two screen

readers for reading the content in the Web forum. However, the researcher has tested the “EnabledForum - EngelsizForum” with the mostly used screen readers in Turkey (Jaws by Freedom Scientific, NetOkur by GVZ, OKU by Bilkent University, etc.) for preventing the possible errors which might occur during the navigation of the participants within the site.

For establishing internal validity of the web forum; all the procedures for data collection and analysis has been standardized, web forum was applied in the natural environment of its occurrence, factors that may have effects on the results were minimized. Similarly, for external validity, the results of this web forum can not be generalized to all visually disabled university students in Turkey as this study was conducted in a public university in Ankara, Turkey with 36 visually disabled students of 39 students total. However, the results can be used for similar studies for visually disabled students in other public or private universities of Turkey.

For establishing reliability of the web forum; the researcher, participants and the natural environment of the web forum did not change throughout the study, items were selected with the help of the domain experts, items were designed and developed after analyzing the specific case of the study with the consultancy of the domain experts, questionnaire was designed in Turkish as it was the native tongue of the participants, English translation of all the items in the web forum was checked by two experts, who are bilingual instructors of this special domain, data collection with web forum followed each other continuously without any break amongst them provided continuous process for the participants to eliminate the risks about reliability.

The validity and reliability analysis were conducted with the domain experts and academicians in their offices by face-to-face meetings with the researcher. According to the feedback provided by them, corrections and changes for the related items of the questionnaire was applied by the researcher.

3.3.3. Interview

An interview is a conversation between two or more people (the interviewer and the interviewee) where questions are asked by the interviewer to obtain information about a specific subject or topic from the interviewee. Interviews are generally used for reaching the hidden ideas and opinions of the participants within a study for the deep understanding of their thoughts about a certain topic. Specifically, a research interview is a structured social interaction between a researcher and a subject who is identified as a potential source of information. Research interviews are well established research methods that can take a variety of forms. There are many types of interview methods which can be used, but the three most commonly used are structured, semi structured and unstructured interviews. A structured interview is actually a simple questionnaire administered by the researcher where questions are asked orally and the responses recorded. This type of interview is used for variety of purposes but can often be used to increase response rates and the quality of answers for questionnaire style research. These kinds of interviews can be challenging as they require a personal sensitivity and adaptability. On the other hand, semi-structured interview is perhaps the most commonly used interview technique in qualitative social research, when the researcher wants to gather certain information which can be compared and contrasted with information from other interviews, and the researcher may produce an interview schedule which is a list of questions that the researcher wants to find out from the interviewee. Finally, unstructured interview is the one where the researcher asks as few questions as possible, permitting the interviewee to talk freely, like an informal talk between the researcher and the interviewee, intervening only to refocus the discussion or probe for additional insights into a key area. This technique enables to interviewee to reestablish the parameters of the discussion, a process which itself reveals what is important to the interviewee.

In this study, the interviews (see Appendix C and Appendix D) were used to answer the research question 1.6; to learn the views and opinions of those visually disabled university students about “EnabledForum - EngelsizForum” after actively

participating and using it for 3 months. Interviews were conducted during July, 2006, just after the data of usage statistics of the web forum was collected between the dates 03.04.2006 and 30.06.2006. Interviewees were selected randomly to get better feedback from the participants about the subject studied. The researcher has written the names of all participants on small pieces of papers and put all these papers in a fabric bag and pulled 10 papers randomly. The selected papers were put in the same bag again and the process continued until 10 different names were gathered. Then, those 10 participants are contacted on their mobile phones and asked them whether they want to be interviewed about the “EnabledForum - EngelsizForum” by the researcher or not. They all accepted to be interviewed on a voluntary basis in their university at the date and time decided by themselves. Interviews were used to reach the students’ in-depth opinions and views about the “EnabledForum - EngelsizForum”.

Semi-structured interview template and questions (As seen in Appendix C) were prepared by the researcher and checked by the members of the thesis follow-up committee and two instructors from the Department of Special Education - Teaching Visually Handicapped Children Program from the university where this study was conducted. The interview guide for the semi-structured interviews was composed of four open-ended questions. Those semi-structured interviews were conducted with the help of digital audio recorder, with the permission of the visually disabled person interviewed. The recorded interview scripts are transcribed by the researcher and written down as text (see Appendix D). The researcher has analyzed the transcribed text by underlying the commonly given responses. The final stage was the interpretation of all the data and text for creating meaningful document that will base this study. During the study, all the participants (Visually disabled students and the instructors working in the Department of Special Education - Teaching Visually Handicapped Children Program) were volunteer respondents who agreed to give up their time and effort, for no rewards.

During the interviews, four open-ended questions were asked to the participants in an order by the researcher. The origins of the questions were: (1) General design of

the forum, (2) The things participants liked most, (3) The things participants disliked most, (4) The things they offer for further development. It was a good opportunity for the participants to explain their ideas and thoughts in an informal manner to the researcher for in-depth data collection that might lead to further development in the Web-based online tools for visually disabled university students.

The interviews were conducted in a non-formal friendly environment, in the building of the Department of Special Education. The participants were already familiar with the places in where the interviews were conducted, so they were quite comfortable during the meetings. The interviewees freely stated their views and opinions about the “EnabledForum - EngelsizForum” and the researcher gathered in-depth information from them.

For establishing internal validity of the interview; all the procedures for data collection and analysis has been standardized, interview was applied in the natural environment of its occurrence, factors that may have effects on the results were minimized. Similarly, for external validity, the results of this interview can not be generalized to all visually disabled university students in Turkey as this study was conducted in a public university in Ankara, Turkey with 36 visually disabled students of 39 students total. However, the results can be used for similar studies for visually disabled students in other public or private universities of Turkey.

For establishing reliability of the interview; the researcher, participants and the natural environment of the interview did not change throughout the study, items were selected with the help of the domain experts, items were designed and developed after analyzing the specific case of the study with the consultancy of the domain experts, interview was designed in Turkish as it was the native tongue of the participants, English translation of all the items in the interview was checked by two experts, who are bilingual instructors of this special domain, data collection with interview

followed each other continuously without any break amongst them provided continuous process for the participants to eliminate the risks about reliability.

The validity and reliability analysis were conducted with the domain experts and academicians in their offices by face-to-face meetings with the researcher. According to the feedback provided by them, corrections and changes for the related items of the questionnaire was applied by the researcher.

3.3.4. Instruments' Validity and Reliability

Joppe (2000) states that validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. Validity specifies the degree of a study for the level of reflecting or assessing the specific concept that the researcher is attempting to measure. Researchers generally determine validity by asking a series of questions, and will often look for the answers in the research of others. Essentially, validity entails the question whether your measurement process, assessment, or project actually measure what you intend it to measure. Wainer and Braun (1998) describe the validity in quantitative research as construct validity. The construct is the initial concept that determines which data is to be gathered and how it is to be gathered. They also state that quantitative researchers actively cause or affect the interplay between construct and data in order to validate their investigation, mostly by the application of a test. This involvement of the researchers in the research process would greatly reduce the validity of a test.

There are two types of validity; internal validity is related with the effects that a researcher obtained in his/her study were caused by his/her conceptual variable or not, and external validity is related with the generalizability of the results, that is, whether the results of a study can be generalized to the whole population of the participants and the situations outside of the specific area of the study. Fraenkel and Wallen (2000) express the main components structuring the internal validity as subject

characteristics, subject attitude, history, instrumentation, implementation, location, mortality, regression, maturation and testing.

In this study, conducting the following steps helped the researcher to establish internal validity:

- Mixed research method (quantitative and qualitative) has been applied,
- All the procedures for data collection and analysis has been standardized,
- Data collection instruments (Questionnaire, Web forum and Interview) were applied in the natural environment of its occurrence,
- Quantitative and qualitative results were interpreted and compared,
- Factors that may have effects on the results were minimized.

Similarly, for external validity, the results of this study can not be generalized to all visually disabled university students in Turkey as this study was conducted in a public university in Ankara, Turkey with 36 visually disabled students of 39 students total. However, the results can be used for similar studies for visually disabled students in other public or private universities of Turkey.

Joppe (2000) clarifies reliability as an extent to which results are consistent over time and they represent the total population accurately, meaning that the results of a study can be reproduced under similar conditions, including methodology and instruments. Similarly, Gall, Borg and Gall, (2003) define reliability as the extent to which an experiment, test, or any measuring procedure yields the same result on repeated trials. Kirk and Miller (1986) identify three types of reliability referred to in quantitative research, which relate to: (1) the degree to which a measurement, given repeatedly, remains the same (2) the stability of a measurement over time; and (3) the similarity of measurements within a given time period. Charles (1995) adheres to the notions that consistency with which questionnaire items are answered or individual's scores remain relatively the same can be determined through the test-retest method at two different times. This attribute of the instrument is actually referred to as stability. Instruments used in the research are important for reliability as a reliable instrument

will provide consistent measures of the thing being measured by the researcher. Fraenkel and Wallen (2000) defines some forms of reliability such as; internal consistency, test-retest, parallel forms, homogeneity test, inter-observer, etc.

In this study, conducting the following steps helped the researcher to establish reliability:

- The researcher, participants and the natural environment of the research did not change throughout the study,
- Three instruments (Questionnaire, Web Forum and Interview) of the study were selected with the help of the domain experts,
- Three instruments (Questionnaire, Web Forum and Interview) of the study were designed and developed after analyzing the specific case of the study with the consultancy of the domain experts,
- Questionnaire, Web forum and interview guide were designed in Turkish as it was the native tongue of the participants,
- English translation of all the items in the questionnaire, Web forum and interview guide was checked by two experts, who are bilingual instructors of this special domain,
- Research design of the study was checked and controlled throughout the study by five different experts; three instructors who were members of the thesis follow-up committee and two instructors from the Department of Special Education in a public university where the study was conducted,
- Data collection steps (with questionnaire, Web forum and interview) followed each other continuously without any break amongst them

provided continuous process for the participants to eliminate the risks about reliability.

The validity and reliability analysis were conducted with the domain experts and academicians in their offices by face-to-face meetings with the researcher. According to the feedback provided by them, corrections and changes for the related items of the questionnaire, Web forum and interview guide are applied by the researcher.

To sum up, the researched did his best and performed an effort to establish validity and reliability of this study by considering all the risks about instruments selection, data collection and analysis (for both quantitative and qualitative parts) and interpretation of results.

3.4. PROCEDURES OF THE STUDY

The study included 13 steps: (1) Finding and contacting with the participants, (2) Developing the questionnaire, (3) Expert review, (4) Applying the questionnaire, (5) Entering data into SPSS, (6) Designing, developing and testing the Web forum, (7) Announcing the Web forum to the participants, (8) Observing and analyzing the daily usage statistics of the Web forum, (9) Entering data into SPSS, (10) Designing the interview, (11) Conducting the interviews with the randomly selected participants, (12) Analyzing the interviews' text and (13) Interpreting and writing the results.

Table 3.2: Timetable of the study

Stages \ Period	1	2	3	4	5	6	7	8	9	10	11	12	13
January, 2006	✓	✓	✓										
February, 2006				✓	✓								
March, 2006						✓	✓						
April, 2006								✓					
May, 2006								✓					
June, 2006								✓					
July, 2006									✓	✓	✓		
August, 2006												✓	
September, 2006													✓
October, 2006													✓

(1) Finding and contacting with the participants
(2) Developing the questionnaire,
(3) Expert review,
(4) Applying the questionnaire,
(5) Entering data into SPSS,
(6) Designing, developing and testing the Web forum,
(7) Announcing the web forum to the participants,
(8) Observing and analyzing the daily usage statistics of the web forum,
(9) Entering data into SPSS,
(10) Designing the interview,
(11) Conducting the interviews with the randomly selected participants,
(12) Analyzing the interviews' text,
(13) Interpreting and writing the results.

Finding and contacting with the visually disabled university students in Ankara, Turkey has started in January, 2006. For finding the participants, the researcher has contacted with the academicians Gazi University, Gazi Faculty of Education, Department of Special Education - Teaching Visually Handicapped Children Program. With the help of an instructor colleague working in that department, the researcher has learned that there are totally 39 visually disabled students in that university including both undergraduate and graduate programs. All those visually disabled students have been contacted on the phone and 36 of them accepted to be participated voluntarily in this study. At the second stage, the questionnaire was designed and developed by the researcher with the academic consultancy of the jury of thesis follow-up committee. The changes suggested by them are applied and the questionnaire was finalized by the researcher. At the fourth stage, the questionnaires were conducted in the campus of the university at the dates and times arranged according to the availability of the visually disabled students. The researcher filled in the questionnaire forms according to the verbal responses given by the participants during the questionnaire meeting. After the researcher meet with all the participants for questionnaire filling, the collected data was entered to the SPSS (Statistical Package for Social Sciences) program for numerical analysis to calculate the ratios and percentages of the items in the questionnaire. After that, design and development of the Web forum (namely, "EnabledForum - EngelsizForum") was started by the researcher and a colleague from the university.

During the technical development of the Web forum, iterative real-time testing was done by the researcher and the colleagues working in the Department Of Special Education - Teaching Visually Handicapped Children Program to find the potential errors that participants may face during their visits on the site. The Web forum is designed and developed considering the most widely used screen readers in Turkey, namely: Jaws for Windows, Thunder, GVZ NetOKUR and Bilkent University's OKU. Moreover, the "EnabledForum - EngelsizForum" is tested by the researcher and the colleagues by using those 4 popular screen readers to experience the reading of the text and the links within the pages to recognize whether all items functioning properly

or not. Based on the feedback provided by the instructors working in the Department of Special Education - Teaching Visually Handicapped Children Program, some minor problems within the “Enabled Forum – EngelsizForum” are corrected. After all, the address of the Web forum “<http://engelsizforum.ceit.metu.edu.tr>” is announced to those 36 visually disabled students by e-mail, instant messages and the telephone. At the date of 03.04.2006, the Web forum was broadcasted on the Web.

During the next three months (around 13 weeks, till 30.06.2008), daily usage logs of the “EnabledForum - EngelsizForum” was observed and recorded by the researcher to analyze and identify the statistics about the subjects and topics in it. With the help of this process, “read”, “replied” and “added new title” ratios of the subjects and topics in the Web forum were identified and this data was entered into the SPSS program for statistical analysis by the researcher. The next step was about conducting the interviews with the randomly selected 10 participants to reach their in-depth opinions and views about the web forum. Structured interview template and questions are prepared by the researcher and checked by the members of the thesis follow-up committee and two instructors from the Department of Special Education - Teaching Visually Handicapped Children Program. Those structured interviews are conducted with the help of digital audio recorder with the permission of the visually disabled person interviewed. The recorded interview scripts are transcribed by the researcher and written down as text. The transcribed text is analyzed with computer software, namely “Weft QDA”. The final stage was the interpretation of all the data and text for creating meaningful document that will base this study. During the study, all the participants (Visually disabled students and the instructors working in the Gazi University, Department of Special Education - Teaching Visually Handicapped Children Program) were volunteer respondents who agreed to give up their time and effort, for no rewards.

3.5. ANALYSIS OF THE DATA

In this study, quantitative and qualitative data were analyzed by the researcher with the help and consultancy of members of the thesis follow-up committee and the domain experts working as instructors in the Department of Special Education at the public university of the study.

For the quantitative responses gathered from the questionnaire and the Web forum, SPSS software is used. SPSS is a professional statistical analysis program, and the researcher preferred to use it for data entry, categorization, analysis and calculation of the ratios and percentages constructed with the data collected from both the questionnaires and the log files of the Web forum, “EnabledForum - EngelsizForum” with the approval of the thesis follow-up committee members. SPSS was a quite efficient tool for this study and met all the requirements for the research.

For the research questions 1.1, 1.2 and 1.3, the data collected with the questionnaires were entered into the SPSS program by the researcher. Three main categories of the questionnaire, Personal information, Computer and the Internet usage and Web forum subjects / topics selection, were located under different files of SPSS. In the first SPSS file, personal information of the participants is grouped under category names and percentages are calculated and located in the related cells next to categories. In the second SPSS file, computer and the Internet usage information of the visually disabled university students are grouped in two categories, five short answer close-ended (“yes” or “no” type), two multiple choice and three open-ended questions. Close-ended answers and their percentages are located in the related cells in the SPSS file. The responses of the participants for the open-ended questions were grouped under categories by the researcher to find out the percentages based on the responses given. Responses from the multiple choice items were also recorded in SPSS. The third SPSS file included the Web forum’s subjects and topics selection based on the preferences of the participants

in the questionnaire forms. This part was important for the researcher to establish the structure and content of the “EnabledForum - EngelsizForum” because the participants selected the topics and the subjects that will be placed under those topics for identifying the content of the Web forum. The rate and percentage of every subject and topic was listed in this SPSS file.

The second part of the quantitative data analysis were about the usage logs of the “EnabledForum - EngelsizForum” for answering the research questions 1.4 and 1.5. As stated above, after the data were collected with the questionnaires, the web forum, “EnabledForum - EngelsizForum” was designed and developed by considering the participants’ choices and preferences. After the Web forum published on the Internet with the address “<http://engelsizforum.ceit.metu.edu.tr>”, the usage logs are recorded by the researcher daily during the 13 weeks period between the dates 03.04.2006 and 30.06.2006. During this period of time, the researcher entered the numbers about the usage logs and statistics of the Web forum into SPSS daily. The statistics about the Web forum topics and subjects were listed with their topic number and subject item letter, with nearby details about the number of participants and their percentage to the all participants according to the action they made in the “EnabledForum - EngelsizForum”, categorized as; “Read”, “Replied” and “Added New Title”. All numerical data were entered by the researcher and percentages are calculated by the SPSS automatically.

For the qualitative part of the study, for answering the research question 1.6, analysis of the semi-structured interviews was done by the researcher. The data recorded during the interviews were transformed into transcribed text, as seen in Appendix C. This transformation of verbal conversation into textual form, which is accessible for multiple reading by multiple readers, is a multi-layered process, which transforms data both in form and function (Lambert, 1997, Nida, 1982). This conversion of field texts to research texts is a theory laden process, and the decisions

and choices the researcher makes along the way enacts the theories influencing the analysis and interpretation (Lapadat, Lindsay, 1999).

Since interviews are not just words spoken at a certain time in response to a social situation, they are embedded in the culture of the place, hence, when transforming, the researcher should keep the target social group (in this study, visually disabled students of a public university) in mind. According to Duranti (1997), converting spoken word into text is much more than simply writing down what is said. He has defined transcription as a technique for the fixing (e.g., on paper or computer screen) of fleeting events for the purpose of detailed analysis. Analysis of the written or spoken words is used extensively in qualitative research and the general principles are borrowed from disciplines of conversation and discourse analysis (Johnstone, 2002, Sacks, 1992). The use of transcribed data and some of the attending methodological difficulties faced are also documented in the literature (Lapadat, Lindsay, 1999, Tilley, 2003), however the difficulties faced in transcribing social data obviously are even more challenging.

In this study, semi-structured interviews were conducted with 10 participants in the campus of their university as they prefer to do so. From the 36 participants, 10 of them were selected randomly and contacted on the telephone by the researcher to conduct a face-to-face interview at the date, time and place decided by themselves. During the interviews, four questions were asked in an order. The origins of the questions are: (1) General design of the forum, (2) The things participants liked most, (3) The things participants disliked most and (4) The things they offer for further development.

Herrington and Oliver (2000) stated how the interview data should be analyzed in qualitative studies. They categorize the activities in four stages, as listed below:

- *Coding*: The researcher codes the individual comments of the interviewees according to the research questions,

- *Ordering and displaying*: The researcher collects the information and determines the patterns and the themes. Collected data are displayed when ready.
- *Conclusion drawing*: The researcher states the conclusions according to the analyzed data and wraps them up to organize the meaningful text.
- *Verifying*: The researcher verifies the conclusions by reviewing the original data.

The researcher followed the stages above to analyze the interview data according to reach the best results for the qualitative part of the study. Those semi-structured interviews are done with the help of digital audio recorder with the permission of the interviewee. The recorded interview scripts are transcribed by the researcher as seen in Appendix D. After all transcription process is completed, the researcher underlined the words and phrases which were mostly pointed out by the interviewees and identified the most common items based on the views and opinions. For the first stage, “Coding”, the researcher coded the individual comments of the interviewees according to the research question 1.6. For the second stage, “Ordering and Displaying”, the responses of the interviewees were compared with the others and the items which were common, same, similar or different are identified and summarized into a meaningful form by the researcher to create the patterns and themes. At the third stage, “Conclusion Drawing”, the interesting points (common or different) appeared as results of the interviews were highlighted by the researcher to reach a decision about the Web forum for the visually disabled students at a public university in Ankara, Turkey. For the final stage, “Verifying”, the researcher confirmed the results by checking the original data gained from both the questionnaire results and the usage statistics of the “EnabledForum - EngelsizForum”.

3.6 VALIDITY AND RELIABILITY OF THE STUDY

In social science, validity can be defined as “measuring the right things” whereas reliability can be defined as “measuring the things right” (Anastasi & Urbina, 1997). A questionnaire, an interview or any other instrument are said to be valid if they actually measures what they are supposed to measure. On the other hand, any instrument for data collection is said to be reliable if they are able to produce the same results when measured at different times or by different participants.

In this study, the validity and reliability of the data collection instruments is done with expert reviews. The questionnaire, Web forum’s design and content, and interview guide were checked by the members of the thesis follow-up committee and the domain experts from the Gazi University Gazi Faculty of Education, Department of Special Education - Teaching Visually Handicapped Children Program. Additionally, the design and content of the Web forum, “EnabledForum - EngelsizForum”, was checked by the experts from Bilkent University Computer Engineering Department - Project Group for Visually Disabled, Informatics Associations of Turkey – Working Group for the Informatics for Visually Disabled, The Federation of the Blind of Turkey, AltıNokta Association for the Blind and EngelsizErisim Web Group.

As stated before, internal and external validity was checked by the researcher with the help, support and guidance provided by the domain experts and the members of the thesis follow-up committee. For establishing internal validity, the researcher has used mixed research methodology (quantitative and qualitative). Moreover, all the procedures for data collection and analysis has been standardized and data collection instruments (Questionnaire, Web forum and Interview) were applied in the natural environment of its occurrence. Additionally, quantitative and qualitative results were interpreted and compared, and the factors that might have effects on the results were minimized. Similarly, for external validity, the results of this study were not generalized to all visually disabled university students in Turkey because this study was conducted only in a public university in Ankara, Turkey. However, the results can

be used for similar studies including visually disabled students in other public or private universities of Turkey.

On the other hand, conducting the following steps helped the researcher to establish reliability. First of all, the researcher, participants and the natural environment of the research didn't change throughout the study. Moreover, three instruments (Questionnaire, Web Forum and Interview) of the study were selected with the help of the domain experts and these instruments were designed and developed after analyzing the domain of the study with the consultancy of those experts. Additionally, all instruments were designed in Turkish as it was the native tongue of the participants, and English translation of all the items in them was checked by two experts, who were bilingual instructors of this special domain. Furthermore, research design of the study was checked and controlled throughout the study by five different experts; three instructors who were members of the thesis follow-up committee and two instructors from the Department of Special Education in a public university where the study was conducted. Finally, data collection steps (with questionnaire, Web forum and interview) followed each other continuously without any break amongst them to guarantee continuous process for the participants to eliminate the risks about reliability.

3.7. ASSUMPTIONS AND LIMITATIONS OF THE STUDY

Within this study, the researcher assumed that:

- The participants responded accurately to the instruments.
- Reliability and validity of the instruments were exact for making precise assumptions.
- All the data were collected and analyzed precisely.

The limitations of this study are:

- This study was limited to the 36 visually disabled students at a public university in Ankara, Turkey during the spring semester of the 2005 – 2006 academic year.
- Validity of this study was limited to the reliability of the instruments used in this study.
- Validity and reliability was limited to the honesty of the participants' responses to the questionnaires.
- Generalizations were only possible for the visually disabled students at a public university in Ankara, Turkey who were enrolled in this study.

3.8. SUMMARY OF THE CHAPTER

In this chapter, the researcher described the methodology he used for the research conducted for the study. More specifically, the researcher has given details about the design of the study, selection of participants, instruments of the study including questionnaire and interview, validity and reliability of the instruments, procedures of the study, analysis of the data collected, validity and reliability of the study, and finally, assumptions and limitations of the study.

CHAPTER 4

RESULTS

This chapter presents the findings of the study based on the research questions stated formerly. The main focus of this study was to reveal “To what extent do visually disabled students at a public university in Ankara, Turkey attend and participate in an online communication and discussion environment on the Web for gathering information and establishing social relationships?” Before presenting the results of this study, demographic information of the participants were provided in the following parts. Finally, results of the study were presented based on the research questions.

The demographic information of the participants was collected by the first part (A) of the questionnaire. Table 4.1 below shows the demographic information of the participants. As seen in Table 4.1, male participants (77.8 %) were much more than female (22.2%) participants in the study. The marital status of the participants showing that most of the visually disabled students in a public university in Ankara, Turkey were single (94.4 %) and only 2 of the participants (5.6 %) were married. The age range of the participants was between 16 and 23 as shown in Table 4.3, and as they were university students, most of the participants in this study aged between 19 and 23 (91.7 %) and the remaining was between 16 and 18 (8.3 %). In this study, the participants were the visually disabled university students in a public university in Ankara, Turkey, and 94.4 % of them were

students in an undergraduate program and remaining 5.6 % were in a postgraduate program.

