ASSISTIVE TECHNOLOGIES FOR STUDENTS WITH DISABILITIES: A SURVEY OF ACCESS AND USE IN TURKISH UNIVERSITIES

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ABSTRACT
This study examined the assistive technology needs of university students with disabilities and the availability of these technologies. It also explored the attitudes of the students with disabilities toward computers and the extent to which these are used by students with disabilities. Data was collected through a questionnaire, from 22 university students enrolled in one private and four public universities located in Ankara, Turkiye. The results of the study indicated that students with disabilities utilized assistive technology for different purposes, such as writing and conducting research, when the resources and support were available. Additionally, relationships between student knowledge, skills, attitudes, social norms, and beliefs were explored.
Keywords: Assistive Technologies, Special Education Technology, College Students, Students with Disabilities

There is a general lack of awareness in Turkey, concerning the needs and capabilities of individuals with disabilities. Some people are unconcerned and justify this lack of awareness by claiming that individuals living with a disability are rare and do not warrant much attention. Others may be concerned but feel incapable of assisting those individuals with disabilities, overwhelmed by the sheer size of the task. Due to this absence of people with disabilities who are active in everyday life in Turkey, the general public is desensitized to the issues surrounding disabilities. The recent 2000 population census in Turkey, was the first to mention disability. However, this census asked no details about individual disabilities. Therefore, the 2000 census did not significantly contribute to the bank of data on this issue. The joint lack of awareness is also experienced by the families of children with disabilities, leaving most without suitable knowledge and skills to carry out basic daily tasks or have social interaction with others. Thus, few children with special needs have been encouraged to participate in the society and strive for independence.

When considering the high percentage of individuals with disabilities in Turkey (12%), educational attainment for these individuals is extremely low (State Institute of Statistics [SIS], 2002). The percentage of primary school graduation is as low as 40%. The percentage decreases drastically as the grade level increases. Unfortunately, less than 3% of individuals with disabilities earn a high school diploma (SIS, 2002). This trend continues in higher education. According to data from the Student Selection and Placement Center (2003, 2008), of all students who take the university entrance exam, only 0.08% are disabled.

Special Education in Turkey
The history of special education in Turkey dates back to 1951, when the Ministry of National Education took responsibility for providing education for those children in need of special education (Organization for Economic Co-Operation and Development [OECD], 1995). In 1982, the Turkish Constitution outlawed any kind of discrimination, advocating equal rights for all citizens and clarifying that those individuals with disabilities should share the same statutory entitlement and curriculum (Sari, 2000). As a result, the Ministry of National Education provides free primary education and also supplements and aids private and corporate initiatives to meet the needs of all children. According to The Turkish State Planning Committee report ([SPO], 1992), the country's goal is to reach the status of developed countries, by building on ideas from other countries and generating a model suited for Turkey. However, new laws and directives from lawmakers mean little unless accompanied by implementation in the classrooms and homes of those living with disabilities. As an example of this disconnect between policy and practice, the last 40 years have seen a limited amount of specialized equipment being provided to special schools (SPO, 1992).

Unlike primary and secondary education, majority of students with disabilities did not receive official support from federal government for higher education until 2005 (Prime Minister Administration for Disabled People, 2005; Article 15). A new approved legislation requires that each university maintain a support unit for students

with special needs (Prime Minister Administration for Disabled People, 2005; Article 8). However, only a few universities have established such a unit to help those students with disabilities. Accordingly, some universities have established a system to support students in their academic endeavors. Although such initiatives assist students as they overcome many technical difficulties, it may also create an added social barrier; as these students would have limited opportunities to interact with students who do not have a disability (e.g., isolation). Furthermore a greater or lesser degree of dependence on the helper can develop (Mittler, 2000; Westwood, 1997).

Assistive Technologies

As part of these initiatives, assistive technologies have become important. Assistive technologies are defined as the technologies or applications (hardware or software) that are specifically developed to assist individuals with disabilities in overcoming barriers (Forgrave, 2002; Rose, 2001). Assistive technologies can help people with disabilities maximize potential and the ability to achieve individualized educational objectives (Ashton, 2002). In educational settings, these technologies help students to access and share information (Hofstetter, 2001; Seegers, 2001), complete school work independently (Seegers, 2001), provide an environment for socialization (Neumann & Uhlenkueken, 2001), and help students with disabilities become prepared for future work (Hofstetter, 2001). Unfortunately, most assistive technologies and internet resources are not accessible to individuals with disabilities, many who want to use these technologies (Ozel, Inan, & Sezer, 2004). Rose (2003) proposed that "We need to use the new technologies not only to overcome existing barriers to learning, but to design an environment for learning that have fewer barriers right from the start "(p. 65).

