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## The analysis of visually impaired individuals' expectations and tendencies of using digital media in the process of education in Turkey

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### Abstract

Together with the development of technology, we know that our lives have changed in many ways. One of the most affected and the changing process is education. In the education process, it is important to make sure that all members of society benefit from it. We also know that visually impaired individuals are an important part of our society. In Turkey, the use of virtual platforms in terms of education by this segment and improving themselves is considered important. The evaluation of the tendency of visually impaired individuals to use virtual environments is specially required for developing software applications the identification of these tendencies, evaluation and use in virtual applications is a remarkable work. Therefore, it is important to identify the difficulties and expectations that may occur while accessing information with virtual platforms. In this research, first visually-impaired individuals' tendencies to use technology was identified and later, the expectations and difficulties they face while using electronics and computer-supported platforms have been analyzed. Data was gathered through survey model in this research. During data collection phase, resulting from the tendency of impaired individuals to hide themselves. Snowball sampling method with 41 participants was applied through face to face and online query. The findings were analyzed with the Statistical analysis method and presented in the form of a table.

Keywords: Education, visually impaired people, e-learning.

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## 1. Introduction

In the 21st century, individuals have access to every aspect of life with the help of computers. Information on digital environments which are used by individuals need to be accessible and understandable by every member of the society.

These days, Internet technologies are developing at a very high speed and this means it can be evaluated as an alternative in the access to information and participation of visually impaired persons in education. Developments in information and communications technology underline the importance of the quantity of knowledge and access to it. The levels of independence and creativity of individuals is expected to increase. And this expectation necessitates the use of information and communications technology in education (Nart, 2007). Visually impaired university students face challenges in trying to access information during their study periods. These students, compared with other disabled individuals, have the need for more diverse and various information (Aydin, 2012). Environments of e-learning in higher education facilitate the participation of visually impaired students in their lessons.

The expectations of visually impaired students and students without visual impairment from computer assisted education are different. As students with visual impairments or sight defects regard sound as their best means of learning, they depend upon computers, consequently, software that will help them effectively use computers (Uzun, 2007). Web technology applications in education are on the rise these days. Unfortunately, growing design of multimedia-based instruction's contents are not increasing at the same rate with respect to visually impaired individuals (Gulen, 2012) & (Buzzi, 2012) It is said that learning tools or advanced assisting technologies (such as voice readers, speech synthesisers and keyboards) are generally not designed to be effectively used by visually impaired users. For instance; the misappropriation and difficulty of simultaneously editable documents to the visually impaired, the in-accessibility of formatting tool boxes and other interactive elements (like menus) or list of documents can be mentioned.

Getting rid of the obstacles that visually impaired individuals encounter while using the Internet; ensuring their more active participation in education or work life has become an area where researchers from other fields have become interested in and where they also developed projects. For instance, DICOMP TRANSFER project which was supported by the subcommittee of European Union's Education and culture under the theme of Lifelong Learning program, which took place between November 1st 2009 to 31st of October of 2011 had aimed to develop a free of charge screen reader that would be used for reading or converting internet or electronic documents in the languages of the participant countries. At the end of the project a screen reader named Thunder Screen reader was presented for use in 12 languages at this, <http://www.screenreader.net/index.php?pageid=15> web address (ADAM, 2012).

In this work, we have tried to identify the challenges and expectations of visually impaired individuals encounter when trying to access information in digital environments and also in their tendencies and habits of using digital environments. The purpose of this research is to study the tendencies and habits of visually impaired students' usage of digital environments during education periods in Turkey. The sub purposes developed to attain this purpose are listed below:

1. What is the situation of visually impaired individuals' access to digital environments?
2. What are the purposes of using Digital environments?
3. What are the problems they face when trying to use Office programs (the likes of Word, Excel, PowerPoint) on computers?
4. Where do they connect to the Internet?
5. What problems do they face when surfing the Internet?
6. What are their resources when trying to access information?
7. What problems do students face when trying to access information
8. Do visually impaired students get assistance from their surroundings when using digital environments?

At the end of this research, the factors affecting the tendencies of visually impaired individuals' usage of digital environments are sequentially sorted and evaluated using Fishbone diagram. The use of new communication technologies in the process of education and training is advantages to all, disabled or otherwise. However, it is important to transform digital resources to be appropriately accessible. The pursuit of educational and training periods becomes easy for every individual including disabled.