Table 4.1: Demographic information of the participants

Sex	N	%
Male	28	77.8
Female	8	22.2
Marital Status		
Single	34	94.4
Married	2	5.6
Age		
16-18	3	8.3
19-23	33	91.7
24-older	0	0.0
Education		
Undergraduate	34	94,4
Postgraduate	2	5,6

N: Number of participants, %: Percentage of participants

Demographic information was collected to record the basic personal data of those visually disabled university students in a public university in Ankara, Turkey. Moreover, the researcher also recorded the names, surnames and e-mail addresses of the participants on questionnaires to contact with them for informing about the results of the study.

4.1. ACCESSING AND USING COMPUTERS AND THE INTERNET

In this part, the researcher has listed the responses of the participants for the research question 1.1: What are the initial opinions of visually disabled students at a public university in Ankara, Turkey for accessing and using computers and the Internet in their daily lives?

The first 6 questions in the second part (B) of the questionnaire were used to gather information about the current situation of visually disabled students at a public university in Ankara, Turkey for accessing and using the computers and the Internet. As seen in Table 4.2, most of the participants (94.0 %) in this study agreed that computers were useful for them. This thought could be formed as a result of their extensive computer usage ratio (100 %) together with the computer ownership at home (80.6 %) and access at the university (97.2 %).

Table 4.2 Accessing and using computers and the Internet

	N	%	N	%
	Yes		No	
Accepting computers useful for visually disabled university students	34	94.0	2	5.6
Computer usage	36	100.0	0	0
Computer ownership at home	29	80.6	7	19.4
Computer access at the university	35	97.2	1	2,8

N: Number of participants, %: Percentage of participants

Within the study, 50 % of the participants (18 students) stated that they spent 1-2 hours and 33.3 % of the participants (12 people) spent 3-4 hours in front of the computer every day, showing that if they were provided computer access, visually

disabled university students were happy to spend their time on computers, as seen in Table 4.3. Similarly, 52.8 % of the participants (19 students) stated that they spent 1-2 hours and 27.8 % of the participants (10 people) stated that they spent 3-4 hours on the Internet for Web browsing as seen in Table 4.3. These results can be an identifier for the important role of computers with an Internet connection in the daily lives of visually disabled university students in a public university in Ankara, Turkey for removing the barriers caused by their disability. Moreover, it can be stated that most of the visually disabled university students can be saved by providing computers with assistive software (speech synthesizers, screen readers, screen magnifiers, etc.) and Internet connection to create an artificial social environment which may reduce their frustrations caused by their vision loss.

Table 4.3 Amount of daily time spent for computer and the Internet use

Time spent for computer usage in a day	N	%
1 – 2 hours	18	50.0
3 – 4 hours	12	33.3
5 – 6 hours	6	16.7
7 or more hours	0	0
Time spent on the Internet in a day		
1 – 2 hours	19	52.8
3 – 4 hours	10	27.8
5 – 6 hours	7	19.4
7 or more hours	0	0

N: Number of participants, %: Percentage of participants

4.2. TYPES OF WEB SITES VISITED

In this part, the researcher has listed the responses of the participants for the research question 1.2: What kind of national or international Web sites do visually disabled students at a public university in Ankara, Turkey visit on the Internet?

The 7th, 8th and 9th questions in the second part (B) of the questionnaire were used to gather information about the kinds of national or international Web sites that visually disabled students at a public university in Ankara, Turkey visit on the Internet. The responses of the students for the types of web sites that they visited mostly on the Web were various. For the 7th item in the B part of the questionnaire, the participants stated the following types of web sites:

Exams - Tests, Research - Development, Information - Documentation, Download, Newspapers, Magazines, Hardware - Software, News, Music, Programs, Shopping, Law, Messaging, E-mail, Psychology, Public Culture, Women, Culture, Art, Poetry, Anecdotes - Jokes, Lesson/Lectures, Technology, Search Engines, Profession, The Blind, Disabled People, Education, Official/Public Institutions, Ethnicity, History, Sports, Computers

The researcher organized these types under 8 main categories and presented the results in Table 4.4, as seen below:

- Education: *Exams-Tests, Information - Documentation, Lesson/Lectures*
- Culture: *Public Culture, Art, Poetry, History, Ethnicity, Women*
- Entertainment: *Music, Anecdotes - Jokes*
- Science: *Research - Development, Hardware - Software, Programs, Technology, Search Engines, Computers*
- Profession: *Law, Psychology, Official/Public Institutions*
- News: *Newspapers, Magazines, News, Sports, Actual (Up-to-date), The Blind, Disabled People*
- Shopping: *Shopping*

- Communication: *E-mail, Chat, Messaging*

Table 4.4 Type of sites that participants visited on the Web

Type of web sites browsed on the Internet	N	%
News	28	77.8
Communication	23	63.9
Profession	18	50.0
Education	18	50.0
Culture	13	36.1
Science	13	36.1
Entertainment	7	19.4
Shopping	2	5.6

N: Number of participants, %: Percentage of participants

Similarly, Turkish sites that participants visit on the Web varied according to the responses provided for the 8th item in the part B of the questionnaire, as seen below:

sinavbankasi.com, kultur.gov.tr, inndir.com, milliyet.com.tr, hepsiburada.com, mavibilgisayar.com, brailleteknik.com, endeli.com, gazeteler.com, gazetekeyfi.com, antoloji.com, memurlar.net, korler.com, itiraf.com, zargan.com, indir.com, korler.net, engelliler.net, eogrenme.aof.edu.tr, korler.bilkent.edu.tr, emuzik.kultur.gov.tr, sabah.com.tr, cumhuriyet.com.tr, hurriyet.com.tr, zirve100.com, borsa.net, cnbce.com, engelsizerisim.com, trforum.com, sanalhane.com, sevgimol.com

The researcher organized these names under 8 main categories and presented the results in Table 4.5, as seen below:

- Newspapers: *sabah.com.tr, cumhuriyet.com.tr, hurriyet.com.tr, milliyet.com.tr, gazeteler.com, gazetekeyfi.com*
- Culture: *kultur.gov.tr, antoloji.com, emuzik.kultur.gov.tr*
- Education: *sinavbankasi.com, eogrenme.aof.edu.tr*
- Entertainment: *endeli.com, itiraf.com, zargan.com, zirve100.com, sevgimol.com, sanalhane.com*
- Information: *memurlar.net, borsa.net, cnbce.com*
- Share: *trforum.com, inndir.com, indir.com*
- Disability: *engelliler.net, korler.net, brailleteknik.com, engelsizerisim.com, korler.bilkent.edu.tr*
- Shopping: *mavibilgisayar.com, hepsiburada.com*

Table 4.5 Type of Turkish sites that participants visited on the Web

Type of Turkish web sites browsed on the Internet	N	%
Disabled	29	80.6
Newspapers	28	77.8
Entertainment	21	58.3
Culture	15	41.7
Information	12	33.3
Sharing	10	27.8
Education	3	8.3
Shopping	2	5.6

N: Number of participants, %: Percentage of participants

According to the responses of visually disabled university students in this study about the names of their favorite Turkish Web sites, it can be stated that most of

them prefer to visit Web sites which are giving information and offering services about disabilities and disabled people (80.6 %), and the Web sites of the daily newspapers (77.8 %), as seen in Table 4.5. This can be caused by the reason that they don't want to feel themselves alone and isolated by searching for other disabled people and facilities offered for them. Similarly, the results in Table 4.5 shows that most of the participants read daily newspapers on the Web with the help of the screen reader installed on their computer.

For the 9th item in the B part of the questionnaire, most of the participants have given the names of the giant web sites: "Google – 44.4 %", "Gmail – 27.8 %", "Hotmail – 25.0 %" and "MSN – 16.7 %", as seen in Table 4.6. Actually, this situation was not specific to the students in this study as "e-mail" is the most popular and important tool for all visually disabled university students to communicate with the outside world to socialize and integrate themselves in daily life.

Table 4.6 Name of International web sites browsed on the Internet

Name of the web sites	N	%
Google	16	44.4
Gmail	10	27.8
Hotmail	9	25.0
MSN	6	16.7
AudioGames	4	11.1
BBC	2	5.6
Creative	1	2.8
Nod32	1	2.8

N: Number of participants, %: Percentage of participants

Final item in the second part (B) of the questionnaire was for informing the participants about the results of this questionnaire and the overall study. The outcome of the answers to this item was as expected; all of the participants (36 visually disabled students at a public university in Ankara, Turkey) requested to receive the results by e-mail as seen in Table 4.7.

Table 4.7 Information request for the results of the study by e-mail

	N	%	N	%
	Yes		No	
Requested to be informed about the results of the study	36	100	0	0

N: Number of participants, %: Percentage of participants

4.3 THE SELECTION OF TOPICS AND SUBJECTS FOR THE WEB FORUM

In this part, the researcher has listed the responses of the participants for the research question 1.3: What are the preferences of visually disabled students at a public university in Ankara, Turkey for the topics and subjects in a Web forum that will be specially designed and developed for them?

In this section, the data collected from the third part (Part C) of the questionnaire was analyzed. This part of the questionnaire was prepared to identify the topics and subjects that visually disabled students at a public university in Ankara, Turkey preferred to see on the Web forum, namely “EnabledForum - EngelsizForum” that would be designed and developed as a result of this study. There were 17 main topics and related subjects located under them. This part of the questionnaire based the fundamental structure of the “EnabledForum -

EngelsizForum”. In this final part of the questionnaire, the researcher asked the participants to identify the topics and subjects that they wanted to be included in the Web forum that will be designed for them. Within the 17 tables listed below, the researcher showed the responses of the participants for the main topics and titles with the numbers (N) - stating the number of participants who preferred that item in the questionnaire, and percentages (%) - stating the ratios of the participants who preferred that item to the total number of participants.

Web forums play an important role for computer users to find the information, documents, software, pictures, music, audio and video files, or any other “thing” they need. Like sighted people, visually disabled university students also benefit from the services and the content provided on a Web forum. But, existing Web forums were not designed and developed according to the needs and expectations of visually disabled university students, by means of content and user-interfaces.

As “EnabledForum - EngelsizForum” was to be designed for a specific user group, visually disabled students of a public university in Ankara, Turkey, it should have been constructed with the selection of topics and subjects identified by them. On the following text, the most preferred topics and subjects selected by the participants will be described.

In the first item, “About the forum”, the participants responded mostly on “Forum help” (52.4 %), “Forum announcements” (50.0 %), “Forum suggestions” (44.4 %) and “Forum complaints” (41.9 %) titles, as seen in Table 4.8. This result can be caused by the fact that participants look for help and support when they had problems on the Web sites that they visited.

Table 4.8 Participants' choices for the topic "About the Forum"

1) About the Forum	N	%
a) Forum Moderators	10	28.2
b) Forum Announcements	18	50.0
c) Forum Help	19	52.4
d) Forum Complaints	15	41.9
e) Forum Suggestions	16	44.4
f) Others: Problems and Solutions	1	2.4

N: Number of participants, %: Percentage of participants

The results of the second topic's responses shows that visually disabled students in this study mostly prefer to be informed about "Supporting tools increasing accessibility" (78.2 %), "Legal rights of the disabled people" (75.8 %), "New treatment methods" (63.7 %) and "Special activities" (55.6 %), as seen in Table 4.9.

Table 4.9 Participants' choices for the topic "The World of the Disabled People"

2) The World of the Disabled People	N	%
a) Social Activities	19	52,4
b) Special Activities	20	55,6
c) Supporting Tools increasing Accessibility	28	78,2
d) New Treatment Methods	23	63,7
e) Legal Rights of the Disabled People	27	75,8
f) Unions, Organizations and Societies	15	41,9
g) Others: More information about the disabled people, Sports Activities	2	5,6

N: Number of participants, %: Percentage of participants

The next part was about “News” topic, which was one of the most popular topics stated by the participants in the 7th item of the second part of the questionnaire. In this topic, “Technology” (83.1 %), “Actual” (69.4 %) and “International news” (69.4 %) were the most popular items responded by the participants, as shown in Table 4.10.

Table 4.10 Participants’ choices for the topic “News”

3) News	N	%
a) Actual News	25	69,4
b) Financial News	13	36,3
c) Life	14	38,7
d) International News	25	69,4
e) Political News	17	47,6
f) Culture and Art	17	47,6
g) Technology	30	83,1
h) Sports	14	38,7
i) Weather Forecast	15	41,9
j) Magazine News	7	19,4
k) Others:	0	0,0

N: Number of participants, %: Percentage of participants

Additionally, in “Printed and Visual Media” topic, “Radios” (66.9 %) and “Newspapers” (63.7 %) got the highest ranks as shown in Table 4.11.

Table 4.11 Participants’ choices for the topic “Printed and Audio-Visual Media”

4) Printed and Audio-Visual Media	N	%
a) Radios	24	66,9
b) Televisions	18	50,0
c) Newspapers	23	63,7
d) Magazines	16	44,4
e) Others:	0	0,0

N: Number of participants, %: Percentage of participants

For the “Education” topic, the participants’ choices were mostly collected in “Computer education” (75.8 %), “Tests – Exams” (55.6 %) and “Foreign Language Education” (50 %). As seen in Table 4.12, participants preferred to be educated in computers and foreign language, two main criteria for them to find a work or socialize with people in other countries.

Table 4.12 Participants’ choices for the topic “Education”

5) Education	N	%
a) Education in Turkey	16	44,4
b) Education Abroad	16	44,4
c) Universities	16	44,4
d) High schools	11	30,6
e) Teachers	14	38,7
f) Students	12	33,1
g) Foreign Language Education	18	50,0
h) Computer Education	27	75,8
i) Tests - Exams	20	55,6
j) Seminars	14	38,7
k) Others:	0	0,0

N: Number of participants, %: Percentage of participants

For the “Culture and Art” topic, 5 subjects were mostly selected by the participants, namely: “Music” (52.4 %), “Books” (50 %), “Concerts” (47.6 %), “Literature” (41.9 %) and “History” (38.7 %), as seen in Table 4.13. The results in this topic showed that visually disabled university students interested in auditory arts (music and concerts) and documentation about history and literature in e-books read by the screen readers.

Table 4.13 Participants’ choices for the topic “Culture and Arts”

6) Culture and Arts	N	%
a) Cinema	11	30,6
b) Theatre	13	36,3
c) Concerts	17	47,6
d) Opera	4	11,3
e) Ballet	3	8,9
f) Painting	4	11,3
g) Music	19	52,4
h) Books	18	50,0
i) Magazines	13	36,3
j) Poetry	13	36,3
k) Literature	15	41,9
l) History	14	38,7
m) Others:	0	0,0

N: Number of participants, %: Percentage of participants

“Health” is one of the important topics that every people expect to see in any Web forum as it is critical for human life. In “Health” topic, as seen in Table 4.14, participants requested to see “Sanity/Mental health” (47.6 %), “Body health” (44.4 %) and “Diseases and treatments” (44.4 %) subjects in the Web forum. Because of their visual disability, “Sanity” was the most popular subject as it deals with the mental models of human beings.

Table 4.14 Participants’ choices for the topic “Health”

7) Health	N	%
a) Body Health	16	44,4
b) Sanity / Mental Health	17	47,6
c) Diseases and Treatments	16	44,4
d) Psychological Support	13	36,3
e) Others:	0	0,0

N: Number of participants, %: Percentage of participants

According to the results as seen in the following Table 4.15 and Table 4.16 below, participants requested content about “Holiday guide” (38.7 %), “Traveling” (36.3 %) and “National tours” (36.3 %) under the “Tourism” topic and “Foreign currency” (38.7 %) and “Gold” (38.7 %) under the “Economy and Finance” topic. It can be stated that the participants like to travel in Turkey with the specially prepared guides prepared for them, but they need help for moving from one city to another as Turkey didn’t have the related infrastructure yet. On the other hand, from the results, it can be understood that visually disabled university students prefer to invest their money in foreign currency or gold for their savings.

Table 4.15 Participants’ choices for the topic “Tourism”

8) Tourism	N	%
a) Holiday Guide	14	38,7
b) Traveling	13	36,3
c) National Tours	13	36,3
d) International Tours	10	28,2
e) Hotels	9	25,8
f) Others:	0	0,0

N: Number of participants, %: Percentage of participants

Table 4.16 Participants' choices for the topic "Economy and Finance"

9) Economy and Finance	N	%
a) Stock Market	8	21,8
b) Monetary	12	33,1
c) Foreign Currency	14	38,7
d) Gold	14	38,7
e) Investment tools	11	30,6
f) Banks	8	21,8
g) Public Organizations	11	30,6
h) Private Organizations	8	21,8
i) Others:	0	0,0

N: Number of participants, %: Percentage of participants

According to the results gained from the “Politics” topic, participants were mostly interested in “Political events in Turkey” (47.6 %) and “Political events in the World” (36.3 %), as seen in Table 4.17. This shows that the university students in this study like politics and want to be informed about political news and events for carrying the responsibility of being a citizen.

Table 4.17 Participants’ choices for the topic “Politics”

10) Politics	N	%
a) Political parties	8	21,8
b) Political Events in Turkey	17	47,6
c) Political Events in the World	13	36,3
d) The Turkish National Assembly	10	28,2
e) Ministers and Member of Parliaments	11	30,6
f) Presidency	8	21,8
g) Prime Ministry	9	25,8
h) Others:	0	0,0

N: Number of participants, %: Percentage of participants

On the other hand, probably the most popular activity for most of the Internet users is instant messaging, namely “Chat”. It was one of the highly marked items in the third part of the questionnaire. Within the scope of the study, it is understood that “instant messaging” is very important for the participants to keep in touch with sighted people for help and cooperation when needed. Consequently, as seen in Table 4.18, “Chat” (52.4 %) and “Relationships” (33.1 %) were the two subjects mostly marked by the participants.

Table 4.18: Participants’ choices for the topic “Love and Friendship”

11) Love and Friendship	N	%
a) Finding Friends	9	25,8
b) Chat	19	52,4
c) Relationships	12	33,1
d) Others:	0	0,0

N: Number of participants, %: Percentage of participants

For “Fashion” topic, the ratios of the subjects “Clothing and Dressing” (33.1 %) and “Current trends” (19.4 %) were close to each other as seen in Table 4.19, and this result showed that visually disabled university students in this study wanted to learn about the current trends in clothing and although they don’t see around, they want to be seen well dressed by others.

Table 4.19 Participants’ choices for the topic “Fashion”

12) Fashion	N	%
a) Clothing and Dressing	12	33,1
b) Current trends	7	19,4
c) Others:	0	0,0

N: Number of participants, %: Percentage of participants

“Entertainment and Humor” was one of the most popular topics in this part of the questionnaire as 50 % of the participants marked at least one subject in this area. “Funny sounds and audio” (58.9 %) got the highest rank but other subjects were very close to it by means of percentages as seen in Table 4.20.

Table 4.20 Participants’ choices for the topic “Entertainment and Humor”

13) Entertainment and Humor	N	%
a) Funny Stories	18	50,0
b) Funny sounds and audio	21	58,9
c) Anecdotes - Jokes	20	55,6
d) Others:	0	0,0

N: Number of participants, %: Percentage of participants

According to the results shown in Table 4.21, visually disabled university students enrolled in this study preferred to be informed about “Swimming” (33.1 %) and “Football” (30.6 %) for sports activities. It was a surprising result that “Swimming” got the highest rank because it is not a common sports activity in Turkey.

Table 4.21 Participants’ choices for the topic “Sports”

14) Sports	N	%
a) Football	11	30,6
b) Basketball	7	19,4
c) Volleyball	5	13,7
d) Tennis	2	5,6
e) Swimming	12	33,1
f) Athletics	8	21,8
g) Gymnastic	7	19,4
h) Body Building	8	21,8
i) Step - Aerobic - Fitness	6	16,9
j) Table Tennis	5	13,7
k) Chess	8	21,8
l) Others: Formula 1, Rally	3	8,9

N: Number of participants, %: Percentage of participants

As it is a purposeful part of the questionnaire for identifying the topics that students would prefer to see on the Web forum, most of the participants marked the subjects under the “Computers and Technology” topic. Consequently, “Computer Software” (69.4 %), “Computer Hardware” (66.9 %) and “the Internet and Web” (63.7 %) were the three mostly selected subjects, as seen in Table 4.22.

Table 4.22 Participants’ choices for the topic “Computers and Technology”

15) Computers and Technology	N	%
a) Operating Systems (Windows, Linux, Macintosh)	22	61,3
b) The Internet and Web	23	63,7
c) Computer Hardware	24	66,9
d) Computer Software (Programs)	25	69,4
e) Portable / Mobile Computers	21	58,9
f) Mobile Phones	16	44,4
g) Others: Crack programs, Patches	2	5,6

N: Number of participants, %: Percentage of participants

Similarly, “Uploading / Downloading on the Internet” topic’s subjects got highest ranks from participants’ marks as they were mostly spending their time on the Web for downloading the files they needed. Therefore, “Computer programs” (75.8 %), “Audio and sound files” (71.8 %) and “Mp3 files” (63.7 %) were the first three subjects marked by the participants. As seen in Table 4.23, although they got very high ranks in percentages; Video files (55.6 %) and Games (44.4 %) were less popular comparing to those first three as they included visual content and they are difficult to understand for a visually disabled student.

Table 4.23 Participants’ choices for the topic “Uploading / Downloading on the Internet”

16) Uploading / Downloading on the Internet	N	%
a) Computer Programs	27	75,8
b) Games	16	44,4
c) Mp3 files	23	63,7
d) Audio and Sound Files	26	71,8
e) Video Files	20	55,6
f) Others: Text files	2	5,6

N: Number of participants, %: Percentage of participants

The final topic in this part of the questionnaire was “Transportation and Motorized Vehicles”, which is a critical domain for visually disabled university students to travel from one location to another. However, because they usually need help from others to travel, the participants didn’t show too much interest in this topic as seen in Table 4.24, but results showed that “Railways” (25.8 %) and “Automobiles” (21.8 %) were the two subjects which got the highest ratios.

Table 4.24 Participants’ choices for the topic “Transportation and Motorized Vehicles”

17) Transportation and Motorized Vehicles	N	%
a) Automobiles	8	21,8
b) Motorcycles	3	8,9
c) Bicycles	2	5,6
d) Airlines	6	16,9
e) Cruise lines	6	16,9
f) Railways	9	25,8
g) Others:	0	0,0

N: Number of participants, %: Percentage of participants

According to the results gained from the third part of the questionnaire, “EnabledForum - EngelsizForum”, the web forum for visually disabled university students in a public university in Ankara, Turkey has been designed and developed by the researcher. The results expressed in tables above were used to identify the items that will be offered in the web forum. 36 participants provided valuable data in the questionnaire for the selection of topics and subjects of the “EnabledForum - EngelsizForum”. The subjects and topics in the Web forum were also listed in the same order with the items above to help the participants for navigation.

4.4. POPULARITY OF TOPICS AND SUBJECTS IN THE WEB FORUM

In this part, the researcher has listed the responses of the participants for the research question 1.4: What are the most popular topics and subjects in the Web forum according to the usage statistics of visually disabled students at a public university in Ankara, Turkey?

This section shows the popularities of the topics and subjects in the “EnabledForum - EngelsizForum” according to the users’ logs recorded between the dates 03.04.2006 and 30.06.2006. The researcher recorded the participants’ activities based on the daily logs kept by the server.

Following tables show the results of the Web forum’s registered users’ navigation statistics based on the data collected from the logs of the server. On the tables, numbers under the “Read” label represents the number of forum users who read the text content under those subjects and numbers under the % ⁽¹⁾ label represents the percentage of the forum users who read the text content under related title to the total 36 registered users of the forum. Similarly, numbers under the “Replied” label represents the number of forum users who replied an answer to that subject and numbers under the % ⁽²⁾ label represents the percentage of the forum users who replied to that subject to the users who read the text content under that subject. Correspondingly, numbers under the “Added” label represents the number of forum users who added new titles under that subject and numbers under the % ⁽³⁾ label represents the percentage of the forum users who added new titles under that subject to the users who read the content under that subject. In all tables, the first numbers located under the “Read”, “Replied” and “Added” titles represent the sum of all the numbers below based on the users’ responses for the related items in the “EnabledForum - EngelsizForum”.

In table 4.25, statistics based on the user logs for the first category, “About the Forum”, are shown. For reading the subjects and content, users mostly interested in “Forum announcements” (44.4 %) and “Forum help” (39.5 %) whereas “Forum suggestions” (50.0 %) got the highest rank for replying. No user added new subjects under the topics in “About the Forum”. The results in Table 4.25 were parallel to the results in Table 4.8, “Forum Help” and “Forum Announcements” were the two most popular subjects but “Forum Help” got slightly higher rank (52.4 %) comparing to others in Table 4.8.