METHOD

The Purpose of the Study

The purpose of the current study was to investigate technological needs for university students with disabilities and examine how such assistive technology could help these students obtain equal opportunities in their pursuit of higher education. In addition, student attitudes toward computer technology were be assessed. The focus of the study centered around the following areas:

- The type and extent of technologies that are currently being used by students with disabilities
- The barriers that impair students with disabilities in utilizing this technology
- Available technologies and facilities for students with disabilities
- Perception and disposition of students with disabilities toward computer technology

Participants

The participants of this study were students pursing higher education degrees (i.e., undergraduate, graduate) in Ankara, Turkey. A total of twenty-two students with disabilities from private and public universities in Ankara, Turkey, participated. The majority of students were female (N=17) and were pursing undergraduate degrees (N=19). The ages of participants ranged from 18 years to 28 years. Most of the students (N=16) were members of several communities and associations that provide services for people with disabilities. The majority of participants were visually impaired.

Table 1 Participant by Demographic Characteristics

	N	%
Gender		
Female	17	77.3
Male	5	22.7
Age		
15-19	4	18.18
20-24	15	68.18
25-29	3	13.64
Education Level		
Undergraduate	19	86.4
Graduate	3	13.6
Types of Disabilities		
Vision	11	50.0
Hearing	4	18.0

Orthopedic/ Mobility	4	18.0
Others	2	9.0
Professional Memberships		
Yes	16	72.7
No	6	27.3

Data Collection and Instrument

An adapted version of the Technology for Students with Disabilities Survey ([TSDS], Ozel, Inan, & Sezer, 2004) was used for data collection. The TSDS consists of five main parts: (1) demographic characteristics, (2) technology status, (3) student perception and disposition toward computer technology (e.g, knowledge/skills, beliefs, attitudes, social norms, access), and (4) suggestions and recommendations. The first section of the TSDS consisted of 10 demographic questions (e.g., gender, age, and department). The second part included a total of 23 questions designed to gather information about student technology use and experiences. The third section was made up of 28 Likert-type items regarding student knowledge and abilities, belief, attitude, social norms, and availability and support for computer technology. The final section collected, participants 'suggestions and recommendations for technology use in education.

Volunteer participants for this study, all students with disabilities, were recruited through email and telephone calls. The questionnaire was directly administrated to each of the participants by one of the researchers. The data obtained from this questionnaire was analyzed using various statistical techniques which included correlation, frequencies, percentages, means and standard deviations.

FINDINGS

University Facilities for Students with Disabilities

As demonstrated in Table 2, limited school facilities for disabled students are accompanied by a severe lack of necessary faculty orientation or training in regard to teaching students with disabilities. Additional facilities, when available, were ill-equipped to address student instructional needs. More critically, the schools had failed to provide equal opportunities to those students with special needs while taking course exams. Even so, it is promising that almost one-half of the students surveyed had the opportunity to use a computer reserved for special needs students.

Table 2 Availability of facilities for students with disabilities (N= 21)

Facilities and Activities	N	Availability (%)
Financial support available for students with disabilities	11	52.4
Computers reserved for students with disabilities	10	47.6
A special unit for students with disabilities	9	42.9
A professional adviser for students with disabilities	8	38.1
Exam locations, time and conditions are suited to your needs.	7	33.3
Equipment is available for loan to students with disabilities	7	33.3
The university or department provides suitable equipment during exams	5	23.8
Measures have been taken to facilitate access for individuals with disabilities	5	23.8
The university has prepared an orientation program for students with disabilities.	3	14.3
Faculties are informed about the educational needs of individuals with disabilities	3	14.3
Counseling and advice services are offered to students with disabilities	4	19.0

Access and Use of Technology

All of the students indicated they had access to a computer either at home, school, or both. Additionally, the majority of students (N=13) preferred to use computers at Internet Cafés, which had internet access and special software installed. The frequency and percentage of students who had access to various technologies are

presented in Table 3.

Table 3 Availability and types of technologies for students with disabilities

	Only School		Only Home		Both	
Technologies	N	%	N	%	N	%
Computer	10	47.6	2	9.5	9	42.9
Internet	10	47.6	2	9.5	6	28.6
Special software	4	19.0	1	4.8	2	9.5
Reading aid	3	14.3	1	4.8	0	0.0
Speaking watch	2	9.5	6	28.6	0	0.0
Wheel chair	1	4.8	2	9.5	1	4.8
Hearing aid	1	4.8	1	4.8	4	19.0
Tape player, DVD player	1	4.8	12	57.1	6	28.6

The majority of students indicated that they used computers frequently and benefited from the use of the internet for communication (e.g., email). Approximately one-half of the students attended a special course to learn how to utilize assistive technologies in both their daily and educational life (see Table 4). In regard to the frequency of computer use, about one-half of the students used the computer more than ten hours per week. However, internet use was relatively low compared to the total amount of computer use reported by the students. This finding may be a result from either the high cost of internet access or the lack of special software for web browsers (e.g., screen reader).