## 2 Method

### 2.1. Model of the research

In this research, a survey model was used while analyzing the challenges encountered by visually impaired students when using digital environments in trying to access information. Survey model describes past or present situations as they are. It in no way tries to change or affect the existing situation (Karasar, 1991). This research can be referred to when needed to study the problems visually impaired students face when using digital environments to access information.

### 2.2. Work Group

The work group of this research is composed of 41 visually impaired students from highschool, vocational school and universities in Kocaeli. Criterion sampling is used in this research from purposeful sampling methods (Patton, 1997). And the criteria here are visual impairment of the participant students. The work, for the easy accessibility of the researchers, was conducted with 41 students in Kocaeli. Personal information such as gender, age, level of study of students who took part in the research is given in Table 1.

**Table 1. Demographic Data related to the students**

Variables		Total(f)	Percentage (%)
Gender	Erkek Male	8	25.8
		23	74.2
Age	15-19	7	22.6
	20-24	8	25.8
	25-29	11	35.5
	30 and above	5	16.1
Level of study	High school	5	16.1
	Pre-university	2	6.5
	Undergraduate	22	71.0
	Graduate	2	6.5
condition of impairment	Limited vision	11	35.5
	No vision	20	64.5
Condition of making Color and light distinction	Able to make out basic colors	7	22.6
	Able to read big texts	4	12.9
Color and light distinction	Perceive light	9	29.0
	Make no distinction	11	35.5

When looking at Table 1, it can be see that 74,2 % of the participants in the research are male and 25.8% of them female. 35.5% of them are between the ages 25-29, 16,1% of them are 30 and above.71,0% of them are undergraduate students and 6,5% of them are pre-university or postgraduate students. 64.5 % of them have no vision at all while 35.5 % have limited vision. When studying their abilities to differentiate color and light; 35.5% of them can't differentiate color and light

at all; 29.0% of them can perceive light; 22.6% of them could differentiate between basic colors; and 12.9 % of them can read big texts.

### 2.3. Data collection tool

In order to identify the problem stated in the purpose of the research, first literature review was done. Later, a form was prepared by the researchers. In the form developed to study the expectations and problems faced by visually impaired students in digital environments, firstly questions relating to their demographic information, education information and their status of disability were given a place in the questionnaire. In the form developed, questions related to efficiency of using information technology are also found. The final forms of the questions in the questionnaire were prepared consulting two lecturers from computer engineering, lecturers from computer and instructional technologies department, informatics department and communications faculty.

### 2.4. Data analysis

In order to determine the range of characteristics of the participants frequency (f) and percentage(%) from descriptive statistics is referred. The data analysis is done with SPSS 20 packet program. As a result of the answers visually impaired students have given to the questions in the questionnaire, the expectation and problems in schools, in lessons, and in applications pertaining to lesson evaluation during education and training periods have been tried to be identified.

## 3. Results

Information related to the status of visually impaired students' access to digital environments is given in Table

**Table 2. Information related the condition of disability and the status of using assistant technologies by students participating in the research**

Variables		Total (f)	Percentage (%)
Whether or not they have taken training related to their condition in special schools	I haven't been educated	6	19.4
	I have been educated at a special school	22	71.0
	I have attended a course	2	6.5
	I have taken training at a rehabilitation center	1	3.2
The status of using assistat technologies when using computers	I use	29	93.5
	I don't use	2	6.5
The status of using computer technologies	Computer	29	93.5
	Tablet or smart phone	28	90.3
	Sound recorder or listening tools scanner(book reading machine)	19	61.3
	Uses none	3	9.7
		-	-

When studying Table 2 it can be seen that most of the disabled students (71 %) have been educated in special schools relevant to their condition of disability. 93.5 % of the students use assistant technologies when using computers. It is also be seen that the most used devices from information

technology tools are computers (93,5 %), tablet and smart phones(90,3 %). On the other hand, they have stated that they don't use scanners (book reading machines) much.

### 3.1. Their purpose of using digital environments (Such as tablet, computers)

Information related to visually impaired students' of purposes of using digital environments is given in Table 3.