Table 4.25 User statistics for the “About the Forum” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
1) About the Forum	63		25	39.7	0	0.0
a) Forum Moderators	9	25.0	4	44.4	0	0.0
b) Forum Announcements	16	44.4	6	37.5	0	0.0
c) Forum Help	14	38.9	4	28.6	0	0.0
d) Forum Complaints	12	33.3	5	41.7	0	0.0
e) Forum Suggestions	12	33.3	6	50.0	0	0.0
f) Problems and Solutions	4	11.1	0	0.0	0	0.0

(1): The percentage of the users who “Read” the topics to the total 36 participants
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic

Under the “The World of the Disabled People” category in the forum, content under “Legal Rights of the Disabled People” (83.3 %) and “Supporting Tools increasing Accessibility” (80.6 %) were the most popular topics read by users. Similarly, participants mostly replied for the titles under “Legal Rights of the Disabled People” (33.4 %) and “Special Activities” (31.6 %). For adding new titles under the existing titles, “Special Activities” (57.9 %), “Legal Rights of the Disabled People” (50.0 %) and “Unions, Organizations and Societies” (% 50.0) were the first three as seen in Table 4.26. The results in Table 4.26 were parallel to the results in Table 4.9, “Supporting Tools increasing Accessibility” and “Legal Rights of the Disabled People” were the two most popular subjects but, differently, “Supporting Tools increasing Accessibility” got slightly higher rank (78.2 %) comparing to others in Table 4.9. The ratios of “read”, “replied” and “added new subject” in Table 4.26 and the selection of items in Table 4.9 state that visually disabled students in this study want to know about their rights and the accessibility tools that will help them to overcome their disability.

Table 4.26 User statistics for the “The World of the Disabled People” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
2) The World of the Disabled People	132		30	22.7	55	41.7
a) Social Activities	17	47.2	2	11.8	3	17.6
b) Special Activities	19	52.8	6	31.6	11	57.9
c) Supporting Tools increasing Accessibility	29	80.6	8	27.6	12	41.4
d) New Treatment Methods	21	58.3	4	19.0	6	28.6
e) Legal Rights of the Disabled People	30	83.3	10	33.3	15	50.0
f) Unions, Organizations and Societies	16	44.4	0	0.0	8	50.0
g) More information about the disabled people	3	8.3	0	0.0	0	0.0
h) Sports Activities	3	8.3	0	0.0	0	0.0
(1): The percentage of the users who “Read” the topics to the total 36 participants						
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic						
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic						

Similar to the results gained from the third part of the questionnaire as shown in Table 4.10, “News” was the most popular category in the “Enabled Forum – EngelsizForum” as its’ posts read 198 times by the users, as seen in Table 4.27. However, only 48 of them replied to the topics and 42 of them added new titles under the topics. The users mostly read and replied to the subjects about “Technology” (88.9 % read, 50.0 % replied and 53.1 % added new title) and “Actual News” (83.3 % read, 26.7 % replied and 30.0 % added new title). It can be stated that participants are also interested in “International News” and “Culture and Art” as they are also popular according to forum users’ responses. The results in Table 4.27 were parallel to the results in Table 4.10; “Technology” was the most popular subject both in Table 4.10 and Table 4.27.

Table 4.27 User statistics for the “News” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
3) News	198		48	24.2	42	21.2
a) Actual News	30	83.3	8	26.7	9	30.0
b) Financial News	17	47.2	3	17.6	3	17.6
c) Life	19	52.8	3	15.8	4	21.1
d) International News	23	63.9	6	26.1	6	26.1
e) Political News	21	58.3	5	23.8	1	4.8
f) Culture and Art	23	63.9	7	30.4	2	8.7
g) Technology	32	88.9	16	50.0	17	53.1
h) Sports	12	33.3	0	0.0	0	0.0
i) Weather Forecast	12	33.3	0	0.0	0	0.0
j) Magazine News	9	25.0	0	0.0	0	0.0

(1): The percentage of the users who “Read” the topics to the total 36 participants
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic

Additionally, the results shown in Table 4.28 confirm the truth that visually disabled students in this study prefer to use the Internet and Web for hearing about the news as they can't read printed newspapers and see the visual items on TV. "Newspapers" (77.8 %) and "Radios" (66.7 %) are the most popular topics read by the users in this category. Similarly, for adding new titles under existing topics, "Radios" (29.2 %) and "Newspapers" (28.6 %) were the first two. Moreover, the results in Table 4.28 were very similar to the results in Table 4.11 where "Radios" (66.9 %) and "Newspapers" (63.7 %) got the highest ranks but, differently, "Radios" got slightly higher rank (66.9 %) comparing to others in Table 4.11.

Table 4.28 User statistics for the "Printed and Audio-Visual Media" topic on "EnabledForum - EngelsizForum"

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
4) Printed and Audio - Visual Media	78		10	12.8	15	19.2
a) Radios	24	66.7	4	16.7	7	29.2
b) Televisions	12	33.3	2	16.7	0	0.0
c) Newspapers	28	77.8	4	14.3	8	28.6
d) Magazines	14	38.9	0	0.0	0	0.0
(1): The percentage of the users who "Read" the topics to the total 36 participants						
(2): The percentage of the users who "Replied" the topic to the users who "Read" the topic						
(3): The percentage of the users who "Added" new topic to the users who "Read" the topic						

“Education” was one of the most popular categories in the “EnabledForum - EngelsizForum” as there were 160 entries for “Read”, 32 entries for “Replied” and 19 entries for “Added”, as seen in Table 4.29. “Computer Education” (86.1 %), “Tests - Exams” (61.1 %) and “Foreign Language Education” (58.3 %) were the most popular topics users read the posts under. The participants replied the topics mostly under “Education abroad” (36.4 %) and “Universities” (30.8 %) whereas they added new titles mostly under “Teachers” (29.4 %), “Universities” (23.1 %) and “Computer Education” (22.6 %). In Table 4.12, “Computer Education” was also the most popular topic (75.8 %) selected by the participants of the questionnaire, similar to the usage statistics presented in Table 4.29, stating that visually disabled university students like to learn about computers and technology.

Table 4.29 User statistics for the “Education” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
5) Education	160		32	20.0	19	11.9
a) Education in Turkey	10	27.8	2	20.0	2	20.0
b) Education Abroad	11	30.6	4	36.4	0	0.0
c) Universities	13	36.1	4	30.8	3	23.1
d) High schools	10	27.8	0	0.0	0	0.0
e) Teachers	17	47.2	4	23.5	5	29.4
f) Students	15	41.7	2	13.3	0	0.0
g) Foreign Language Education	21	58.3	4	19.0	0	0.0
h) Computer Education	31	86.1	8	25.8	7	22.6
i) Tests - Exams	22	61.1	2	9.1	1	4.5
j) Seminars	10	27.8	2	20.0	1	10.0
(1): The percentage of the users who “Read” the topics to the total 36 participants						
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic						
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic						

“Culture and Arts” was also a popular category in the web forum according to the users’ responses for reading, replying and adding new titles under existing topics. As seen in Table 4.30, “Music” (58.3 %), “Literature” (55.6 %), “Poetry” (50.0 %) and “Concerts” (50.0 %) were the topics mostly read by the participants. Interestingly, the users replied mostly on the “Painting” (50.0 %), “Ballet” (50.0 %), “Music” (47.6 %) and “Opera” (40.0 %) topics. On the other hand, forum users mostly added new titles under “Opera” (60.0 %) and “Poetry” (50.0 %) topics. When the popularities of the items were compared, the results shown in Table 4.30 and Table 4.13 were slightly different, “Music” was the most popular item in both tables but in Table 4.13, “Books” (50 %) and “Concerts” (47.6 %) were the second and third, whereas “Literature” (55.6 %) and “Poetry” (50.0 %) were the second and the third in Table 4.30 according to the “read” ratios of the items. However, in the “Culture and Arts” category, participants’ choices for the other items in both questionnaire and the Web forum showed similarities, as presented in Tables 4.13 and 4.30.

Table 4.30 User statistics for the “Culture and Arts” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
6) Culture and Arts	156		30	19.2	25	16.0
a) Cinema	8	22.2	0	0.0	0	0.0
b) Theatre	11	30.6	0	0.0	0	0.0
c) Concerts	18	50.0	4	22.2	6	33.3
d) Opera	5	13.9	2	40.0	3	60.0
e) Ballet	4	11.1	2	50.0	0	0.0
f) Painting	4	11.1	2	50.0	0	0.0
g) Music	21	58.3	10	47.6	7	33.3
h) Books	17	47.2	4	23.5	0	0.0
i) Magazines	17	47.2	4	23.5	0	0.0
j) Poetry	18	50.0	2	11.1	9	50.0
k) Literature	20	55.6	0	0.0	0	0.0
l) History	13	36.1	0	0.0	0	0.0

(1): The percentage of the users who “Read” the topics to the total 36 participants
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic

As seen in Table 4.31, in “Health” category, “Sanity / Mental Health” (50.0 %) and “Psychological Support” (44.4 %) were the two topics users read the titles mostly. For replying to the read content and adding new titles, “Psychological Support” (50.0 %) got the highest percentages. The results shown in Table 4.31 and Table 4.14 were parallel, “Sanity / Mental Health” was the most popular topic (47.6 %) selected by the participants of the questionnaire, similar to the usage statistics presented in Table 4.31 with the 50.0 %. However, the ratios of the items in Table 4.14 were very near to each other but the ratios of those items were quite different in Table 4.31 according to the “read”, “replied” and “added” statistics. For example, in Table 4.14, “Psychological Support” was the least popular item in the questionnaire, but according to the usage statistics shown in Table 4.31, it was the second one visited by the participants of the “EnabledForum - EngelsizForum”.

Table 4.31 User statistics for the “Health” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
7) Health	58		22	37.9	5	8.6
a) Body Health	14	38.9	6	42.9	0	0.0
b) Sanity / Mental Health	18	50.0	6	33.3	2	11.1
c) Diseases and Treatments	10	27.8	2	20.0	0	0.0
d) Psychological Support	16	44.4	8	50.0	3	18.8

(1): The percentage of the users who “Read” the topics to the total 36 participants
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic

For the “Tourism” topic, visually disabled computer users read mostly the content under the “National Tours” (33.3 %), “Traveling” (30.6) and “Holiday Guide” (27.8 %) topics, as seen in Table 4.32. Therefore, users replied the titles mostly under the topics “Traveling” (36.4 %) and “National Tours” (33.3 %), and for adding new titles, “National Tours” (25.0 %) got the highest rank. When the questionnaire results checked in Table 4.15, “Holiday Guide” was the most popular item (38.7 %) in this category, followed by “Traveling” and “National tours” with very near percentages. However, it can be stated that the results gained from the usage statistics of the web forum for all the items under “Tourism” category in Table 4.32 were parallel to the participants’ choices provided in questionnaire forms.

Table 4.32: User statistics for the “Tourism” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
8) Tourism	48		12	25.0	5	10.4
a) Holiday Guide	10	27.8	2	20.0	0	0.0
b) Traveling	11	30.6	4	36.4	2	18.2
c) National Tours	12	33.3	4	33.3	3	25.0
d) International Tours	8	22.2	2	25.0	0	0.0
e) Hotels	7	19.4	0	0.0	0	0.0

(1): The percentage of the users who “Read” the topics to the total 36 participants
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic

Within the “Economy and Finance” category, participants mostly read the titles under the topics “Gold” (41.7 %) and “Foreign Currency” (41.7 %), but reply rates of the topics “Public Organizations” (61.5 %), “Private Organizations” (44.4 %), “Stock Market” (44.4 %) and “Monetary” (40.0 %) are higher than others, as shown in Table 4.33. On the other hand, the users added new titles at most under “Investment tools” (62.5 %) topic. The values in Table 4.33 were very similar with the values in Table 4.16, indicating that participants’ preferences for the “Economy and Finance” were mostly collected under “Foreign currency” and “Gold”. It is quite impressive that visually disabled university students in this study want to control their savings by themselves and want to be informed about which investment tool is best for them.

Table 4.33 User statistics for the “Economy and Finance” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
9) Economy and Finance	85		26	30.6	20	23.5
a) Stock Market	9	25.0	4	44.4	0	0.0
b) Monetary	10	27.8	4	40.0	3	30.0
c) Foreign Currency	15	41.7	2	13.3	0	0.0
d) Gold	15	41.7	2	13.3	4	26.7
e) Investment tools	8	22.2	2	25.0	5	62.5
f) Banks	6	16.7	0	0.0	2	33.3
g) Public Organizations	13	36.1	8	61.5	6	46.2
h) Private Organizations	9	25.0	4	44.4	0	0.0
(1): The percentage of the users who “Read” the topics to the total 36 participants						
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic						
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic						

For “Politics” category within the Web forum, the participants mostly read the titles under “Political Events in Turkey” (44.4 %) as shown in Table 4.34. However, they replied mostly on the topics “Political Events in the World” (66.7 %) and “Presidency” (60.0 %). For adding new titles, “The Turkish National Assembly” (62.5 %) got the highest rank from the participants. When compared with the questionnaire results shown in Table 4.17, the results were parallel, indicating that participants were mostly interested in “Political Events in Turkey”. Moreover, the results indicate that visually disabled university students in this study interested in politics and want to express their ideas if appropriate environments provided for them.

Table 4.34 User statistics for the “Politics” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
10) Politics	76		30	39.5	14	18.4
a) Political parties	10	27.8	0	0.0	0	0.0
b) Political Events in Turkey	16	44.4	6	37.5	7	43.8
c) Political Events in the World	12	33.3	8	66.7	0	0.0
d) The Turkish National Assembly	8	22.2	4	50.0	5	62.5
e) Ministers and Member of Parliaments	8	22.2	4	50.0	2	25.0
f) Presidency	10	27.8	6	60.0	0	0.0
g) Prime Ministry	12	33.3	2	16.7	0	0.0
(1): The percentage of the users who “Read” the topics to the total 36 participants						
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic						
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic						

As stated before, visually disabled university students like to find and chat with new people on the Internet for removing the barriers to establish social relationships. They have very good typing skills on standard keyboards and like to chat with others on instant messaging programs, like Microsoft’s MSN Messenger. For the “Love and Friendship” category in the “EnabledForum - EngelsizForum”, titles under all three topics read mostly by the users as seen in Table 4.35. For replying to the titles, “Finding Friends” (57.1 %) topic got the highest ratios whereas for adding new titles, “Chat” (56.5 %) got the highest ratio. The results were similar to the data collected with the questionnaire, as shown in Table 4.18, where “Chat” is the most popular item. As expected, visually disabled university students in this study preferred to feed their communication needs by chatting with people on the Internet, proved by the results shown in both Table 4.18 and 4.35.

Table 4.35 User statistics for the “Love and Friendship” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
11) Love and Friendship	56		22	39.3	24	42.9
a) Finding Friends	14	38.9	8	57.1	7	50.0
b) Chat	23	63.9	6	26.1	13	56.5
c) Relationships	19	52.8	8	42.1	4	21.1
(1): The percentage of the users who “Read” the topics to the total 36 participants						
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic						
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic						

For the “Fashion” category, as seen in Table 4.36, 27.8 % of the participants read the titles under “Clothing and Dressing” and 13.9 % for the “Current Trends”. For replying those topics, 40.0 % of the participants replied for the titles under “Current Trends” and 20.0 % replied for the “Clothing and Dressing”. When compared with the data collected with the questionnaire, in Table 4.19, the results were exactly the same, proving the fact that “Fashion” was not a main concern for visually disabled university students in this study. These results can be caused by the visual disability of the participants as they don’t see their environment.

Table 4.36 User statistics for the “Fashion” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
12) Fashion	15		4	26.7	0	0.0
a) Clothing and Dressing	10	27.8	2	20.0	0	0.0
b) Current trends	5	13.9	2	40.0	0	0.0

(1): The percentage of the users who “Read” the topics to the total 36 participants
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic

“Entertainment and Humor” category was also popular within the “EnabledForum - EngelsizForum” as more than half of the participants read the titles under at least one topic, as seen in Table 4.37. However, users only replied (10.0 %) for “Funny Stories” and added (15.0 %) new titles under it. These results were parallel with the results shown in Table 4.20 gained from the questionnaire. Those results are caused by the fact that visually disabled university students in this study want to have fun and enjoy life to reduce the feel of remediless caused by their disability.

Table 4.37 User statistics for the “Entertainment and Humor” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
13) Entertainment and Humor	64		2	3.1	3	4.7
a) Funny Stories	20	55.6	2	10.0	3	15.0
b) Funny sounds and audio	23	63.9	0	0.0	0	0.0
c) Anecdotes - Jokes	21	58.3	0	0.0	0	0.0
(1): The percentage of the users who “Read” the topics to the total 36 participants						
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic						
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic						

For the “Sports” category, as seen in Table 4.38, the participants mostly read the topics about “Swimming” (44.4 %), “Chess” (27.8 %) and “Football” (27.8 %). However, users replied only “Swimming” (37.5 %) and “Chess” (20.0 %) within all titles in this category. For adding new titles under the existing topics, “Step - Aerobic - Fitness” (80.0 %) were on the first and “Swimming” (75.0 %) were on the second rank. There are some differences with the results shown in Table 4.21, where “Football” was at the second place for the participants’ preference in sports.

Table 4.38 User statistics for the “Sports” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
14) Sports	79		8	10.1	28	35.4
a) Football	10	27.8	0	0.0	0	0.0
b) Basketball	8	22.2	0	0.0	0	0.0
c) Volleyball	3	8.3	0	0.0	0	0.0
d) Tennis	4	11.1	0	0.0	0	0.0
e) Swimming	16	44.4	6	37.5	12	75.0
f) Athletics	6	16.7	0	0.0	3	50.0
g) Gymnastic	8	22.2	0	0.0	2	25.0
h) Body Building	3	8.3	0	0.0	0	0.0
i) Step - Aerobic - Fitness	5	13.9	0	0.0	4	80.0
j) Table Tennis	6	16.7	0	0.0	0	0.0
k) Chess	10	27.8	2	20.0	7	70.0
l) Automotive Sports	4	11.1	0	0.0	0	0.0

(1): The percentage of the users who “Read” the topics to the total 36 participants
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic

Within the “EnabledForum - EngelsizForum”, “Computers and Technology” was one of the most popular categories in which users read the titles, replied on them and added new titles under existing topics. As seen in Table 4.39, “Computer Software (Programs)” topic got the highest ratio for reading (72.2 %), replying (84.6 %) and adding new titles (80.8 %) under it. The results were parallel with the data collected with the questionnaire as shown in Table 4.22, but “Portable / Mobile Computers” got the third rank as read by the participants but reply and added new topic ratios were very low comparing to others. Those results show that visually disabled university students in this study like to follow the developments on information and communication technologies, especially for the computer software and hardware. Using the appropriate software on available hardware enables visually disabled computer users to ease up the daily tasks and connect to the life online.

Table 4.39 User statistics for the “Computers and Technology” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
15) Computers and Technology	123		84	68.3	78	63.4
a) Operating Systems (Windows, Linux, Macintosh)	17	47.2	12	70.6	0	0.0
b) Internet and Web	19	52.8	14	73.7	25	38.5
c) Computer Hardware	23	63.9	16	69.6	17	73.9
d) Computer Software (Programs)	26	72.2	22	84.6	21	80.8
e) Portable / Mobile Computers	20	55.6	4	20.0	2	10.0
f) Mobile Phones	18	50.0	12	66.7	13	72.2
g) Cracks, Freeware and Patches	8	22.2	0	0.0	2	25.0
(1):	The percentage of the users who “Read” the topics to the total 36 participants					
(2):	The percentage of the users who “Replied” the topic to the users who “Read” the topic					
(3):	The percentage of the users who “Added” new topic to the users who “Read” the topic					

Similarly, “Uploading / Downloading on the Internet” category was also popular by means of reading, replying and adding new titles. As seen in Table 4.47, the users mostly read the titles under “Computer Programs” (86.1 %), “Audio and Sound Files” (77.8 %) and “Mp3 Files” (72.2 %) titles. Similarly, the titles under those three topics were mostly replied and new titles added under them. When compared with the data collected with the questionnaire for this category (as shown in Table 4.23), it can be stated that results were exactly the same. The results in Table 4.40 shows that visually disabled university students in this study logged in to the “EnabledForum - EngelsizForum” for searching and downloading the programs, mp3 and other audio files that they need. It is so normal because this situation is also valid for the sighted people as web forums act as a sharing environment for the crack software, games and mp3 files to download.

Table 4.40 User statistics for the “Uploading / Downloading on the Internet” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
16) Uploading / Downloading on the Internet	117		82	70.1	91	77.8
a) Computer Programs	31	86.1	24	77.4	27	87.1
b) Games	19	52.8	8	42.1	3	15.8
c) Mp3 files	26	72.2	25	96.2	39	43.8
d) Audio and Sound Files	28	77.8	22	78.6	22	78.6
e) Video Files	13	36.1	0	0.0	0	0.0
f) Text files	3	8.3	0	0.0	0	0.0

(1): The percentage of the users who “Read” the topics to the total 36 participants
(2): The percentage of the users who “Replied” the topic to the users who “Read” the topic
(3): The percentage of the users who “Added” new topic to the users who “Read” the topic

Final category within the “EnabledForum - EngelsizForum” was “Transportation and Motorized Vehicles”, which is not a popular topic according to the results presented in Table 4.41. In this category, the titles under “Railways” (13.9 %) were mostly read by the users and 80.0 % of those users replied and 60.0 % added new titles under this topic. The results shown in Table 4.41 were very similar to the ones gained from the questionnaire for the same category, as seen in Table 4.24. It can be stated from the results in Table 4.48 that visually disabled university students in this study prefer to travel by trains as railway transportation is cheap, organized and easily accessible by all disabled people.

Table 4.41 User statistics for the “Transportation and Motorized Vehicles” topic on “EnabledForum - EngelsizForum”

	Read	% ⁽¹⁾	Replied	% ⁽²⁾	Added	% ⁽³⁾
17) Transportation and Motorized Vehicles	15		4	26.7	15	
a) Automobiles	3	8.3	0	0.0	1	33.4
b) Motorcycles	1	2.8	0	0.0	0	0.0
c) Bicycles	1	2.8	0	0.0	0	0,0
d) Airlines	3	8.3	0	0.0	1	33.4
e) Cruise lines	2	5.6	0	0.0	0	0.0
f) Railways	5	13.9	4	80.0	3	60.0
(1):	The percentage of the users who “Read” the topics to the total 36 participants					
(2):	The percentage of the users who “Replied” the topic to the users who “Read” the topic					
(3):	The percentage of the users who “Added” new topic to the users who “Read” the topic					

4.5. USAGE STATISTICS FOR COMMUNICATION AND DISCUSSION

In this part, the researcher has listed the responses of the participants for the research question 1.5 – “What are the effects of the Web forum on visually disabled students at a public university in Ankara, Turkey for gathering information and establishing social relationships with others?”

In the following Table 4.42, the users’ statistics for all the topics and subjects in the Web forum are shown with the numerical data representing the number of participants of this study for “Reading the text under the subjects”, “Replying for the titles under the subjects” and “Adding new titles under the subjects” within the “EnabledForum - EngelsizForum”.

According to the results shown in the Table 4.42, it can be stated that “Uploading / Downloading on the Internet” (290 responses), “News” (288 responses), “Computers and Technology” (285 responses), “The World of the Disabled People” (217 responses), “Education” (211 responses) and “Culture and Arts” (211 responses) were the most popular topics in the Web forum.

If the participation totals (1523 for “Read”, 471 for “Replied” and 439 for “Added”) are distributed to those 36 visually disabled university students, it can be seen that, on the average, every student read 42.30 subjects, replied to the 13.09 subjects and added 12.20 new subjects under the existing topics during data collection period of 89 days, between the dates 03.04.2006 and 30.06.2006.

When these results compared with the data collected with the questionnaire prior to the development of the “EnabledForum - EngelsizForum”, it can be stated that results were parallel, the responses of the participants in both questionnaire and web forum were mostly similar. Visually disabled university students in this study mostly interested about technology, news, disabilities, education and cultural activities.

Table 4.42 Users’ statistics for all topics on “EnabledForum - EngelsizForum”

Topics / Subjects	N Read	N Replied	N Added	Total Responses
1) About the Forum	63	25	0	88
2) The World of the Disabled People	132	30	55	217
3) News	198	48	42	288
4) Printed and Audio - Visual Media	78	10	15	103
5) Education	160	32	19	211
6) Culture and Arts	156	30	25	211
7) Health	58	22	5	85
8) Tourism	48	12	5	65
9) Economy and Finance	85	26	20	131
10) Politics	76	30	14	120
11) Love and Friendship	56	22	24	102
12) Fashion	15	4	0	19
13) Entertainment and Humor	64	2	3	69
14) Sports	79	8	28	115
15) Computers and Technology	123	84	78	285
16) Uploading / Downloading on the Internet	117	82	91	290
17) Transportation and Motorized Vehicles	15	4	15	34
Participation Totals	1523	471	439	

N: Representing the number of participants (Web forum users)

To sum up, these numerical data prove that “EnabledForum - EngelsizForum” was an efficient environment for visually disabled university students in this study for integrating themselves in an online communication and discussion environment to access up-to-date information organized under specific categories, share their ideas and learn what others think about a topic or subject.