Table 4 Frequency of Computer and Internet Use

	Computer		Internet	
	N	%	N	%
Never	0	0	2	9.5
0-3 hours	5	22.7	4	19.0
3-6 hours	6	27.3	7	33.3
6-10 hours	2	9.1	2	9.5
10 hours or more	9	40.9	6	28.6

Students used computers for various purposes. Writing and research were the most frequently identified purposes for computer use. Other frequently reported purposes were internet surfing, email, and instant messaging. Table 5 shows the percentage of activities, for which university students with special needs used computers.

Table 5 Purposes of Computer Use

Activities	N	%
Writing	19	86
Doing research	19	86
Surfing on the Internet	17	77
Reading and writing e-mail	13	59
Instant Messaging	13	59
Listening to music	11	50
Access to electronic journals and books	10	45
Watching Films	8	36
Playing games	6	27
Designing product/work	4	18
Programming	2	9
Others	2	9

Student Perception and Disposition toward Technology
Students' beliefs and attitudes toward computer technology were high. Unfortunately, students scored low on knowledge of computer resources and support available to them. To find out whether any correlation existed among these variables, pearson correlation coefficients were computed. The relationship between students' knowledge/skills and attitudes ($r(20) = .533$, $p = .016$) and social norms and beliefs ($r(38) = .511$, $p = .021$) were found to be positive and statistically significant. The correlation coefficients, means, and standard deviations of students' perception in five different scales are presented in Table 6.

Table 6 Correlations, Means, and Standard Deviation

Variables	1.	2.	3	4	5
1. Knowledge/Skills	1				
2. Beliefs	-.005				
3. Attitudes	.533*	.180			
4. Resources/Support	.198	-.008	-.019		
5. Social Norms	.202	.511*	.332	.298	1
Mean	3.78	4.23	4.04	3.44	4.29
SD	.59	.44	.58	.48	.56

DISCUSSION
The current study indicated that students with disabilities utilized technology for different purposes, such as writing and conducting research, when the resources and support were available. This finding is supported by Fichten et al (2001) and Goodman, Tieene and Luft (2002) which found that disabled university students frequently used computers and the Internet in their daily lives and for educational purposes. Students in these studies reported similar beliefs in the ability of computers to help with writing, overcoming barriers caused by specific impairments, organizing and promoting personal growth and independence. Nevertheless, students need access and adaptations (e.g., screen magnification, dictation software, Braille, screen readers) to use the computers effectively (Fichten et al., 2001). For this reason, universities should provide the necessary environment and software/hardware to enhance student access and effective computer use.

An interesting finding was the relationship among social norms and student beliefs. This relationship indicated that when students with disabilities received support and ecouragement from their peers, or witnessed the utilization of technology by others, their beliefs about what they could do with technology increased. Informing students with disabilities about computer technologies and/or allowing them to observe computer use by their peers might lead to an increase in their belief in their own ability to utilize technology. Goodman, et al. (2002) found the presence or lack of environmental support was an important factor in influencing a student's decision to adopt or reject a technology. Furthermore, Michaels, Prezant and Jackson (2002) emphasized that knowledge and awareness of assistive technologies among students with disabilities is a vital component in facilitating assistive technology use. The other relationship between student knowledge/skills and their attitudes suggested that when students have higher computer knowledge and skill, their attitude toward computer use increases. Therefore, training opportunities for students with disabilities on how to use computer technology would increase the students' attitudes. It might be ventured that when student belief and attitude increases, the likelihood of technology use increases.

CONCLUSION
The purpose of this study was to examine the needs and availability of assistive technologies for university students with disabilities. The study also explored student attitudes toward computers and the extent to which computers are utilized by students with disabilities. The findings indicated that, in academic settings, facilities for students with disabilities are limited. Although Turkey recognizes the rights of children with disabilities to receive a suitable (comparatively equal) education, the right to special education has not been upheld in practice as required by law (Sari, 2000). Unfortunately, most higher education institutions are not familiar with available technologies, nor the many ways these technologies can be applied (Ozel et al., 2004). So that accessible education is available to students with disabilities, several factors should be addressed, including: Trained staff to provide services for disabled students, knowledge and awareness of assistive technologies among students with disabilities, and support in the form of availability of these technologies from university administration (Michaels et al. , 2002). Unfortunately, the lack of knowledge and skills which are required to ensure the accessibility of electronic course materials for students with disabilities is a common issue amongst university

professors (Fichten et al., 2001). Therefore, in addition to accessibility, university faculty should be trained to meet the academic needs of students with disabilities (Senel, 1998).

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