4.6. VIEWS AND OPINIONS ABOUT THE WEB FORUM

In this part, the researcher has listed the responses of the participants for the research question 1.6: What are the views and opinions of visually disabled students at a public university in Ankara, Turkey about the Web forum after using it?

Interviews were conducted during July, 2006, just after the usage statistics of the “EnabledForum - EngelsizForum” were analyzed. From the participants (registered users of the Web forum), 10 of them were selected randomly and contacted on the telephone by the researcher to conduct a face-to-face interview at the date, time and place decided by themselves. The researcher has written the names of all the participants on small pieces of papers and put all these papers in a fabric bag and pulled 10 papers randomly. Then, those 10 participants were contacted on their mobile phones and asked them whether they want to be interviewed about the “EnabledForum - EngelsizForum” by the researcher or not. They all accepted to be interviewed on a voluntary basis. The interviews were semi-structured with four open ended questions and targeted to learn the in-depth ideas and opinions of the participants about the design, structure and the content of the “EnabledForum - EngelsizForum” after active participation in it during 3 months period. During the interviews, four questions were asked to the interviewees about: (1) General design of the forum, (2) The things participants liked most, (3) The things participants disliked most and (4) The things they offer for further development. The responses of the interviewees was recorded by a digital audio recorder and transcribed by the researcher. The responses and comments of the interviewees are described in this section of the study.

For the first question (“What do you think about the general structure and design of the EnabledForum?”) in the interview, the comments of the interviewees were mostly positive, stating that this Web forum closed a gap for the visually disabled university students using the Internet by providing a specially designed text-based interface for comfortable navigation and easily readable text content for the

existing screen readers, especially Jaws. Moreover, they expressed that overall structure of the content was well designed and the expectations of the visually disabled university students were met by the services offered within the site. Furthermore, the interviewees pointed out that issues about navigation within the Web forum were well fit for the needs of them as they are a special interest group for Web developers. Additionally, they stated that “EnabledForum - EngelsizForum” was very fast and loaded without any delay, resulted in reducing the amount of time they spent for visiting all titles in the forum.

The text obtained from the views and opinions of the participants in the first item of the interview guide emphasized the following points, as listed below:

- Navigation was easy and fast (Stated by the 1st, 2nd, 3rd, 5th, 7th and 9th Interviewee as seen under the 1st item of Appendix D),
- Screen readers worked perfect (Stated by the 1st, 3rd, 7th, 9th and 10th Interviewee as seen under the 1st item of Appendix D),
- Design was good (Stated by the 1st, 4th, 5th, 8th and 9th Interviewee as seen under the 1st item of Appendix D),
- Content was adequate and easily accessible (Stated by the 2nd, 4th, 5th, 9th and 10th Interviewee as seen under the 1st item of Appendix D),
- Met the needs of visually disabled university students in Turkey (Stated by the 3rd, 4th, 5th, 6th, 7th, 8th and 10th Interviewee as seen under the 1st item of Appendix D),
- Closed the gap in the domain (Stated by the 3rd, 6th and 7th Interviewee as seen under the 1st item of Appendix D).

For the second question (“What did you like mostly in the EnabledForum?”) in the interview, interviewees stated that they liked the structure and navigation links providing easy surfing within the Web forum. Moreover, they expressed that registration and login part of the Web forum was well designed and it was very easy to become a member to the forum in a short time. Additionally, it was pointed out by the interviewees that the text of the Web forum was easily read by the screen reader, which was very important for the visually disabled university students to understand the content and structure. Furthermore, the interviewees stated that the format of the topics, subjects and titles with hierarchical numbering (for example: 2, 2.1, 2.1.1) provided easiness for following up the navigation. In addition, the numbers presenting how many posts included within a topic or subject shown in parenthesis found useful for deciding the amount of time needed to read all subjects under them. Consequently, the interviewees stated that, in the display part of any text under the titles, seeing the details about the owner, date and time first provided acknowledging about the registered users.

The text obtained from the views and opinions of the interviewees in the second item of the interview guide highlighted the following points, as listed below:

- Navigation was easy and fast (Stated by the 1st, 2nd, 3rd, 5th, 7th and 9th Interviewee as seen under the 2nd item of Appendix D),
- Identification of subjects and users was appropriate (Stated by the 1st, 2nd, 4th, 6th and 9th Interviewee as seen under the 2nd item of Appendix D),
- Numbered links helped as a navigation guide (Stated by the 2nd and 9th Interviewee as seen under the 2nd item of Appendix D),
- Screen readers worked perfect (Stated by the 2nd and 6th Interviewee as seen under the 2nd item of Appendix D),

- Content was fair but can be extended (Stated by the 3rd, 8th and 10th Interviewee as seen under the 2nd item of Appendix D),
- Structure of the forum was easy to learn (Stated by the 3rd, 5th and 7th Interviewee as seen under the 2nd item of Appendix D),
- Numbers representing number of posts in a subject was good (Stated by the 4th, 5th, 6th and 9th Interviewee as seen under the 2nd item of Appendix D),
- Add-ins and updates are needed for further use (Stated by the 3rd and 10th Interviewee as seen under the 2nd item of Appendix D).

For the third question (“What did you dislike mostly in the EnabledForum?”) in the interview, interviewees stated that the number of topics and subjects within the Web forum should be increased for widening the areas of interest. Moreover, it was pointed out that more computer software (programs) and mp3 files should be added to the site for allowing the users to download freely. Additionally, they expressed that “session time-out” period within the Web forum to be remembered as a registered user was too short and it created frustration for the visually disabled university students as they might spend their time with another activity while also logged in to the forum. Furthermore, one interviewee stated that there should be a “back” link in every content page for returning to the previous page.

The text obtained from the views and opinions of the interviewees in the third item of the interview guide highlighted the following points, as listed below:

- More topics and subjects should be offered (Stated by the 1st, 3rd, 4th and 6th Interviewee as seen under the 3rd item of Appendix D),

- More audio files and program download links should be included (Stated by the 1st, 2nd, 6th, 8th and 9th Interviewee as seen under the 3rd item of Appendix D),
- Session time-out period can be longer (Stated by the 2nd, 3rd, 5th and 9th Interviewee as seen under the 3rd item of Appendix D),
- “Back” link should be placed in each page (Stated by the 5th and 10th Interviewee as seen under the 3rd item of Appendix D).

For the fourth question (“What do you want to offer for further development in the EnabledForum?”) in the interview, interviewees stated that there should be more topics and subjects in different areas for attracting more visually disabled university students on the Internet and more content would be better for increasing the attractiveness and popularity of this Web forum for reaching more visually disabled people. Moreover, interviewees offered that an instant messaging tool for chatting with the users who were online at the forum would be beneficial for them to communicate simultaneously with others. Additionally, the interviewees stated that they wanted an interactive dynamic tool within the “EnabledForum - EngelsizForum” for informing the registered users about any changes and updates in the forum subjects and topics by sending e-mail messages to them. Furthermore, one interviewee pointed out that interactive learning sessions with the guided tutorials could be organized within the forum weekly for teaching a specific topic to the registered users.

The text obtained from the views and opinions of the interviewees in the fourth item of the interview guide summarized the following points, as listed below:

- More topics and subjects should be added daily (Stated by the 1st, 3rd, 6th and 8th Interviewee as seen under the 4th item of Appendix D),

- Instant messaging amongst online users of the forum should be offered (Stated by the 1st, 3rd, 5th and 7th Interviewee as seen under the 4th item of Appendix D),
- Automatic e-mailing for informing the users about updates should be sent (Stated by the 2nd Interviewee as seen under the 4th item of Appendix D),
- Instant messages for informing the users about the changes and updates in forum topics and subjects should be included (Stated by the 2nd Interviewee as seen under the 4th item of Appendix D),
- Online training and educational activities in specific topics should be organized for forum users (Stated by the 4th and 10th Interviewee as seen under the 4th item of Appendix D),
- More audio files and program download links should be included (Stated by the 5th and 10th Interviewee as seen under the 4th item of Appendix D),
- Administration of the forum should left to the visually disabled people (Stated by the 5th and 8th Interviewee as seen under the 4th item of Appendix D),
- More content about visual disability should be included (Stated by the 9th Interviewee as seen under the 4th item of Appendix D).

The interviews were very useful for the researcher to learn the views and opinions of the participants about the “EnabledForum - EngelsizForum” and reach in-depth thoughts of them for further studies in this area. Moreover, the information gained as a result of the interviews proved that Web forums play an important role for the visually disabled university students to establish a social connection with others on

the Internet and these kinds of Web forums can act as an information center for them as they offer information organized under variety of topics for easy access.

4.7. SUMMARY OF THE CHAPTER

In this part of the study, the data collected from the visually disabled students of a public university in Ankara, Turkey have been analyzed and the results obtained from the analysis process have been presented in the related tables with the comments of the researcher. Results discussed above show that, almost all of the participants expressed their positive thoughts about the “EnabledForum - EngelsizForum”, which a web forum specially designed according to the needs, requests and expectations of the visually disabled students of a public university in Ankara, Turkey. Moreover, the results indicated that this Web forum met the expectations of the participants in this study as it provided an online communication and discussion platform for them in different topics and subjects identified by their opinions collected with the questionnaire. Participants’ logs and usage statistics of the “EnabledForum - EngelsizForum” provides a meaningful answer to the research question “To what extent do visually disabled university students in a public university in Ankara, Turkey attend and participate in online communication and discussion environment on the Web to establish a social interaction with others?”. Additionally, participants stated that this Web forum was the first one in the special domain of the visually disabled university students in Turkey and became successful with the help, support and active participation of 36 visually disabled students of a public university in Ankara, Turkey. Furthermore, it could be interpreted from the results of the interviews that participants of the study were quite happy to have a Web forum as a result of an academic research study constructed with their thoughts and opinions.

CHAPTER 5

DISCUSSION AND CONCLUSION

The purpose of this study is to discover the perceptions of the visually disabled students at a public university in Ankara, Turkey about computer and the Internet usage, and the reasons that are leading to the isolation of them from the society by means of communication and interaction with others. Within the scope of the study, the researcher designed and developed an online communication and discussion environment, namely “EnabledForum - EngelsizForum” for the visually disabled students at a public university in Ankara, Turkey for enabling them to establish social relationships with others by actively participating in it. Questionnaires based the fundamental structure of this Web forum which was used for collecting data about the usage statistics of those visually disabled university students for the popularity of the topics and subjects, and interviews were used to reach in-depth thoughts of the participants about the design, structure and content of the “EnabledForum-EngelsizForum”. In this part of the study, the researcher will conclude the findings and results based on the previously described text.

5.1. OVERVIEW

Over 40 million people in the World are visually disabled and over 120 million people have significant sight loss problems that cannot be corrected, cured or treated by conventional refraction, medicine or surgery. (World Health Report, World Health Organization, 2004). This number is expected to double by the year 2020 (World

Health Report, World Health Organization, 2004). Developments in the Internet and Web technologies carry a big chance for visually disabled students with facilities enabling their daily life tasks easy to accomplish. Today, especially young people and university students with visual disabilities use the Web for connecting to the life with the interactive activities, such as education, communication, shopping and information gathering.

Technology plays an increasingly important role in assisting visually disabled university students in accessing the information needed to complete their courses of study and in preparing the assignments. Through determination, support from significant others in the lives of visually disabled university students and use of communication and interpersonal skills needed for academic survival, they can succeed in the face of considerable frustration and what others saw as difficult odds.

Williamson, Wright, Schauder and Bow (2001) declares that the Internet and Web is very important for the visually disabled students and they mean a luxury, a necessity, a way to participate in the information society, a way to access more information than before. Moreover, Williamson, Wright, Schauder and Bow (2001) states that the lack of fit between the needs of the person with a visual disability and the technology is less concerned than the economical dimension of the related equipment. For visually disabled university students, online environments, such as Web forums, are extremely important in accessing up-to-date information, similar to gathering it from radio or television. Similarly, Ross (2002) point out that the growth in the number of registered visually disabled customers of Web services should encourage the administrators of the organizations to consider the design and structure of their Websites. If the marketing opportunities were insufficient to re-evaluate their Websites, the resulting negative publicity could provide the motivation to force managers to consider visually disabled customers for their Web presence. Moreover, Leporini, Andronico and Buzzi (2004) declare that although the Internet is a valuable source of information and offers great availability of online services such as e-learning, e-business and e-government,

so, the difficulties in it may discourage visually disabled users from accessing those online services.

However, in Turkey, visually disabled citizens are not considered valuable and important by the service providers and Web site administrators due to the graphical nature of the Web. But, when we think of the social responsibility of the society as a human being, disabled people should also have the same rights and facilities which are offered for the sighted citizens to meet the equality principles. As we already know, after the usage areas have been diversified and widened with the help of the technological developments, the Internet and Web became the dominant media for information retrieval and communication, so, visually disabled people in Turkey should benefit from that by participating in the online environments, such as discussion boards and Web forums. The uses of the Internet and Web together with active participation in forums provide social interaction and communication to the visually disabled people with others for removing the barriers in socializing.

Visually disabled students at the universities can be encouraged to access the instructional resources as a result of obtaining education as a positive challenge. An increasing range of educational and instructional services are now available to assist those visually disabled university students. In some universities in Turkey (Bilkent University, Gazi University, Anadolu University, etc.), instructors and researchers are available to assist visually disabled students in educational activities. Moreover, disability services staff (Teachers, Consultants and Officers) are also employed in both governmental and non-governmental organizations of Turkey to help the visually disabled university students in their daily lives. Additionally, public or private service agencies also play an important role in providing information and documentation to those visually disabled university students in accessible formats. Additionally, the researchers and domain experts working in the organizations such as the Federation of the Blind of Turkey, AltıNokta Blind Association, Visually Disabled Project Group in Bilkent University, Gazi University Department of Special Education and Working

Group for the Informatics for Visually Disabled in the Informatics Associations of Turkey are looking for more efficient ways in which technology can be used to provide better educational environments for the visually disabled students.

This study had four interlinked purposes: First, to analyze the current situation of the visually disabled students at a public university in Ankara, Turkey about accessing and using computers and the Internet. Second, to discover the expectations of those visually disabled students from a Web forum by means of topics and subjects that will be offered in it. Third, to design and develop a Web forum that will serve to those visually disabled students in a public university in Ankara for providing information sharing, communication and discussion environment for them. Fourth, to enable those visually disabled students at a public university in Ankara, Turkey to attend and participate in an online communication and discussion environment on the Web to communicate with others for removing the barriers on establishing social relationships.

5.2. DISCUSSION

Visually disabled university students have different profiles for using technology, especially computers and the Internet. The Web brought many advantages to the human life by making the daily tasks easy and comfortable for its users. Moreover, the people who are benefited from the Web-based services on the Internet can find what they need and continue their life with less effort and time providing more effectiveness. Moreover, especially visually disabled university students can use computers as a life saving tool as the enablers of the important tasks a human should accomplish daily, such as reading news, informed about the events occurring in their surrounding environment, keep in touch with other people, etc. For doing so, Web forums play an important role for visually disabled university students to connect them to the life. Moreover, these technological tools may also act like a bridge between visually disabled university students and other students as a communication and discussion environment based on the categorized topics and subjects.

Furthermore, a well designed Web forum may help the visually disabled university students to find the information and resources they need for their courses and instructional activities.

Lazar et al. (2007) state that visually disabled students spend more time than sighted students for performing computer-based tasks. However, they point out that visually disabled students waste less time responding to frustrations than sighted users. Additionally, they declared that from a technical point of view, many of the most common causes of frustration on the Web pages (such as unlabelled forms, missing or confusing alt text of the pictures, etc.) are easy to solve. Furthermore, Fukuda, Saito, Takagi and Asakawa (2005) express that the improvement of information density by using visual effects makes it difficult for visually disabled students to understand the page structures on the Web sites. Moreover, inappropriate alternative text offered on the Web pages increase the cognitive workload of the visually disabled students.

Consequently, it is claimed that if Web designers and developers give more attention to these problems, the time spent by visually disabled students for overcoming those frustrations could be lowered. Fukuda, Saito, Takagi and Asakawa (2005) have introduced two metrics: “Navigability – for evaluating the structure of the Web content” and “Listenability – for marking appropriate alternative texts to read aloud”. Similarly, Craven (2003) states that visually disabled students have to spend more time for navigation within Web pages, especially when they contain many information and hyperlinks to other locations on the Web. Similarly, in the findings of their study, Kuber, Yu, McAllister (2007) stated that visually disabled students were able to perceive and identify objects presented on the Web interface and locate a hyperlink on a Web page and use this as a basis of communicating their spatial position to the sighted students.

On the other hand, observations revealed that students who are experienced in the assistive technologies (such as screen readers and speech synthesizers) were more successful with the computer related tasks. Solutions include better training for the

Web site administrators, stronger government policy by the policy makers and Web development tools that integrate accessibility more strongly into the design process from the beginning of the development process. (Lazar et al., 2007)

However, Harper, Goble and Stevens (2000) state that Web usability studies have found that content organization and navigation paths are the two most important factors; followed by link effectiveness, link differentiation and destination prediction for supporting the accessibility of visually disabled students. For benefiting the content of the Web sites, specially designed text-based Web browsers are needed. At this point, Pun et al. (1998) state that the major difficulty in designing Internet browsers for visually disabled students is caused by the bi-dimensional structure of the textual and graphical information presented on the Web. However, it is a problematic case for one dimensional nature of the existing output devices such as TTS (Text-to-speech) converters. Another difficulty in presenting the content to the visually disabled students caused by the presence of embedded images carrying explanatory information. Existing Web browsers for visually disabled students typically transform the bi-dimensional content of the Web pages into text-only version by analyzing the source code. These browsers often have difficulties in presenting the global layout of the structure, and usually remove all graphical content.

Similarly, Leuthold, Bargas-Avila and Opwis (2008) state that for visually disabled computer students, text based interfaces are more usable than the graphical user interfaces (GUI) together with improving the Web navigation experience. Moreover, they point out that as long as governmental institutions and private companies are unable to guarantee the usability of their Web sites, they should think carefully before investing in the accessibility and functionality. On the other hand, Chandrashekar et al. (2006) states that TAP (Think Aloud Protocol), as a concurrent verbal protocol method, may not be effective for use with visually disabled students using a screen reader to access Web sites and declares that further research is need to modify this protocol for use more effectively with these users. However, Watanabe et al. (2007) state the feasibility of a universally designed voice browser for structuring information

according to not only source code of the Web page but also the page's structure. Restructuring the Web page content into a uniform hierarchy is a truly effective approach for the aural presentation and navigation.

But, correspondingly, it is difficult to design and develop a Web browser that will serve to both visually disabled and sighted university students because both groups have different demands. Not only different presentation methods but also different mechanisms should be prepared; their activation or deactivation would depend on the user. At this point, Kurniawan et al. (2002) highlight the importance of understanding visually disabled students' mental models to improve the usability of Web sites and interactive online applications for them. They state that visually disabled students possess either a functional or structural mental model or both. It is expressed that visually disabled students also adopt a rich and highly procedural strategy for interacting with a new system or application. Kurniawan et al. (2002) point out that a mismatch between users' mental models and the new system can potentially cause problems when learning a new system by visually disabled computer users.

As seen from the prescribed text, visually disabled university students can benefit from the text-based resources on the Web if they have a Web browser and a screen reader installed on their computers having an Internet connection. They may follow the content in Web forums on the Internet if the design and structure of the forum helps the screen reader to read aloud the text correctly to construct the information in their mind. The observations of the researcher during the study showed that some visually disabled university students which are expert users of the computers can type much faster than sighted people on the ordinary keyboard and they can actively participate in communication and discussion environments such as Web forums for connecting to the life.

As seen in Table 4.2 and Table 4.3, visually disabled university students in this study have easy access to the computers and the Internet both at their homes and at the university campus. The problem is that there are not available resources on the Web

for helping them to access up-to-date information and the online platforms that they may communicate with others and discuss on topics. Similarly, questionnaire results shown in Table 4.4 prove that visually disabled university students mostly interested in “News” and “Communication”. Moreover, numerical data presented in Table 4.5 and Table 4.6 indicate that those participants like to be informed about other disabled people and their problems and were using e-mail services to contact with others. However, after the development of this “EnabledForum - EngelsizForum”, it played an important role for providing an online and instant sharing environment for those visually disabled students by replacing other offline techniques.

Within this study, the researcher applied a questionnaire prior to the development of the web forum to identify the topics and subjects that will be offered to the participants on “EnabledForum - EngelsizForum”. According to the results expressed in between the Tables 4.8 and 4.24, it is so clear that visually disabled university students in this study expect daily news, information about disabled people, computers and the Internet together with the downloads related with computer software and the audio files. These results can be used for further research in this area for offering online services to this special group of users of computers and the web.

As we all know, Web forums are very popular since 4-5 years because of the free services they offer to the registered users and they play an important role for computer users to find what they are looking for, such as information on a specific topic, software, audio and video files, etc. However, existing Web forums were not designed and developed according to the needs and expectations of the visually disabled university students in Turkey, by means of both structure and content. Moreover, those students are also looking for an online meeting point to send and receive messages on specific topics to keep in touch with others.

The usage statistics of the “EnabledForum - EngelsizForum” proved that customized design and content would be helpful for those visually disabled students to keep in touch with life by communicating with others and discussing on topics under

predefined categories. As shown in Table 4.42, “Uploading / Downloading on the Internet”, “News”, “Computers and Technology”, “The World of the Disabled People”, “Education” and “Culture and Arts” were the most popular topics in the Web forum. These results were probably caused by the demographic information of the participants as they were all university students and eager to learn new things to develop themselves both mentally and personally to overcome the barriers caused by their visual disability.

To sum up, “EnabledForum - EngelsizForum”, which is designed and developed as a result of this study has filled a gap for visually disabled university students by providing an online communication and discussion environment. The usage statistics of the “EnabledForum - EngelsizForum” proved that visually disabled university students can use Web forums actively if they feel themselves comfortable in navigation and understanding the content.

5.3. CONCLUSION

Current developments on the Internet and Web technologies brought many advantages to the people with visual disabilities. They may have access to the computers and the Internet at their homes, schools or work environment with the help of the assistive software (screen reader, speech synthesizer, voice recognizer, etc.) installed.

Sánchez (2007) stated that the development of computer systems for learners with visual disabilities helped the improvements in the efforts for the systematized and structured construction of these systems. Moreover, recent advances in computer technology support this systemization and provide educational foundation lay under them. Similarly, Corn and Wall (2002) point out that visually disabled university students need a means of accessing information either on printed material or in electronic format on computers. Moreover, Corn and Wall (2002) declare that educational opportunities and employment after graduation for visually disabled

university students depend on how we shape the assistive technologies with appropriate hardware and software for them to increase their academic performance and social communication and interaction levels. However, Cretu et al. (2006) express that recent information and communication technologies specifically developed for visually disabled students are not easy accessible for other visually disabled people who are not university students. At this point, Kolb (1984) express that the use of group communication tools (Web forums) provide better skills for the university students in problem solving processes when they actively participated in sessions. Moreover, Jones and Cooke (2006) states that the use of online communication and collaboration tools to enhance student learning creates new possibilities for investigation into areas such as learning networks, learning objects and learning agents systems with the help of artificial intelligence techniques.

Additionally, Jones and Cooke (2006) suggest a term, “Window into Learning’ as an iterative approach that can be identified as a beneficial outcome for the students and academic staff at the universities for the collaborative use of a VLE - Virtual Learning Environments. Furthermore, Jones and Cooke (2006) believe that this concept contribute to the understanding of the potential of online communication and discussion forums. At this point, they state that “Window into Learning” offers a critical understanding into university students’ problem-solving processes and provides a richer, qualitatively enhanced and autonomous learning environment to the instructors to use for the students and enable them to achieve the aims of efficiency, enhancement and extension in education.

As stated before, “EnabledForum - EngelsizForum”, which is designed and developed according to the responses of the participants, was used for two main purposes: First is to evaluate the visually disabled university students’ enthusiasm and interest for attending and participating in a Web forum to gather up-to-date information under different categories and to establish communication with others, and second is to identify which topics and subjects are mostly preferred and visited by the participants.

The results obtained from the questionnaire, web forum and the interviews can be an identifier for the important role of computers with an Internet connection in the daily lives of visually disabled university students in a public university in Ankara, Turkey for removing the barriers caused by their disability. Moreover, it can be stated that most of the visually disabled university students can be saved by providing computers with assistive software (speech synthesizers, screen readers, screen magnifiers, etc.) and Internet connection to create an artificial social environment which may reduce their frustrations caused by their vision loss.

According to the results shown in the Table 4.42, it can be stated that “Uploading / Downloading on the Internet” (290 responses), “News” (288 responses), “Computers and Technology” (285 responses), “The World of the Disabled People” (217 responses), “Education” (211 responses) and “Culture and Arts” (211 responses) were the most popular topics in the Web forum. In Table 4.42, if the participation totals (1523 for “Read”, 471 for “Replied” and 439 for “Added”) are distributed to those 36 visually disabled university students, it can be seen that, on the average, every student read 42.30 subjects, replied to the 13.09 subjects and added 12.20 new subjects under the existing topics during data collection period of 89 days, between the dates 03.04.2006 and 30.06.2006.

When these results compared with the data collected with the questionnaire prior to the development of the “EnabledForum - EngelsizForum”, it can be stated that results were parallel, the responses of the participants in both questionnaire and web forum were mostly similar. Visually disabled university students in this study mostly interested about technology, news, disabilities, education and cultural activities.

On the other hand, interviews provided valuable information about the web forum and helped the researcher to enhance the study for further research. For the first item of the interview guide (“What do you think about the general structure and

design of the EnabledForum?”), the comments of the interviewees were mostly positive, stating that this Web forum closed a gap for the visually disabled university students using the Internet by providing a specially designed text-based interface for comfortable navigation and easily readable text content for the existing screen readers, especially Jaws. Moreover, they expressed that overall structure of the content was well designed and the expectations of the visually disabled university students were met by the services offered within the site. Furthermore, the interviewees pointed out that issues about navigation within the Web forum were well fit for the needs of them as they are a special interest group for Web developers. Additionally, they stated that “EnabledForum - EngelsizForum” was very fast and loaded without any delay, resulted in reducing the amount of time they spent for visiting all titles in the forum.

Similarly, for the second item of the interview guide (“What did you like mostly in the EnabledForum?”), interviewees stated that they liked the structure and navigation links providing easy surfing within the Web forum. Moreover, they expressed that registration and login part of the Web forum was well designed and it was very easy to become a member to the forum in a short time. Additionally, it was pointed out by the interviewees that the text of the Web forum was easily read by the screen reader, which was very important for the visually disabled university students to understand the content and structure. Furthermore, the interviewees stated that the format of the topics, subjects and titles with hierarchical numbering (for example: 2, 2.1, 2.1.1) provided easiness for following up the navigation. In addition, the numbers presenting how many posts included within a topic or subject shown in parenthesis found useful for deciding the amount of time needed to read all subjects under them. Consequently, the interviewees stated that, in the display part of any text under the titles, seeing the details about the owner, date and time first provided acknowledging about the registered users.

However, for the third item of the interview guide (“What did you dislike mostly in the EnabledForum?”), interviewees stated that the number of topics and subjects

within the Web forum should be increased for widening the areas of interest. Moreover, it was pointed out that more computer software (programs) and mp3 files should be added to the site for allowing the users to download freely. Additionally, they expressed that “session time-out” period within the Web forum to be remembered as a registered user was too short and it created frustration for the visually disabled university students as they might spend their time with another activity while also logged in to the forum. Furthermore, one interviewee stated that there should be a “back” link in every content page for returning to the previous page.

Finally, for the fourth item of the interview guide (“What do you want to offer for further development in the EnabledForum?”), interviewees stated that there should be more topics and subjects in different areas for attracting more visually disabled university students on the Internet and more content would be better for increasing the attractiveness and popularity of this Web forum for reaching more visually disabled people. Moreover, interviewees offered that an instant messaging tool for chatting with the users who were online at the forum would be beneficial for them to communicate simultaneously with others. Additionally, the interviewees stated that they wanted an interactive dynamic tool within the “EnabledForum - EngelsizForum” for informing the registered users about any changes and updates in the forum subjects and topics by sending e-mail messages to them. Furthermore, one interviewee pointed out that interactive learning sessions with the guided tutorials could be organized within the forum weekly for teaching a specific topic to the registered users.

The interviews were very useful for the researcher to learn the views and opinions of the participants about the “EnabledForum - EngelsizForum” and reach in-depth thoughts of them for further studies in this area. Moreover, the information gained as a result of the interviews proved that Web forums play an important role for the visually disabled university students to establish a social connection with others on

the Internet and these kinds of Web forums can act as an information center for them as they offer information organized under variety of topics for easy access.

This Web forum is the first one in its domain in Turkey and provided an online environment for the visually disabled students at a public university in Ankara as a meeting and sharing point on the Web. Previously, visually disabled people (university students and others) were using a mailing list developed by Bilkent University, Department of Computer Engineering for announcements and discussion on specific topics related with the visual disability, blindness, sight loss, color blindness, etc. However, that mailing list was not organized according to topics and subjects and there was no navigation aids for helping the visually disabled people to find their ways in the list. Additionally, a Web forum serving to the all disabled people in Turkey also exists but it is designed like a standard Web forum with graphical interfaces and animation-based advertisements which creates problems for screen reader software. During the interviews, participants stated that “EnabledForum - EngelsizForum” closed a gap for the specialized web sites giving services to visually disabled people on the Internet.

The results of the usage statistics of the “EnabledForum - EngelsizForum” proved that visually disabled university students in Turkey need such environments to express themselves on the Internet and they see this Web forum as an information gathering tool to be informed about what is happening around them to keep in touch with life.

Visually disabled computer users, either students or others, have a great chance for removing the social isolation in the society caused by their disability. Correspondingly, they look for tools and instruments enable them to establish social interaction with both visually disabled and sighted people through the communication channels like the Internet and Web. At this point, “EnabledForum - EngelsizForum” play an important role for providing meaningful content and useful information that visually disabled university students require for their daily needs. Moreover,

“EnabledForum - EngelsizForum” provides those services free of charge and without annoying graphical animations or commercial advertisements like in other Web forums. Additionally, the infrastructure of the “EnabledForum - EngelsizForum” can be used for educational purposes at universities for informing the visually disabled students about news and announcements of courses or other academic activities.

5.4. SUGGESTIONS

As this study focused on the visually disabled students at a public university in Ankara, Turkey, the results and findings cannot be generalized to all visually disabled students in Turkey but some suggestions for further research studies can be offered to the researchers and academician who are interested in this area. This study is conducted with 36 visually disabled university students, by using the research instruments including questionnaire, Web forum and interview.

The structure and template of the Web forum designed and developed in this study can easily be modified and used for educational purposes at universities, in public or private institutions for providing instructional materials and documentation needed by the visually disabled people. Additionally, more features (such as instant messaging, automatically sent e-mails about updates, online instruction, etc.) based on the suggestions of the participants during the interviews can be added to increase the effectiveness of the Web forum. Furthermore, the instructors of the visually disabled students at the universities can use this Web forum for the announcements about the courses or for sharing their lecture notes electronically. Moreover, the data collected from those 36 visually disabled university students may provide valuable contribution for both governmental and non-governmental efforts and studies to improve the quality of education given to all visually disabled students in Turkey.

Therefore, the results and findings of this study may be used for re-structuring the special education system in primary and secondary schools of Turkey to interfere as early as possible to prevent potential problems that those students may face during

their university life. Additionally, if visually disabled students grow by interacting with computer and Web technologies during their childhood, they may overcome the social interaction and communication problems caused by their special case.

It is difficult to provide a fully accessible education system for the visually disabled university students and many research studies and efforts should be done to overcome the barriers caused by their disability. However, individual and group support is needed in this domain to inform all types of institutions, organizations, associations and agencies (public or private) to provide appropriate services to those visually disabled students with the help of current Web and the Internet technologies. As the Internet is the key element for communication and sharing amongst all the people on the World, visually disabled people can also use this key to open the doors which is already closed because of their disability. However, governmental support should be provided in human resources and financial issues for the efforts and studies conducted by researchers of this domain. If visually disabled university students are well educated during their university life with the support of Internet technologies and Web-based tools, they may easily find jobs when graduated.

The results gathered from this study provided a startup point for the efforts in the domain of education of visually disabled university students to help them during their university life for communication and discussion with the help of web based tools. When used properly, current Internet technologies enable those students to integrate themselves to the social life around if they can use computers by screen readers. Screen readers will be the critical for the success of all the studies in this domain.

To sum up, this study may help the researchers in the area of visually disabled people (students, workers, etc.) for designing and developing Web based tools for them to enhance their social life. The Web forum, “EnabledForum - EngelsizForum”, may act as a base for communication and discussion environments which will be designed and developed in the future for further online applications and services offered on the Internet and the Web.

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APPENDIX A

QUESTIONNAIRE FOR VISUALLY DISABLED UNIVERSITY STUDENTS

GÖRME ENGELLİ ÜNİVERSİTE ÖĞRENCİLERİ İÇİN ARAŞTIRMA ANKETİ

Bu anket, Ortadoğu Teknik Üniversitesi Eğitim Fakültesi Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü Doktora Programı'nda öğrenci olan Bülent Gürsel Emiroğlu tarafından Doktora tezinde kullanılmak üzere geliştirilmesi planlanan Web forum'a temel oluşturmak için hazırlanmıştır. Bu anket ile toplanan bilgiler ışığında, Ankara'da bir devlet üniversitesinde öğrenim gören Görme Engelli Öğrenciler için iletişim, bilgi paylaşımı ve tartışma platformu olması beklenen "EngelsizForum" Web Forumu tasarlanarak geliştirilecek ve hizmetinize sunulacaktır. Katıldığınız için teşekkür ederim.

Bülent Gürsel Emiroğlu

A – KİŞİSEL BİLGİLER

- 1) Adınız Soyadınız :
- 2) Cinsiyetiniz : Bay ... Bayan ...
- 3) Medeni haliniz : Bekar ... Evli ...
- 4) E-posta adresiniz :
- 5) Yaşınız : 16 – 18 ... 19 – 23 ... 24 – üstü ...
- 6) Eğitim Durumu: Lisans ... Yüksek Lisans ...

B – BİLGİSAYAR VE İNTERNET KULLANIMINA YÖNELİK BİLGİLER

- 1) Bilgisayarların görme engelli üniversite öğrencileri için faydalı olduğunu düşünüyor musunuz? Evet ... Hayır ...
- 2) Bilgisayar kullanabiliyor musunuz? Evet ... Hayır ...
- 3) Evde bilgisayarınız var mı? Evet ... Hayır ...
- 4) Okulda bilgisayar erişiminiz var mı? Evet ... Hayır ...
- 5) Günde kaç saatinizi bilgisayar başında geçiriyorsunuz?
1 - 2 ... 3 - 4 ... 5 - 6 ... 7 - üstü
- 6) Günde kaç saatinizi İnternet’de geçiriyorsunuz?
1 - 2 ... 3 - 4 ... 5 - 6 ... 7 – üstü
- 7) İnternet’te hangi konuda ve alanda siteleri ziyaret edersiniz?
- 8) İnternet’te en çok ziyaret ettiğiniz Türkçe siteler hangileridir?
- 9) İnternet’te en çok ziyaret ettiğiniz yabancı siteler hangileridir?
- 10) Bu anketin sonuçlarını e-posta ile almak ister misiniz? Evet ... Hayır ...

C – WEB FORUM İÇİN KONU TERCİHLERİ

Aşağıda size okuyacağım konulardan ve başlıklardan hangilerinin geliştirilecek “EngelsizForum” da yer almasını istediğinizi söyler misiniz?

1) Forum ile ilgili

- a) Forum Moderatörleri
- b) Forum Duyuruları
- c) Forum Yardımı
- d) Forum Şikayetleri
- e) Forum Önerileri
- f) Diğer - Lütfen belirtiniz :

2) Engelliler Dünyası

- a) Sosyal faaliyetler
- b) Özel etkinlikler
- c) Erişilebilirliği artıran yardımcı araçlar
- d) Yeni tedavi yöntemleri
- e) Engellilerin hukuki hakları
- f) Dernekler, Kurumlar ve Topluluklar
- g) Diğer - Lütfen belirtiniz :

3) Haberler

- a) Güncel haberler
- b) Ekonomi haberleri
- c) Yaşam
- d) Dünyadan haberler
- e) Siyaset haberleri
- f) Kültür ve sanat haberleri
- g) Teknoloji haberleri
- h) Spor Haberleri
- i) Hava Durumu
- j) Magazin Haberleri
- k) Diğer - Lütfen belirtiniz :

4) Yazılı ve Görsel Medya

- a) Radyo
- b) Televizyon
- c) Gazeteler
- d) Dergiler
- e) Diğer - Lütfen belirtiniz :

5) Eğitim

- a) Yurtiçi Eğitim
- b) Yurtdışı Eğitim
- c) Üniversiteler
- d) Liseler
- e) Öğretmeler
- f) Öğrenciler
- g) Yabancı dil eğitimi
- h) Bilgisayar eğitimi
- i) Sınavlar
- j) Seminerler
- k) Diğer - Lütfen belirtiniz :

6) Kültür - Sanat

- a) Sinema
- b) Tiyatro
- c) Konser
- d) Opera
- e) Bale
- f) Resim
- g) Müzik
- h) Kitap
- i) Dergi
- j) Şiir
- k) Edebiyat
- l) Tarih
- m) Diğer - Lütfen belirtiniz :

7) Saęlık

- a) Beden saęlığı
- b) Ruh saęlığı
- c) Hastalıklar ve tedavileri
- d) Psikolojik destek
- e) Dięer - Lütfen belirtiniz :

8) Turizm

- a) Tatil rehberi
- b) Geziler
- c) Yurtiçi Turlar
- d) Yurtdışı Turlar
- e) Oteller
- f) Dięer - Lütfen belirtiniz :

9) Ekonomi ve Finans

- a) Borsa
- b) Para
- c) Döviz
- d) Altın
- e) Yatırım araçları
- f) Bankalar
- g) Resmi kuruluşlar
- h) Özel kuruluşlar
- i) Dięer - Lütfen belirtiniz :

10) Siyaset

- a) Siyasi partiler
- b) Türkiye'deki siyasi olaylar
- c) Dünyadaki siyasi olaylar
- d) Türkiye Büyük Millet Meclisi
- e) Bakanlar ve Milletvekilleri
- f) Cumhurbaşkanlığı
- g) Başbakanlık
- h) Diğer - Lütfen belirtiniz :

11) Aşk, Sevgi, Arkadaşlık ve Dostluk

- a) Arkadaş bulma
- b) Sohbet
- c) İkili ilişkiler
- d) Diğer - Lütfen belirtiniz :

12) Moda

- a) Kıyafet ve giyim
- b) Güncel akımlar
- c) Diğer - Lütfen belirtiniz :

13) Eğlence ve Mizah

- a) Komik hikayeler
- b) Komik sesler, replikler
- c) Fıkralar - şakalar
- d) Diğer - Lütfen belirtiniz :

14) Spor

- a) Futbol
- b) Basketbol
- c) Voleybol
- d) Tenis
- e) Yüzme
- f) Atletizm
- g) Jimnastik
- h) Vücut geliştirme
- i) Step - Aerobik - Fitness
- j) Masa Tenisi
- k) Satranç
- l) Diğer - Lütfen belirtiniz :

15) Bilgisayar ve Teknoloji dünyası

- a) İşletim Sistemleri (Windows, Linux, Macintosh)
- b) İnternet ve Web
- c) Bilgisayar Donanımları
- d) Bilgisayar Yazılımları (Programlar)
- e) Taşınabilir Bilgisayarlar
- f) Cep telefonları
- g) Diğer - Lütfen belirtiniz :

16) Internet'ten dosya indirme ve ykleme

- a) Bilgisayar Programları
- b) Oyunlar
- c) Mp3 dosyaları
- d) Mzik ve Ses Dosyaları
- e) Video Dosyaları
- f) Dięer - Ltfen belirtiniz :

17) Taşıtlar ve Motorlu Araçlar Dnyası

- a) Otomobiller
- b) Motorsikletler
- c) Bisikletler
- d) Havayolu taşımacılıęı
- e) Deniz taşımacılıęı
- f) Demiryolu taşımacılıęı
- g) Dięer - Ltfen belirtiniz :

Anketimiz burada sona ermiştir. Katılımınız ve katkılarınız için çok teőekkr ederim.

APPENDIX B

“ENABLEDFORUM - ENGELSIZFORUM” WEB SITE SAMPLE SCREEN SHOTS

The following screen shots has captured from the “EnabledForum - EngelsizForum” at the date 03.04.2006, just at the beginning of the data collection period of the Web forum.

The researcher, who is also the administrator of the Web forum, has logged in to the site by his username and password and captured the following screen shots.

The last screen shot on page 190 is about the registration page for the new users of the Web forum.

The screen shots on pages 188 and 189 are about sample posts submitted by visually disabled university students in this study.

Screen shot of the Home and Login Page of “EngelsizForum”

Görme Engelliler İletişim ve Paylaşım Platformu - Engelsiz Forum - Windows Internet Explorer

File Edit View Favorites Tools Help

http://engelsizforum.ceit.metu.edu.tr/

Görme Engelliler İletişim ve Paylaşım Platformu - ...

Engelsiz Forum

Bu web forum, Ortaođu Teknik Üniversitesi Eğitim Fakültesi Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü Doktora Programı'nda öğrenci olan Hatil Ersoy ve Bülent Gürsel Emirođlu tarafından Türkiye'deki görme engelli bireyler için bilgi paylaşımı ve tartışma platformu olması amacıyla hazırlanmıştır.

Forumdaki altkonu ve başlıkları görmek ve tartışmalara katılmak için üye girişi yapmanız gerekmektedir.

Kullanıcı Adı:

Şifre:

[Giriş](#)

[Şifremi Unuttum](#) - [Üye olmak istiyorum](#)

Ana Konular

Şu anda 17 tane aktif konu var.

1. **Forum ile ilgili** (6 alt konu)
2. **Engelliler Dünyası** (8 alt konu)
3. **Haberler** (10 alt konu)
4. **Yazılı ve Görsel Medya** (4 alt konu)
5. **Eğitim** (10 alt konu)
6. **Kültür - Sanat** (12 alt konu)
7. **Sağlık** (4 alt konu)
8. **Turizm** (5 alt konu)
9. **Ekonomi ve Finans** (8 alt konu)
10. **Siyaset** (7 alt konu)

Done

Internet | Protected Mode: On

100%

Screen shot of the Index Page of “EngelsizForum”

Görme Engelliler İletişim ve Paylaşım Platformu - Engelsiz Forum - Windows Internet Explorer

http://engelsizforum.cet.metu.edu.tr/default.asp

File Edit View Favorites Tools Help

Görme Engelliler İletişim ve Paylaşım Platformu - ...

Engelsiz Forum

Bu web forum, Ortadoğu Teknik Üniversitesi Eğitim Fakültesi Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü Doktora Programı'nda öğrenci olan Halil Ersoy ve Bülent Gürsel Emiroğlu tarafından Türkiye'deki görme engelli bireyler için bilgi paylaşımı ve tartışma platformu olması amacıyla hazırlanmıştır.

Hoşgeldiniz Sayın bge
Yönetici İşlemleri [Çıkış](#)

Ana Konular Şu anda 17 tane aktif konu var.
Yeni konu eklemek için [tıklayınız](#).

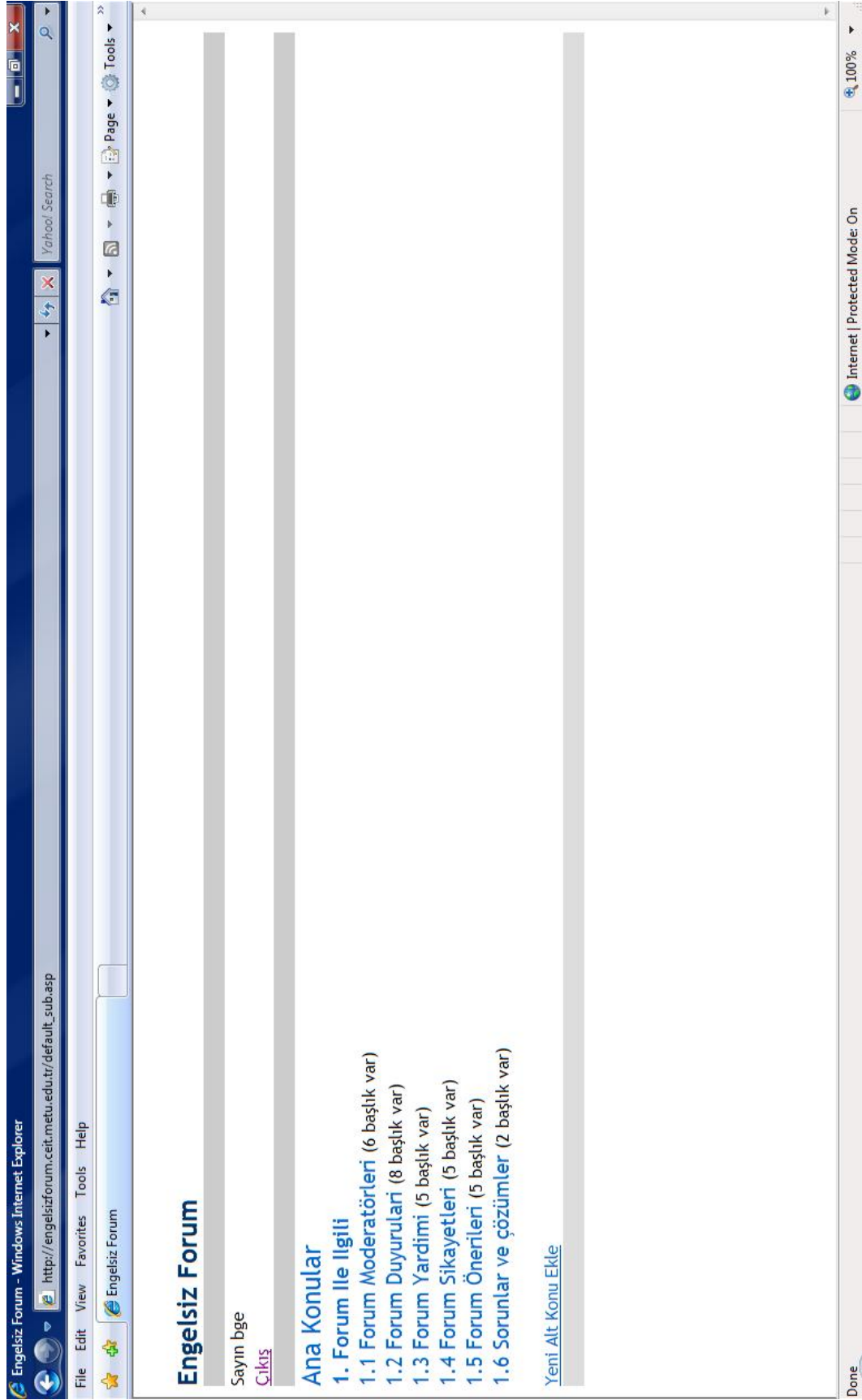
1. **Forum ile ilgili** (6 alt konu)
2. **Engelliler Dünyası** (8 alt konu)
3. **Haberler** (10 alt konu)
4. **Yazılı ve Görsel Medya** (4 alt konu)
5. **Eğitim** (10 alt konu)
6. **Kültür - Sanat** (12 alt konu)
7. **Sağlık** (4 alt konu)
8. **Turizm** (5 alt konu)
9. **Ekonomi ve Finans** (8 alt konu)
10. **Siyaset** (7 alt konu)
11. **Ask, Sevgi, Arkadaşlık ve Dostluk** (3 alt konu)
12. **Moda** (2 alt konu)
13. **Eğlence ve Mizah** (3 alt konu)
14. **Spor** (12 alt konu)

Done

Internet | Protected Mode: On

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Screen shot of the “1) About the Forum” category



Screen shot of the “2) The World of Disabled People” category

Engelsiz Forum - Windows Internet Explorer
http://engelsizforum.ceit.metu.edu.tr/default_sub.asp

File Edit View Favorites Tools Help
Engelsiz Forum

Engelsiz Forum

Sayın bge
[Çıkış](#)

Ana Konular

- 2. Engelliler Dünyası
- 2.1 Sosyal faaliyetler (12 başlık var)
- 2.2 Özel etkinlikler (13 başlık var)
- 2.3 Erisilebilirliği artıran yardımcı araçlar (16 başlık var)
- 2.4 Yeni tedavi yöntemleri (11 başlık var)
- 2.5 Engellilerin hukuki hakları (18 başlık var)
- 2.6 Dernekler, Kurumlar ve Topluluklar (10 başlık var)
- 2.7 Engelliler hakkında bilgi (2 başlık var)
- 2.8 Engellilere Özel Sportif faaliyetler (3 başlık var)

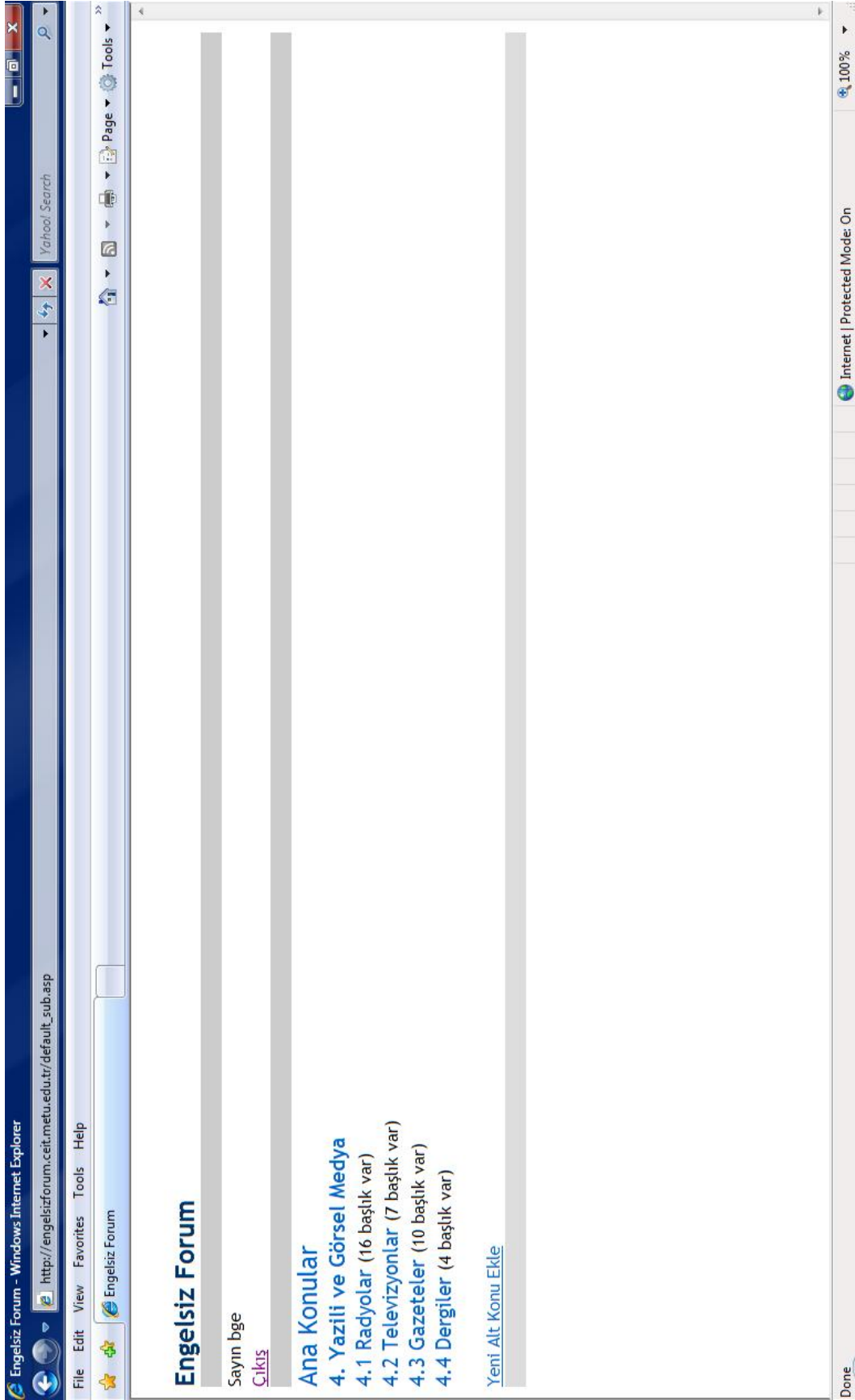
[Yeni Alt Konu Ekle](#)

Done

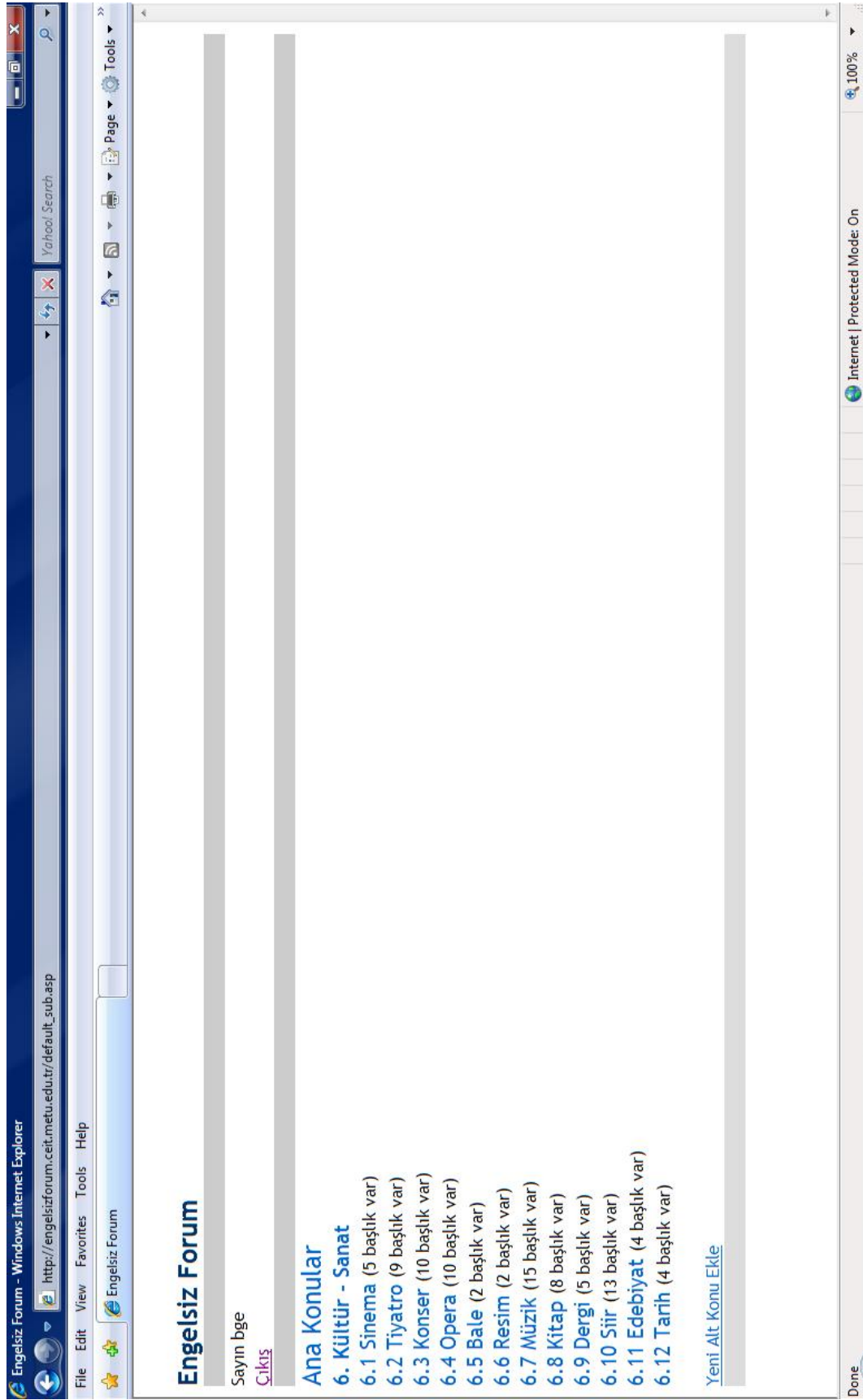
Screen shot of the “3) News” category



Screen shot of the “4) Printed and Audio-Visual Media” category



Screen shot of the “5) Education” category



Screen shot of the “6) Culture and Arts” category

Engelsiz Forum - Windows Internet Explorer
File Edit View Favorites Tools Help
https://engelsizforum.celit.metu.edu.tr/default_sub.asp
Engelsiz Forum
Yahoo! Search
Home Page Tools
Done
Internet | Protected Mode: On
100%

Engelsiz Forum

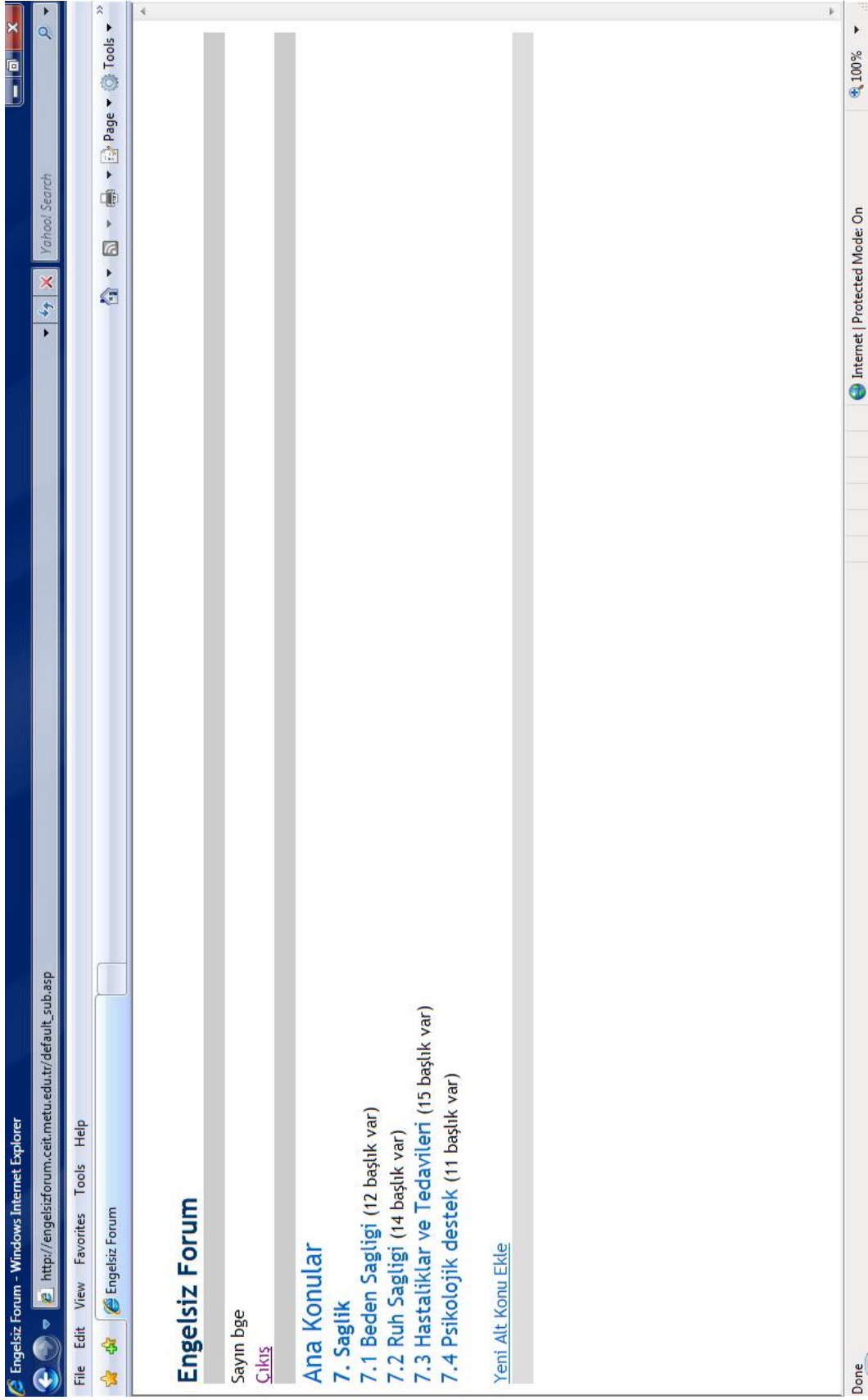
Sayın bge
[Çıkış](#)

Ana Konular

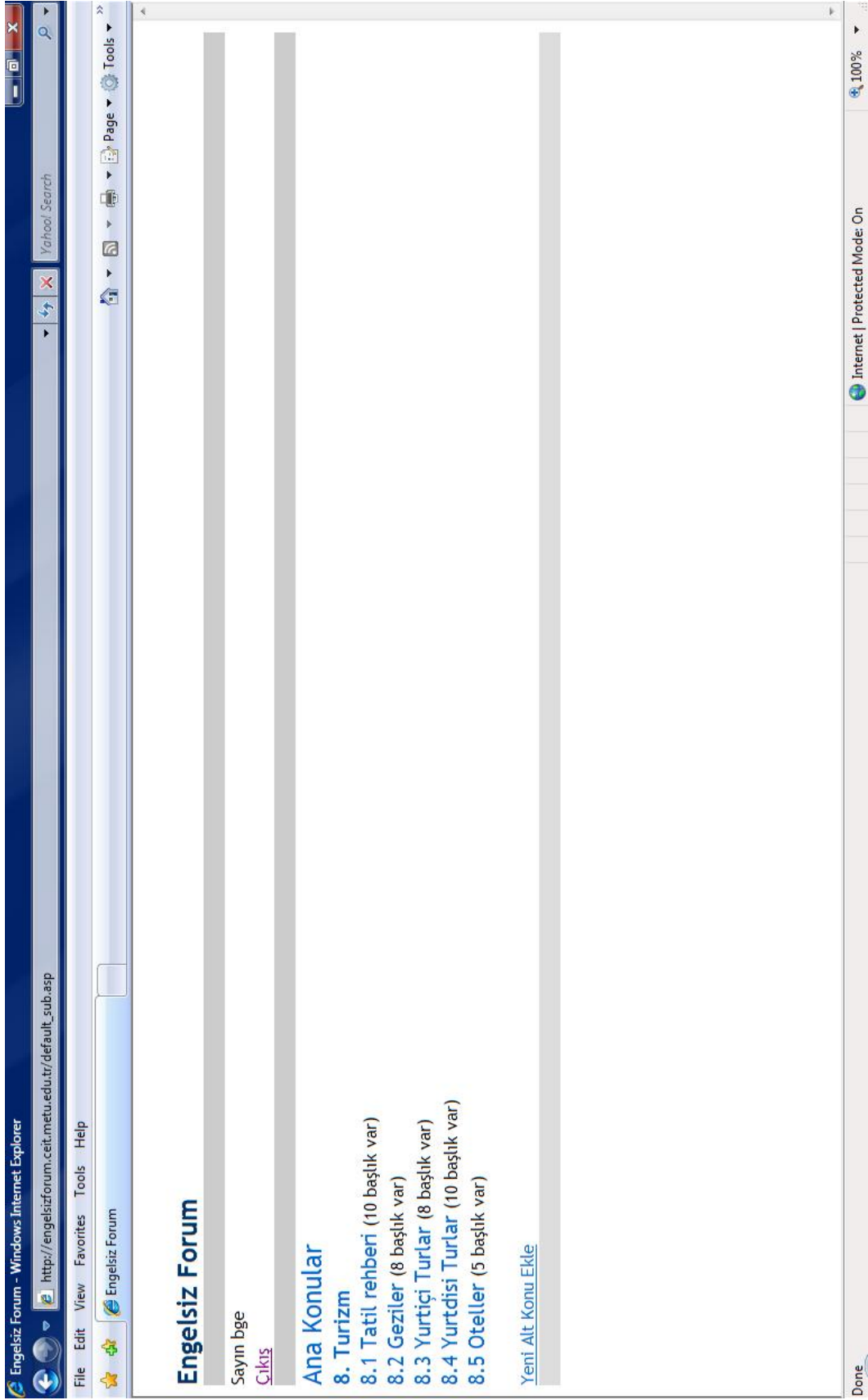
- 6. Kùltür - Sanat
 - 6.1 Sinema (5 başlık var)
 - 6.2 Tiyatro (9 başlık var)
 - 6.3 Konser (10 başlık var)
 - 6.4 Opera (10 başlık var)
 - 6.5 Bale (2 başlık var)
 - 6.6 Resim (2 başlık var)
 - 6.7 Müzik (15 başlık var)
 - 6.8 Kitap (8 başlık var)
 - 6.9 Dergi (5 başlık var)
 - 6.10 Siir (13 başlık var)
 - 6.11 Edebiyat (4 başlık var)
 - 6.12 Tarih (4 başlık var)

[Yeni Alt Konu Ekle](#)

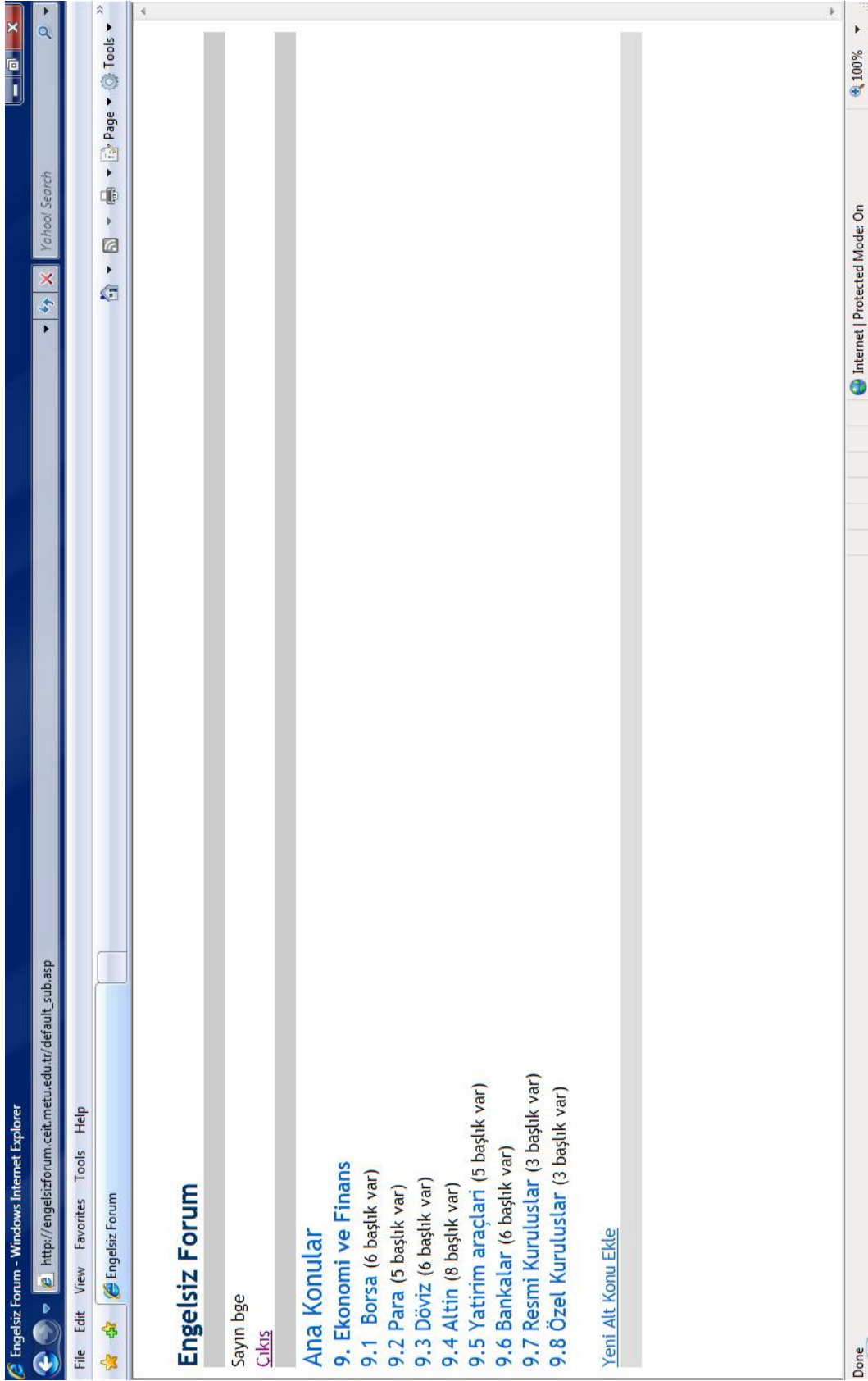
Screen shot of the “7) Health” category



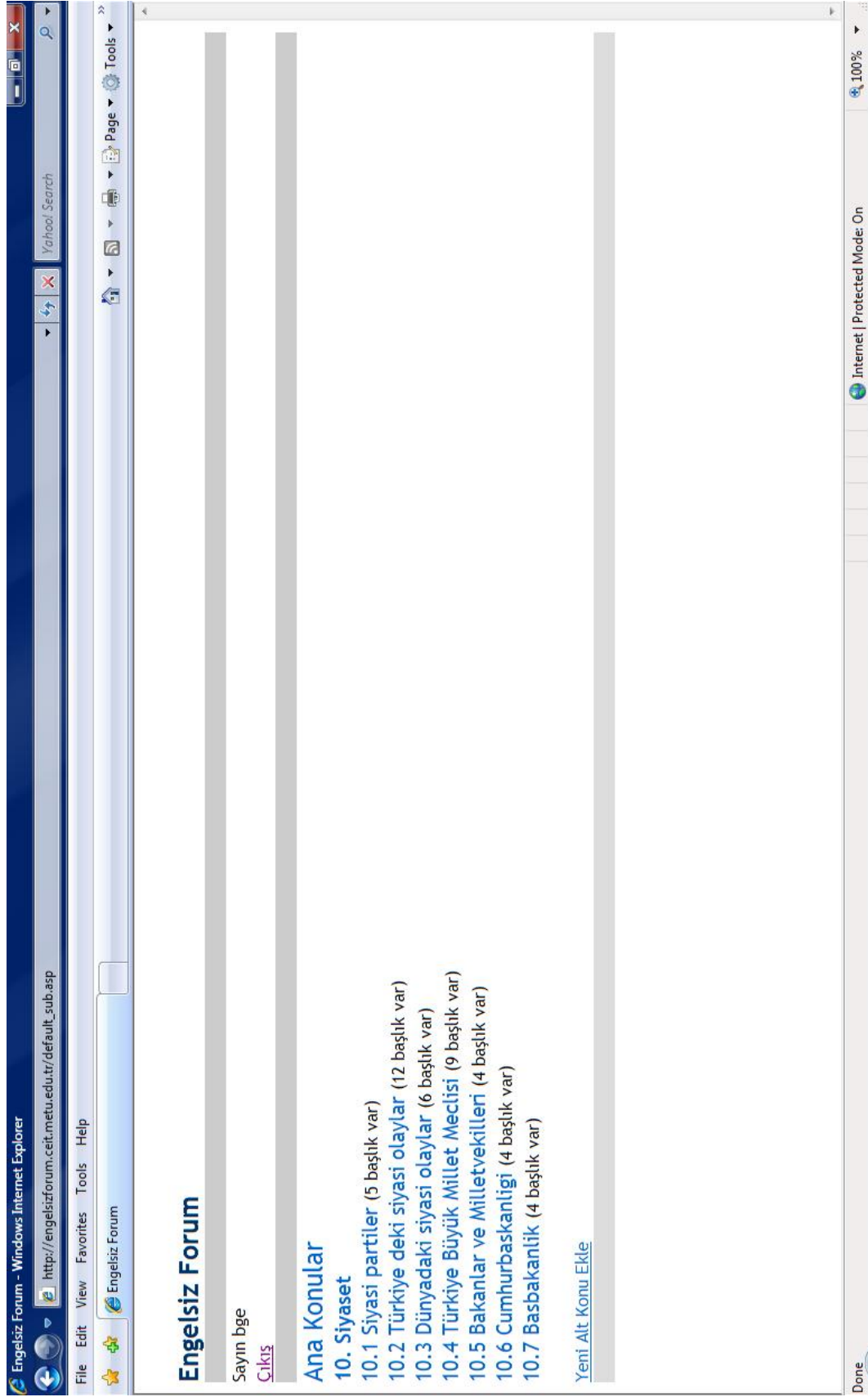
Screen shot of the “8) Tourism” category



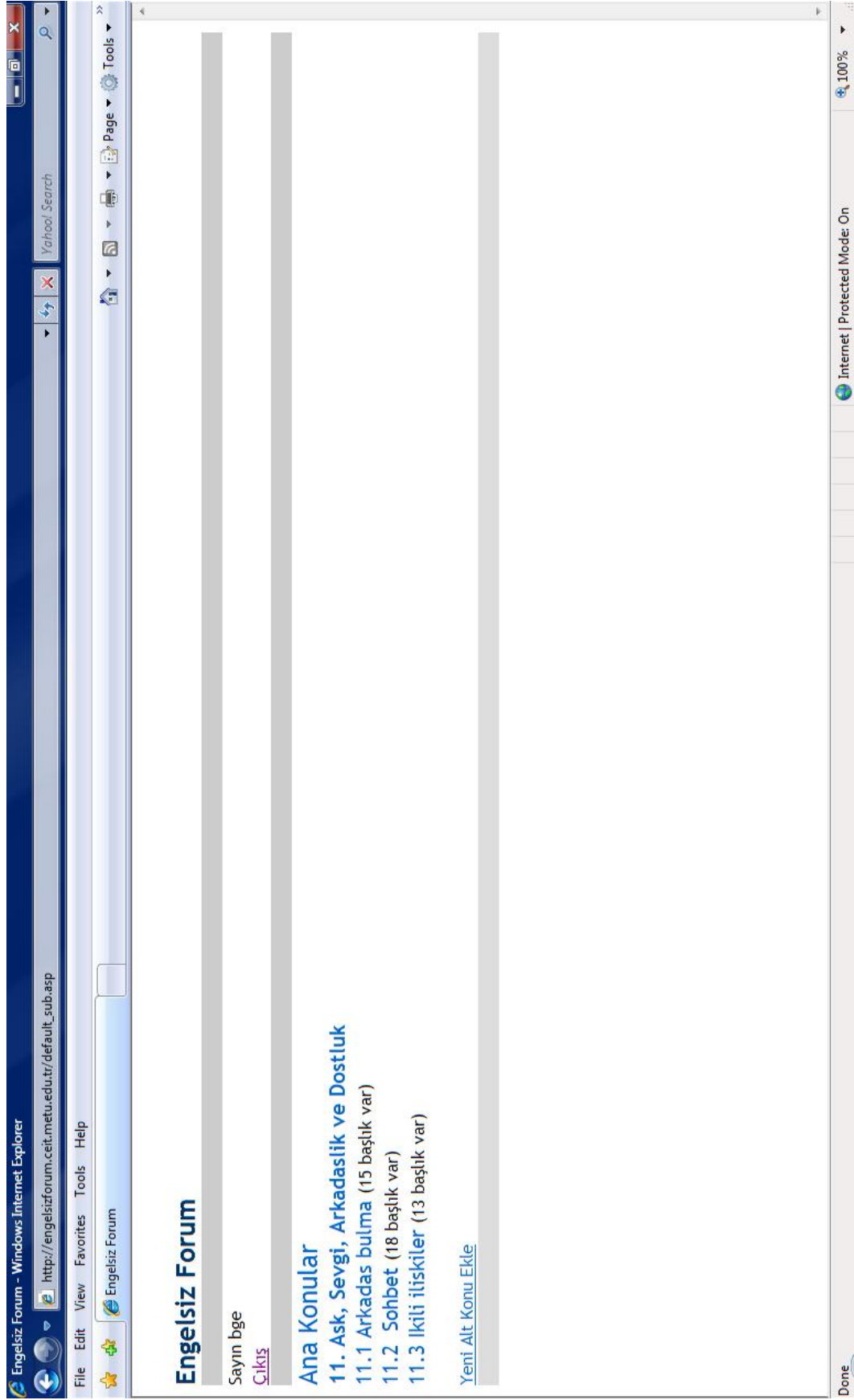
Screen shot of the “9) Economy and Finance” category



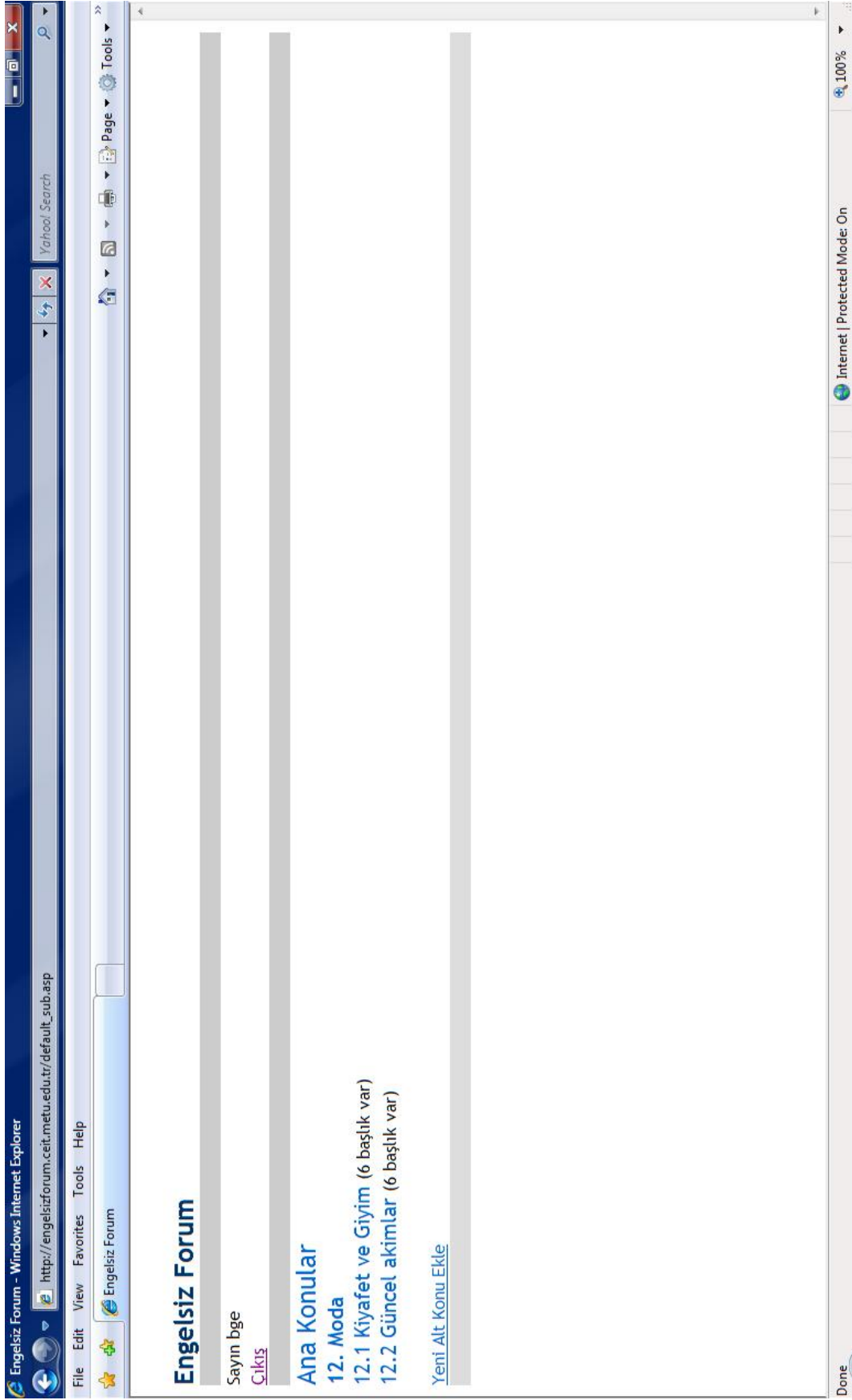
Screen shot of the “10) Politics” category



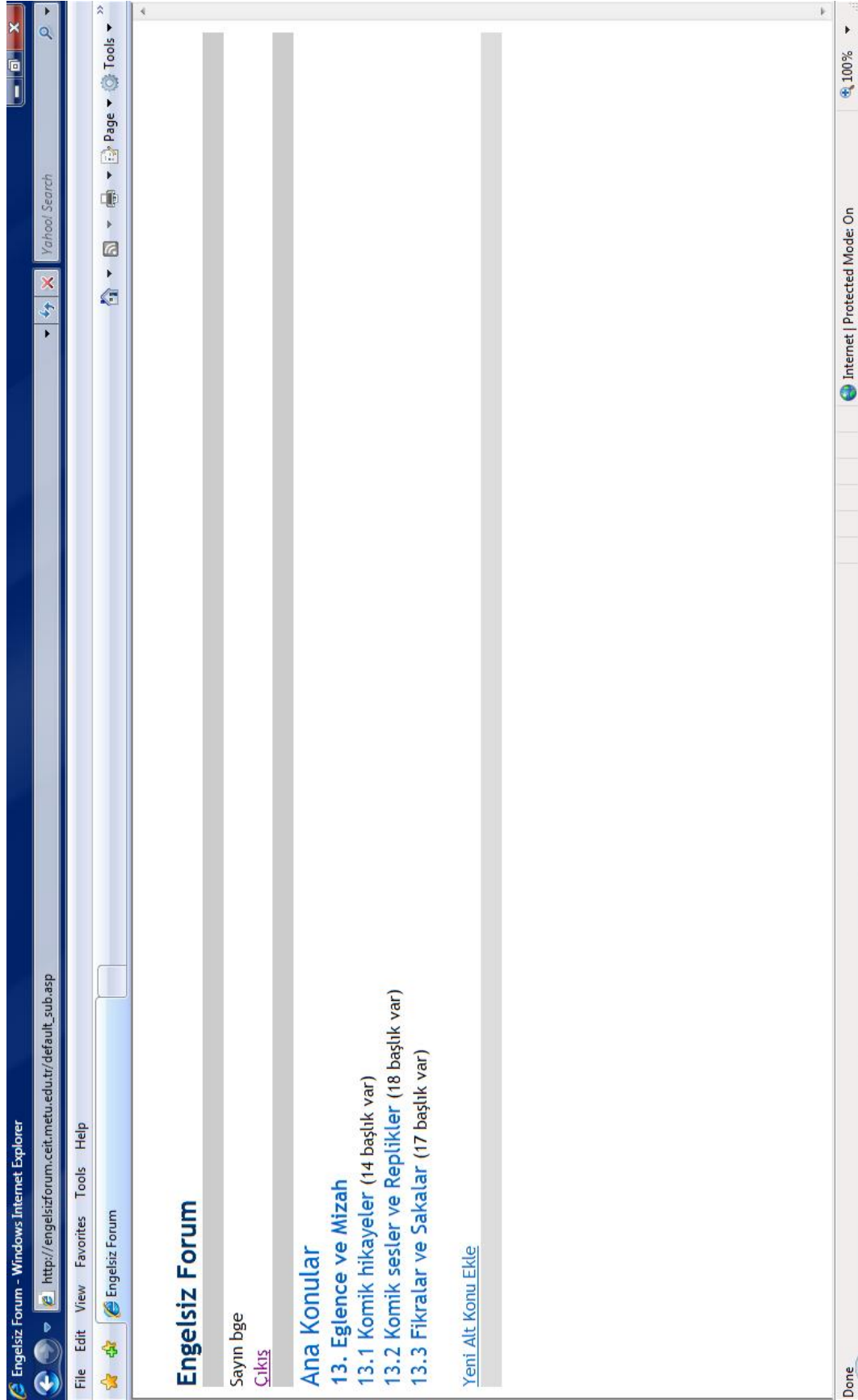
Screen shot of the “11) Love and Friendship” category



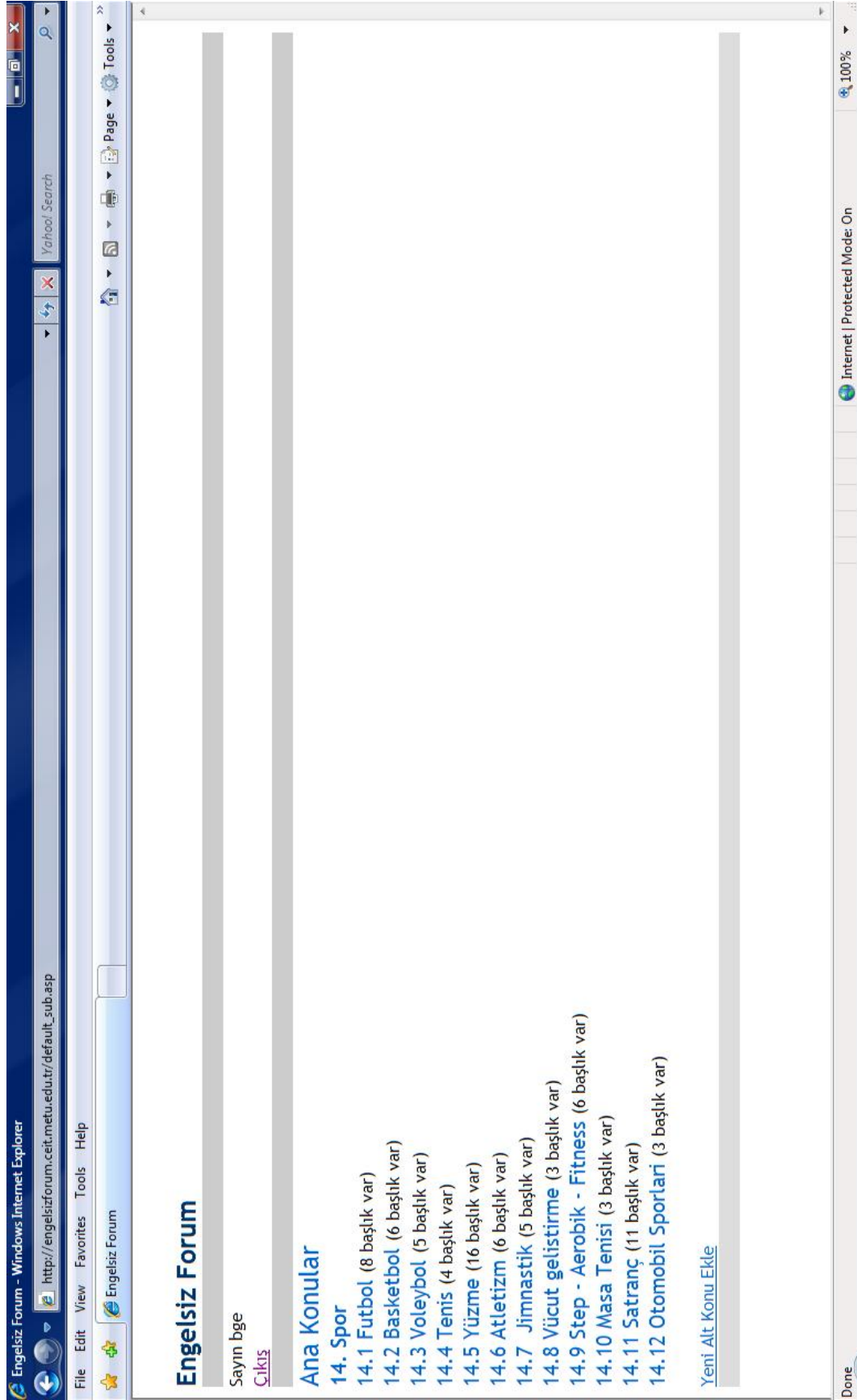
Screen shot of the “12) Fashion” category



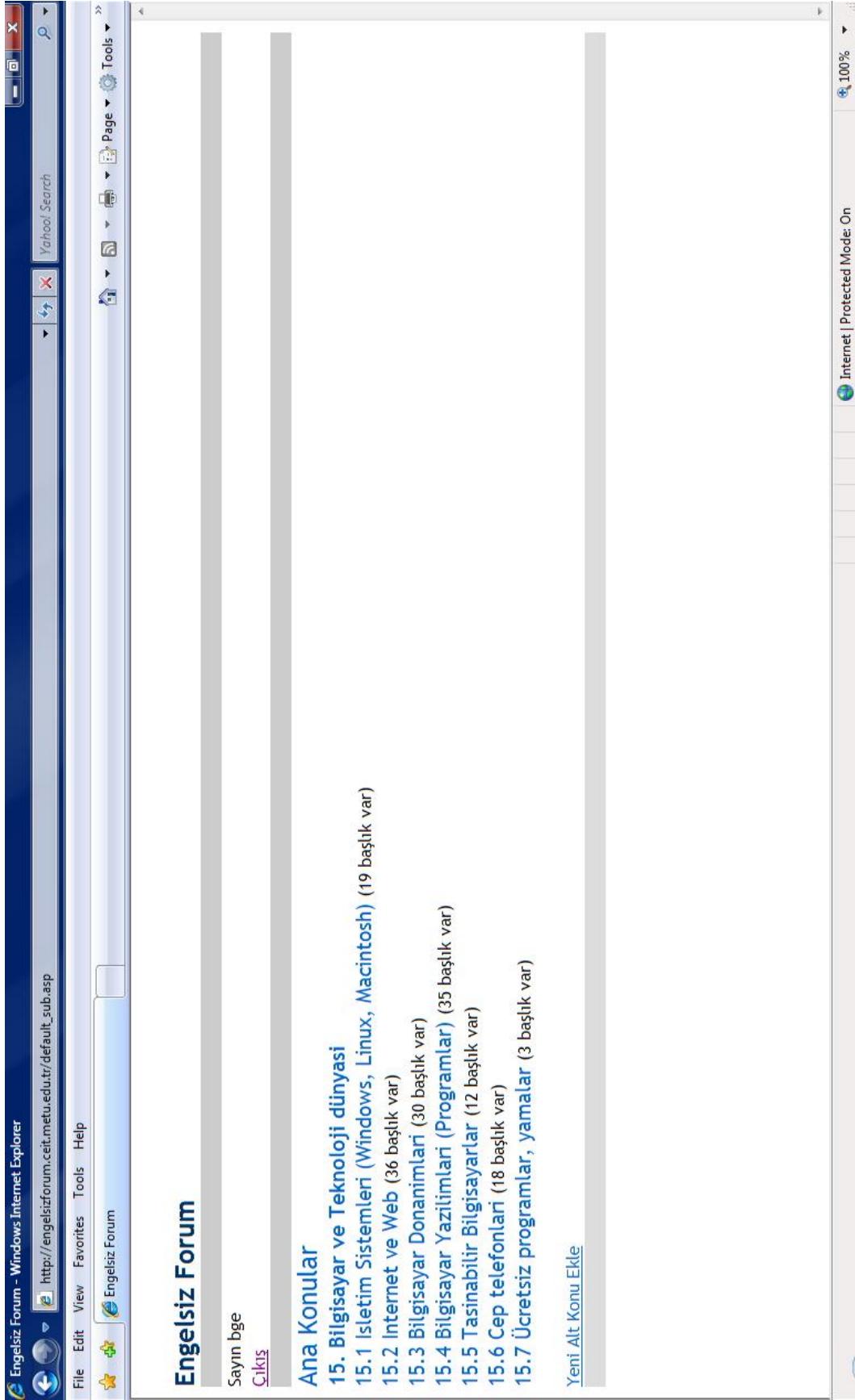
Screen shot of the “13) Entertainment and Humor” category



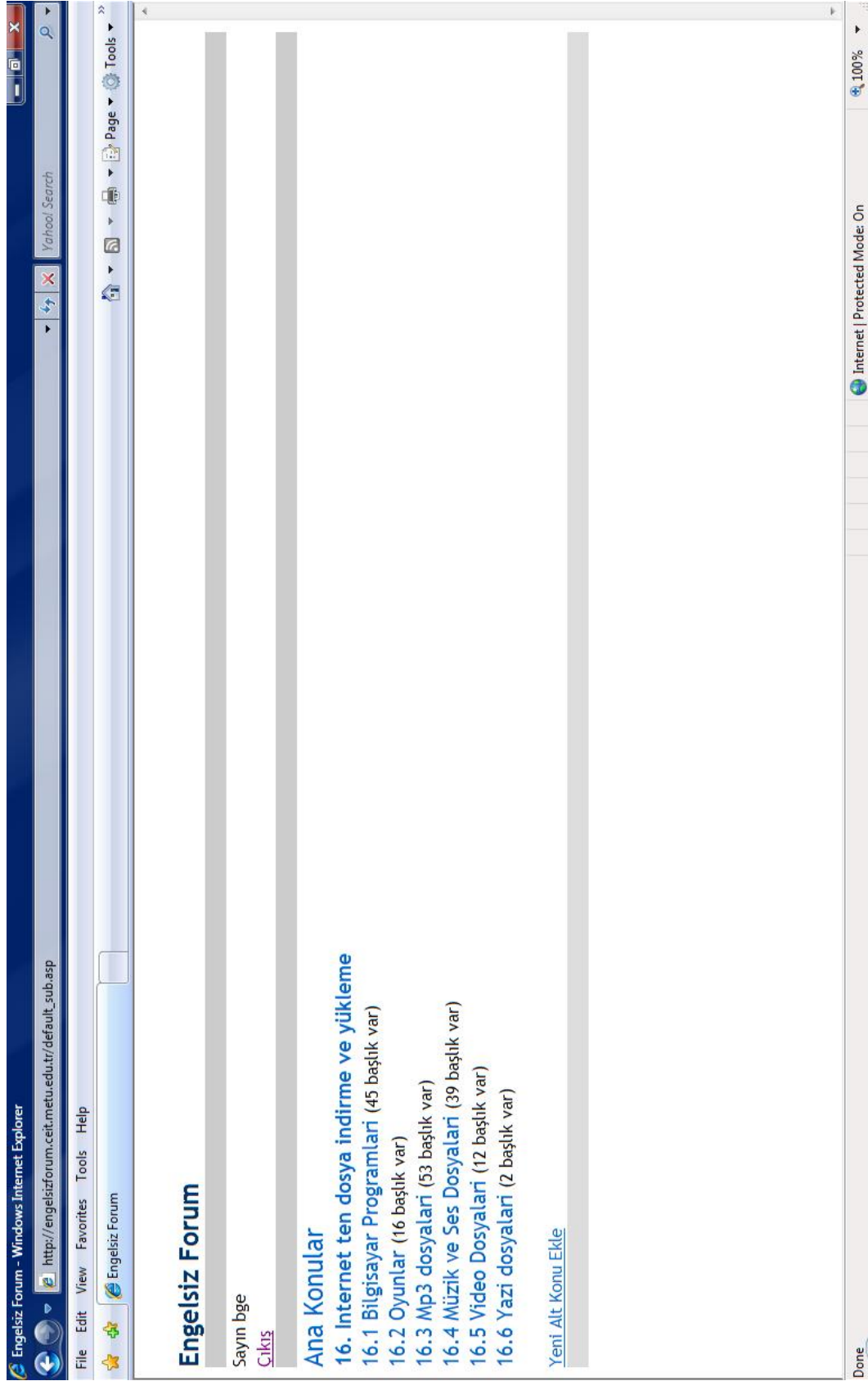
Screen shot of the “14) Sports” category



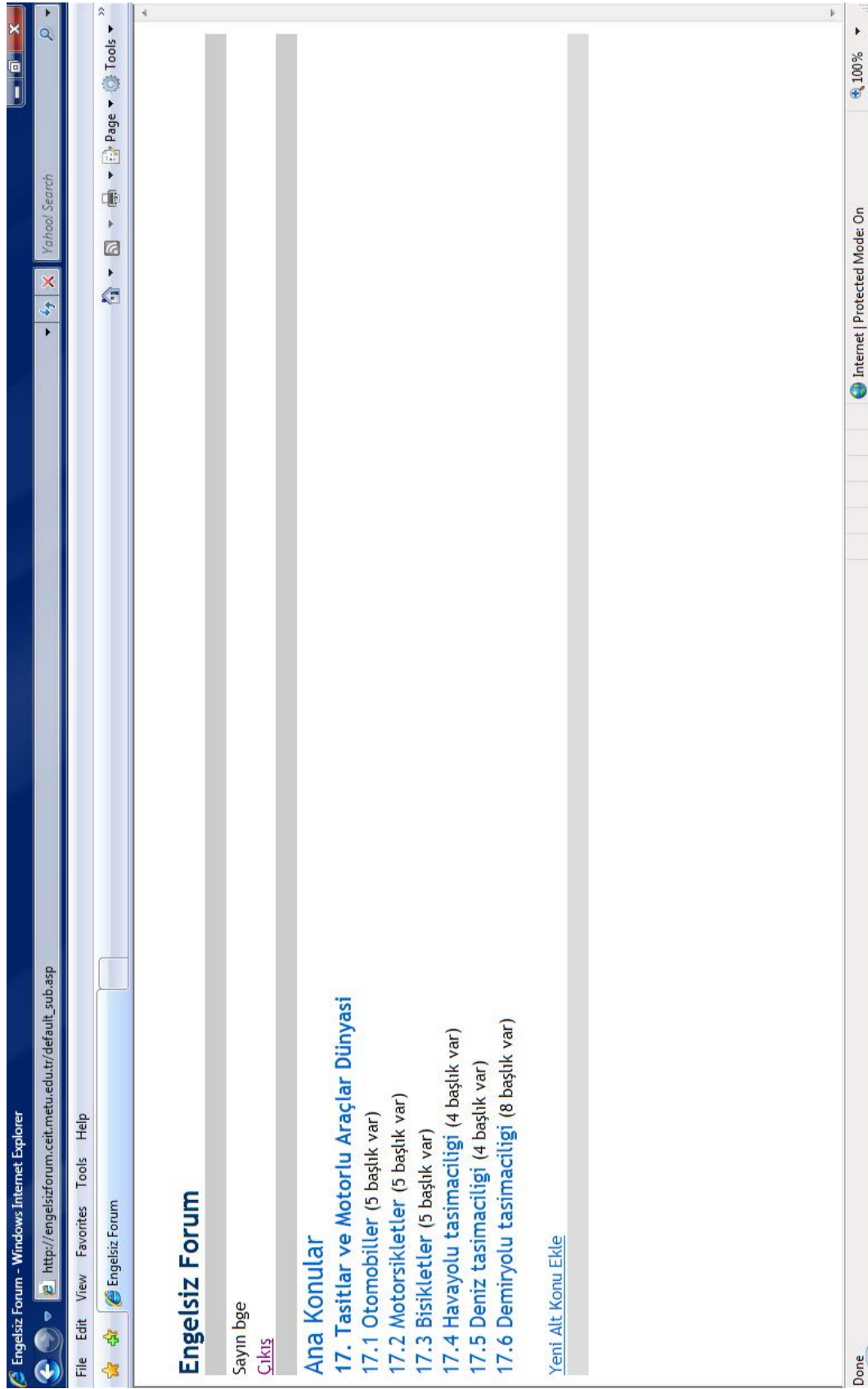
Screen shot of the “15) Computers and Technology” category



Screen shot of the “16) Uploading and Downloading on the Internet” category



Screen shot of the “17) Transportation and Motorized Vehicles” category



Screen shot of a sample page of a post

Engelsiz Forum - Windows Internet Explorer
http://engelsizforum.cet.metu.edu.tr/default_topic.asp
File Edit View Favorites Tools Help
Engelsiz Forum

Engelsiz Forum

Sayın bge
[Çıkış](#)

Ana Konular

2. Engelliler Dünyası

2.2. Özel etkinlikler (Toplam 1 başlık var)

2.2.1 Ankara Üniversitesi Özel Eğitim Topluluğu

berky
10/05/2006
6:35:47 PM
[Bu başlığı sil](#)

Özel Eğitim Topluluğu, üyelerinin Ankara Üniversitesi Eğitim Bilimleri Fakültesi öğrencilerinin oluşturduğu bir öğrenci topluluğudur. Topluluk, toplumda engellilik ve engellilerin yaşadıkları sorunlarla ilgili farkındalığın artırılması amacıyla kurulmuştur ve faaliyetlerini bu paralelde sürdürmektedir. Topluluk, Özel Eğitim Bölümü öğretim elemanlarından birinin sorumluluğu altında öğretim dönemi içinde çeşitli etkinliklerde bulunmaktadır. Sorumlu öğretim elemanı ile birlikte planlanan bu etkinlikler öğrencilerin katkıları ile gerçekleştirilmektedir. Bu etkinlikler şu şekilde sıralanabilir: 1. Topluluk üyesi öğrenciler alana ilgili projelerde gönüllü olarak çalışmakta ve destek vermektedir. (Örneğin: Engelsiz Kampus Projesi, Kaynaştırma Projesi vb.) 2. Topluluk, engellilerle ilgili konularda çevrilmiş filmleri fakülte öğrencilerinin ücretsiz olarak izlemesini sağlamaktadır. (Örneğin: Fareler ve İnsanlar, Forrest Gump, Şifre Merkür, Yağmur Adam, vb.) 3. Topluluk, özel eğitim alanında çalışan profesyonelleri, engelli ailelerini ya da konuyla ilgili dernek yöneticilerini davet ederek öğrencilerin katılabileceği toplantılar düzenlemektedir. (Örneğin: Spina Bifida Derneği, Rett Sendromu Derneği vb.) 4. Topluluk üyelerinin konuyla ilgili toplantılara katılması sağlanmaktadır. (Örneğin: ODTÜ'de gerçekleştirilen "Üniversite ve Engel" toplantısı, Altı Nokta Kökler Derneği'nin düzenlediği internet haftası etkinlikleri, M.E.B. Özel Eğitim ve Rehberlik Genel Müdürlüğü ziyareti vb.)

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Screen shot of a sample page of a post

Engelsiz Forum - Windows Internet Explorer
https://engelsizforum.ceit.metu.edu.tr/default_topic.asp

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Engelsiz Forum

Engelsiz Forum

Sayın bge
[Çıkış](#)

Ana Konular

2. Engelliler Dünyası

2.5. Engellilerin hukuki hakları (Toplam 1 başlık var)

2.5.1 birlesmis milletler engelli haklari sözleşmesi türkiye tarafından imzalandi. iste sözleşmenin türkçe tam metni harun

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Bu başlığı sıt

Türkiye tarafından imzalanan, toplam 50 maddeden oluşan ve taraf olan devletlere, engellilere karşı ayrımcılığı ortadan kaldırmak ve onların yaşam standartlarını yükseltmek gibi yükümlülükler getiren sözleşmenin tam metni şu şekildedir: ENGELLİLERİN HAKLARINA DAİR SÖZLEŞME BASLANGIÇ Bu Sözleşme'ye Taraf Devletler, (a) Birleşmiş Milletler Şartı'nda ilan edilmiş olan ve insanlık ailesinin tüm mensuplarının doğustan sahip oldukları onuru, değeri, esit ve devredilmez hakları dünyada özgürlüğün, adalet ve barışın temeli olarak kabul eden ilkeleri anımsayarak, (b) Birleşmiş Milletler'in, İnsan Hakları Evrensel Beyannamesi ve İnsan Haklarına İlişkin Uluslararası Sözleşmeler ile, herkesin herhangi bir ayrımcılığa uğramaksızın, bu belgelerde tanınan hak ve özgürlüklere sahip olduğunu kabul ve ilan ettiğini göz önünde bulundurarak, (c) Tüm insan haklarının ve temel özgürlüklerin evrenselliğini, bölünmezliğini, bütüncülüğünü ve bağıtlığı ve engellilerin bu haklardan ayrımcılığa uğramaksızın yararlanmalarının güvence altına alınması gerektiğini yeniden onaylayarak, (d) Ekonomik, Sosyal ve Kültürel Haklara İlişkin Uluslararası Sözleşme'yi, Medeni ve Siyasal Haklara İlişkin Uluslararası Sözleşme'yi, Her Türlü İrk Ayrımcılığının Ortadan Kaldırılmasına İlişkin Uluslararası Sözleşme'yi, Kadınlara Karşı Her Türlü Ayrımcılığın Önlenmesine Dair Uluslararası Sözleşme'yi, İskence ve Diğer Zalimane Gayri insani veya Küçültücü Muamele veya Cezaya Karşı Sözleşme'yi, Çocuk Haklarına Dair Sözleşme'yi ve Tüm Göçmen İşçilerin ve Aile Fertlerinin Korunmasına Dair Uluslararası Sözleşme'yi anımsayarak, (e) Engelliğin verilen bir kavram olduğunu ve engelliğin sakat kısılların, onların diğer bireyler ile birlikte esit bir temelde topluma tam ve etkili katılmalarına olanak tanımayan tutumlar ve çevre koşullarla etkileşiminden kaynaklandığını tanıyarak (f) Engelliler için Dünya Eylem Programı ve Sakatlar için Fırsat Esitliği Konusunda Standart Kurallar'da yer alan ilke ve politika önerilerinin engellilere fırsat esitliği sağlanmasına yönelik ulusal, bölgesel ve uluslararası seviyede politikaların, planların, programların ve eylemlerin geliştirilmesi, tasarlanması ve değerlendirilmesine katkısını göz önünde bulundurarak, (g) Engelliğe ilişkin konuların sürdürülebilir kalkınmayla ilgili stratejilerin ayrılmaz bir parçası olarak ele alınmasının önemini vurgulayarak, (h) Engelli olduğu için bir kişinin ayrımcılığa uğramasının kişinin doğustan sahip olduğu onuru ve değeri ihlal ettiğini de göz önünde bulundurarak, (i) Buna ek olarak engellilerin çeşitliliğini tanıyarak, (j) Daha yoğun bir desteğe ihtiyacı olan engelliler dahil olmak üzere, tüm engellilerin insan haklarının güçlendirilmesi ve korunması gerektirini göz önünde bulundurarak (k) Caciği belnelere vs.vikiimliliğilere rasmen annallilerin toplumun esit iivaleri olarak topluma katılmıda annallarda

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Screen shot of a Registration Page for new users

Engelsiz Forum - Windows Internet Explorer
http://engelsizforum.cet.metu.edu.tr/membership.asp

Engelsiz Forum

Engelsiz Forum Yeni Üyelik

Üye olmak için aşağıdaki bilgileri giriniz ve **Kaydet**'i tıklayınız.

Kullanıcı Adı:

Şifre:

Şifre (Tekrar):

Adımız:

Soyadımız:

Eposta:

Telefon:

Şehir:

Ülke:

[Kaydet](#) [Yazgeç](#)

Done

APPENDIX C

INTERVIEW GUIDE FOR THE VISUALLY DISABLED STUDENTS

GÖRME ENGELLİ ÜNİVERSİTE ÖĞRENCİLERİ İLE GÖRÜŞME REHBERİ

Görüşülen :

Görüşmeci :

Görüşme Tarih ve Saati : ... / 09 / 2006

Görüşme Süresi :

Merhaba,

Bu görüşme, Ortadoğu Teknik Üniversitesi Eğitim Fakültesi Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü Doktora Programı'nda öğrenci olan Bülent Gürsel Emiroğlu tarafından doktora tezinde kullanılmak üzere geliştirilen “EngelsizForum” ile ilgili siz değerli kullanıcıların görüş ve önerilerini öğrenmek için planlanmıştır. Bu görüşme ile sizlerin yaklaşık 3 ay boyunca aktif olarak kullandığınız bilgi paylaşımı ve tartışma platformu olarak tasarlanan web forumun tasarım ve içeriği hakkında yorumlarınız alınmaya çalışılacaktır. Katıldığınız için teşekkür ederim.

Görüşmeye başlamadan önce belirtmek istediğim bazı noktalar var. Yapılacak görüşme sadece bu akademik çalışma için kullanılacaktır. Bu çalışma sonucunda yayınlanacak belge ve dökümanlarda isminiz hiçbir şekilde kullanılmayacaktır. Eğer sizin için de bir sakıncası yok ise, ve izninizle, görüşmemizi ses kayıt cihazı ile kayıt edilecektir. Başlamadan sormak istediğiniz bir soru var mı? Teşekkürler.

Sorularıma başlıyorum:

- 1) “EngelsizForum” un yapısını ve tasarımını genel olarak nasıl buldunuz?
- 2) “EngelsizForum” un en beğendiğiniz yönleri nelerdir?
- 3) “EngelsizForum” un en beğenmediğiniz yönleri nelerdir?
- 4) “EngelsizForum” un bundan sonrası için önerileriniz nelerdir?

Sorularım bunlardı. Sizin sormak veya eklemek istediğiniz birşey var mı?

Teşekkür ederim.

APPENDIX D

CITATIONS FROM INTERVIEWS IN TURKISH

1) *“EngelsizForum” un yapısını ve tasarımını genel olarak nasıl buldunuz?*

Interviewee 1: “Bence güzel olmuş, genel olarak gayet iyi. Sayfalarda gezinmek çok kolaydı, kaybolmadım. Jaws genelde forumlarda sorun çıkarır ama sizinkinde sorunsuz okudu, bravo! Tasarımı iyiydi, genel olarak isteklerime cevap verdi.”

Interviewee 2: “İçindeki konulardan çok faydalandım, güzeldi. Benim için faydalı oldu. Konulara ve yazılara kolay ulaştım, sitede gezmek kolaydı, kullanımı kolaydı, sevdim. Gayet hızlı gezebildim, beklemek zorunda kalmadım. İçerik tamamen yazılardan oluştuğu için sorun yaşamadık gezerken. Bekleme yaşatmadı, hızlı dolaşabildim.”

Interviewee 3: “Forum bu alandaki açığı kapadı, Türkiye’de bizim ihtiyaçlarımıza göre bir site yoktu, iyi oldu. Ekran okuma güzeldi, rahatça anladım. Sayfalar hızlı yüklendi, ekran okuma bekletmedi. Surf kolaydı, heryere girdim çıktım.”

Interviewee 4: “Körlere göre kullanımı kolay olmuş, içindeki yazıları okumam kolay oldu. İhtiyaçlarımıza göre tasarlandığı belli, körlere tamamen hitap ediyor. Web’deki engelliler için gereken sayfa ve kaynak açığını çok iyi kapadı, ihtiyaçlarımıza cevap verdi.”

Interviewee 5: “Türkiye şartlarında forumları gezmek bizler için zordur ama sizinki güzeldi. Sayfa içerikleri iyi düzenlenmişti, takip etmem kolay oldu. Komple forumu gezmek uzun sürmedi, sistem gayet hızlı ve sorunsuz. Körler için site tasarlamak farklıdır, görmeyen kullanıcı grubu olarak işinizi zorlaştırdık. Ama bizim ihtiyaç duyduğumuz şeyleri yaptığınız için sağolun, beklentilerimi karşıladı.”

Interviewee 6: “Daha önce bizim için geliştirilen bir forum yoktu, bu açığı kapadı. Genel yapısını çok beğendim, tebrikler, elinize sağlık. Engellilere forum yapılması güzel birşey. Körler için çok güzel oldu bu ama sizin için yorucu oldu herhalde.”

Interviewee 7: “Forum iyiydi, güzeldi, 1 ay boyunca sürekli girdim, daha önce olmayan birşey yapmışsınız, bu alanda ilk olmasına rağmen gayet başarılıydı. Forumdaki tüm sayfaları hızlıca gezebildim, Jaws takılmadı hiç. Bence körlerin ihtiyaç duyduğu buluşma ortamını sağladı.”

Interviewee 8: “Vallaha dürüstçe söylemek gerekirse forum için ümitli değildim, basit birşey bekliyordum ama süper olmuş, çok emek vermişsiniz, sağolun. Biz körler gibi özel gruba bir web sitesi tasarlamak zordur, iyi becermişsiniz. Hizmet kalitesi iyiydi. İnternet’te vakit geçiren körler faydalanacaktır.”

Interviewee 9: “Açıkçası yıllardır İnternet kullanıyorum, Türkiye’deki Web’deki forumları zor da olsa sürekli takip ediyorum, sizin yaptığınız forum ötekilere göre gayet güzel ve kullanışlı. Konuları ve yazıları çok rahat buldum ve dinledim. Jaws sorunsuz okudu. Forum yapısında eksik yoktu bence, içerik yazıları iyiydi. Genel yapı iyi düzenlenmiş, genelden özele akış vardı.”

Interviewee 10: “Biz engelliler için web forum yoktu, sizinki ilk oldu. Ben kendi adıma beğendim, güzel olmuş, faydalandım. İçerik hep yazı olduğu için herşeyi anladım, ekran okuyucu diğer forumlarda olduğu gibi sorun çıkarmadı.”

2) “EngelsizForum” un en beğendiğiniz yönleri nelerdir?

Interviewee 1: “Kolay gezmeyi sevdim, içinde dolaşmak çok kolaydı, linkler ve bağlantılar sorunsuz çalıştı. Zaten üyelik prosedürü çok kısaydı, gereksiz sorularla bunaltmadı. Konuları okumadan önce kimin yazdığını, ne zaman yazdığını bilmek hoşuma gitti, Forum’da hangi kullanıcılar daha aktif bunu anladım, yeni kullanıcıları tanımak çok hoşuma gitti.”

Interviewee 2: “Forumda kaybolmadan vakit geçirmek bence faydalıydı. Linklerin numaralandırılması çok iyi olmuş, forum’da nerde olduğumu unutturmadı bana. Bunu dışında forum’da gezinmek çok kolaydı, alt ve üst linklere rahat ulaştım, Jaws zorlanmadı. Üye olmak çok sürmedi, işimizi epey kolaylaştırmışsınız.”

Interviewee 3: “Ben yapıyı çok beğendim, bağlantılar ve hiyerarşi güzel oturmuş. Diğer Forum’lardaki üyelik prosedürü sizinkinde sorun olmadı, çabucak üye oldum, bunu beğendim. Konuları gezerken içerik yeterliydi ama daha da geliştirilebilir.”

Interviewee 4: “İlk önce üye olmak kolaydı, zorlanmadım. Konuların başındaki tarih, saat ve kullanıcı adı bana tembel ve çalışkan kullanıcıları gösterdi, bu özelliğini çok sevdim forumun. Ayrıca forumu takip ederken konularda kaç tane yazı olduğun gösteren sayılar faydalı oldu, çok zaman gerektiren konuları sonraya bıraktım.”

Interviewee 5: “Sistemi öğrenmek uzun sürmedi, linkleri takip etmek işimizi kolaylaştırdı, aradığımızı bulduk sonuçta. Sayfalardaki post sayılarına bakarak süreyi ölçtüm, işime çok yaradı, hangi konu popülerse ordan başladım.”

Interviewee 6: “Forumun yapısını keşfetmem biraz zaman aldı ama 2. ve 3. girişte çok rahat ettim. En beğendiğim şey, biz körlerin gözü olan ekran

okuyucunun yazıları sorunsuz okuması oldu. Ayrıca kaç kiři nereye kaç tane konu açmış, yazı yazmış belirtilmesi iyi oldu, konuları ona göre sıraladım kafamda.”

Interviewee 7: “Çok kısa zamanda üye olabilmeyi beğendim, işimizi kolaylaştıran bir yapısı vardı forum’un, onu beğendim. Sonra bağlantıları bulmak ve gitmek kolaydı, hoşuma gitti.”

Interviewee 8: “Üyelik kısmı kısa ve hızlıydı, fazla uğraştırmadı, ilk önce bunu beğendim. Forum’daki konuları ve içerik doyurucuydu ama biraz daha genişletilebilir.”

Interviewee 9: “Ben en çok konuların ve başlıkların önünde bulunan rakamları faydalı buldum, bence körler için web sitelerinde ve forumlarda böyle yardımcı rakamlar olsa çok iyi oluyor. Forum’da bir de şey vardı, hangi konuda ne kadar yazı var, kaç kiři yazmış, bunları bilmek iyi oldu. ”

Interviewee 10: “Aslına bakarsanız iyi iş olmuş, genel olarak olumlu herşey, ama bence en güzeli böyle bir işe girişmeniz. Mutlaka eklentiler ve güncellemeler ile daha iyi olacaktır.”

3) “EngelsizForum” un en beğenmediğiniz yönleri nelerdir?

Interviewee 1: “Beğenmemek değil de Forum’da daha çok konu olsa daha iyi olurdu. Malum biz severiz Internet’te gezinmeyi, daha çok konu olursa vakit geçirmek için sağa sola gitmemize gerek kalmaz, herşeyi tek bir adreste buluruz. Bir de ses dosyalarının sayısı yetersizdi, o kısımdaki dosyaları artırırsanız daha iyi olur.”

Interviewee 2: “Forum’da birşey dikkatimi çekti, sanırım belli bir süre hiç bir yere tıklamayınca dışarı atıyor, tekrar login olmak gerekiyor, bunu beğenmedim, bu süre daha uzun olmalıydı. Başka, başka, hah, program download kısmındaki programlarda çeşitlilik lazım, her aradığım programı bulamadım indirmek için.”

Interviewee 3: “Konular ve ana başlıkların sayısı bence yetersiz, artılırsa daha iyi olur, diğer Forum’lara gitmemize gerek kalmaz. Bir de kayıtlı kalma süresi biraz kısa olmuş bence, onu uzatın, tekrar şifre girmek zorunda kaldık.”

Interviewee 4: “Tabii ki herşey güzel olmuş ama konu sayısı biraz daha artırılabilir, aslında bunu biz de yapabiliriz, nasılsa bize bu hakkı vermişsiniz. Onun dışında sorun yok bence.”

Interviewee 5: “Beğenmediğim şey, sanırım forumda zamanlayıcı vardı, bir süre sonra tekrar kullanıcı adı ve şifre girmek gerekiyordu, gerçi ben başından kalktıktan 2 saat falan sonra geldim, ondan olabilir, bu olmasa daha iyi olurdu. Başka bir sorun da, sayfaları gezdikten sonra geldiğimiz yere geri dönmek için bağlantı yoktu, ‘önceki sayfaya dön’ gibi bir bağlantı olsa iyi olurdu.”

Interviewee 6: “Keşke daha çok içerik olabilseydi ama buna da şükür, artık bizim de bir Forum’umuz var. Keşke daha çok mp3 dosyası koysaydınız, indirir dinlerdik. Aradığım programları indirmek için bulamadım. Beğenmediklerim bu kadar.”

Interviewee 7: “Herşey güzeldi ama daha çok crack program olsaydı iyi olurdu. Onları heryerde bulamıyoruz. Başka sorun yoktu.”

Interviewee 8: “Bülent Bey, program indirme linklerinin sayısını artırırsanız daha iyi olurdu, bulmak zor onları. Bir de daha çok müzik dosyası koysaydınız, mp3 ler mesela, son çıkan albümler falan yoktu, bu hoşuma gitmedi.”

Interviewee 9: “Keşke Forum’da hatırlanma süresi daha uzun olsaydı, bir saat başka bir iş yaptım, geldim tekrar girmek zorunda kaldım. Bunu yanında program indirme bağlantıları ve mp3 lerin sayısı azdı, daha çok olmasını beklerdim.”

Interviewee 10: “Forum’da beğenmediğim pek birşey yok ama bence her sayfaya ‘Geri’ link’i koysanız iyi olur, bence yani. Gezgin’in ‘Geri’ linkini kullanmak zorunda kalmazdık.”

4) *“EngelsizForum” un bundan sonrası için önerileriniz nelerdir?*

Interviewee 1: “Önceki soruda da belirttiğim gibi daha çok konular eklerseniz veya moderator arkadaşlar hergün eklerse memnun oluruz. Bir de Messenger’da olduğu gibi Forum’daki üyelerle doğrudan chatleşme imkanı olursa iyi olur. Size son olarak teşekkür ediyorum böyle bir forum geliştirdiğiniz için, umarım sizden sonra da bizim için birşeyler yapanlar olur.”

Interviewee 2: “Önerilerim, bence Forum’daki konularda bir değişiklik olduğu zaman veya güncelleme olduğunda bize otomatik e-posta atılsın, haberdar olalım. Veya Forum’da vakit geçirirken anlık mesajlarla bize haber verilse hangi konuda eklemeler var diye, bunu önerebilirim mesela.”

Interviewee 3: “Bence Forum’daki kullanıcı sayısının artması için konu çeşitliliği ve zenginliği artırılmalı. İlerki çalışmalarınızda Forum’a daha çok konu ekleyebilirsiniz daha iyi olur. Sanırım bu tek kişinin altından kalkabileceği bir iş değil. Aslında sizin gibi arkadaşlara yardımcı olsalar, imkan verseler de bizim için daha çok şeyler yapsanız. Mesela Forum’la birlikte çalışan mesaj programı da yapılırsa, sohbet etmeyi çok seviyoruz biz.”

Interviewee 4: “Benim önerim haftalık veya günlük olarak eğitim etkinlikleri olması Forum’da. Belli bir konuyla ilgili eğitici öğretici uygulamalar yaptırılabilir online olarak Forum’da. Mesela yeni teknolojiler veya tekniklerle ilgili bizlere de söz hakkı tanıyan eğitimler verilebilir Forum’da. Son şey olarak da size teşekkür ediyorum bu Forum’u yaptığınız için.”

Interviewee 5: “Forum’un popülaritesinin artması için ihtiyaç duyduğumuz programların ve dosya indirme imkanlarının artırılması lazım. Bir de eğer mümkünse ben o anda Forum’da gezinen insanlarla konuşmak isterim, chat yapmak isterim. Son olarak siz bu çalışmayı tamamladıktan sonra Forum’un ayakta kalabilmesi için yönetimin bizlere verilmesini isteriz.”

Interviewee 6: “Forum bence gayet güzel ve kullanışlı, bundan sonrasında bazı ufak tefek eklentiler ve güncellemeler ile işlevini yerine getirmeye devam edecektir. Belki konu sayısı ve içerikler artırılabilir ama o da zamanla olacaktır.”

Interviewee 7: “Forum’u biraz daha çekici hale getirmek ve daha çok kullanıcı üye yapmak için içine mesajlaşma sistemi eklenebilir. Veya Forum’daki üyeler birbirlerine anlık mesaj atıp alabilirler. Bunları önerebilirim.”

Interviewee 8: “Bülent Bey, sonraki aşamalarda Forum içeriği zenginleştirilirse bizim için daha iyi olur, bunu siz yapabilirsiniz veya bize öğretin nasıl yapılacağını biz yapalım. Hem bu sayede daha çok arkadaş üye olabilir siteye. Bizim de arkadaş çevremiz genişler.”

Interviewee 9: “Ben biz körler için daha çok içerik olmasını isterim, ama varolan içerik de beklentileri karşılıyor. Başka bir önerim yok.”

Interviewee 10: “Belli başlı konularla ilgili bize Forum üzerinden eğitim verilebilir. Anlık duyurular mesaj pencereleri açılarak okunabilir. Bizim ihtiyaç duyduğumuz program ve mp3 dosyaları daha çok yer alabilir. Bu kadar.”

CURRICULUM VITAE

PERSONAL INFORMATION

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EDUCATION

Degree	Institution	Year of Graduation
MSc	The University of Nottingham, Computer Science and Information Technologies, Nottingham, United Kingdom	2001
BSc	Middle East Technical University, Computer Education and Instructional Technologies, Ankara, Turkey	2000
High School	Çınarlı Anatolian Technical Medium-High School, İzmir, Turkey	1995

WORK EXPERIENCE

Year	Place	Enrollment
09.2006 - Present	Baskent University, Dept. of Comp. Eng.	Instructor / Lecturer
06.2003 - Present	TUBİTAK TEYDEP, TTGV	Referee, Member of Evaluation Committee
02.2002 - 07.2006	Atılım University, Dept. of Comp. Eng.	Instructor / Lecturer
11.2000 - 05.2001	DataNUM, Nottingham, UK	Analyst Programmer, Tester
09.1999 - 06.2000	TED Ankara College	Programmer, Visual Designer
09.1998 - 06.2000	METU, Faculty of Education	Technical Expert, Consultant

FOREIGN LANGUAGES

Turkish (Native), English (Advanced)

PUBLICATIONS

- Emiroglu, B.G. (2008) Web Based Multimedia Support in Computer Networks Course: A Case Study. Proceedings of the IETC 2008, 8th International Educational Technology Conference, pp. 247-252, 6-9 May 2008, Anadolu University, Eskisehir, Turkey
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