**Table 3. Information related to the purposes of using digital environments by students participating in the research**

Purposes of using digital environments	Total (f)	Percentage (%)
Communication	28	90.3
Research	27	87.1
Entertainment	24	77.4
information	28	90.3
Voice readers for texts	26	83.9
to use Office programs	25	80.6
Send e-mails	27	87.1
to surf the internet	25	80.6
to use social media	24	77.4
to listen to music	25	80.6
to listen to movies	26	83.9
to play games	13	41.9

It can be observed that the purposes of using technology by the participant students is mostly communication(90.3 %), information(90.3 %), research(87.1 %) and to send e-mails(87.1 %).It can also be noticed entertainment (77.4 %), voice readers for texts(83.9 %), Office programs(80.6 %), surf the internet(80. 6 %) and social media(77.4 %) purposes are also high.

### 3.2. The problems they faced when using office programs (Such as Word, Excel, Powerpoint) on Computers

Information related to the problems students face when using office programs (Word, Excel, Powerpoint) on computers are given place in Table 4.

**Table 4 Information related to the problems faced by participant students when using office programs on computers**

The problems the faced when using office programs	Total(f)	Percentage (%)
Sound inavailability	6	19.4
The lack of explanative texts next to images	17	54.8
The incompatibility of office programs with screen reading programs	6	19.4
Having a lot of images while using office programs(Word,Excel,Powerpoint) on computers	6	19.4

When studying table 4, it can be seen that the biggest problem students who took part in the research face when using office programs on computers is the lack of explanative texts next to images (54,8 %). In addition, 19.4 % of the students stated that sound inavailability, the incompatibility of office programs with screen reading programs and having a lot of images while using office programs have made it difficult to use office programs.

### 3.3. Places where they connect to the Internet

Information relating to the places where students connect to the Internet is given in Table 5

**Table 5 Information relating to the places where students connect to the Internet**

Places connected to the Internet	Total (f)	Percentage (%)
Home	27	87.1
School	9	29.0
Internet cafe	9	29.0
Mobile devices	4	12.9

As seen from Table 5 students prefer to connect to the internet from home (87.1 %). It is also observed that students don't prefer to connect to the internet from their mobile phones (12.9 %)

### 3.4. The problems they face when surfing websites

Information related to the problems students face when surfing websites are given in Table 6.

**Table 6 Information related to the problems participants students in the research faced when surfing websites**

Problems encountered on websites	Total (f)	Percentage (%)
The lack of explanative texts for graphics(images, buttons) when surfing websites	27	87.1
The lack of explanative links for tags on websites	21	67.7
The presence of web items that aren't perceived by screen readers	25	80.6
The lack of sound for security codes	27	87.1
Buttons not having titles	26	83.9
The lack of audible features on web pages	10	32.3
The lack of explanative texts for forms and tables	15	48.4

When studying the problems students face when surfing websites, 87.1 % of the problems occur due to the lack of explanative texts for graphics(images, buttons) and sound for security codes. They have also expressed that the presence of web items that aren't perceived by screen readers(80.6 %) and buttons not having titles(83.9 %) as problems they encountered.

### 3.5. Access to information resources

Information related to students' resources for accessing information are given in Table 7

**Table 7. Information related to research participant students' resources for accessing information**

Access to information resources	Total (f)	Percentage (%)
Library	26	83.9
Newspaper	26	83.9
Social Media	27	87.1
Blog	27	87.1
Magazine	26	83.9

80 % of the students have stated that they use libraries, newspapers, social media, blogs and magazines as their resources for access to information.

### 3.6. The problems encountered when accessing information

Information related to the problems students face when accessing information is given in Table 8

**Table 8. Information related the problems faced by participant students of the research**

The problems encountered when accessing information	Total (f)	Percentage (%)
No Braille printers	6	19.4
Hand-written texts aren't readable	11	35.5
Sound documents don't exist	8	25.8
Reading voice programs don't exist	5	16.1

When looking at the problems faced by students when accessing information, 35.5 % of them have expressed their inability to read hand-written texts, 25.8 % of them stated the lack of Braille printers, 16.1 % of them noted the lack of sound documents as the problems they faced when trying to access information

### 3.7. The condition of getting assistance when using digital environments

Visually impaired students were asked if they get assistance when using digital media and the results are given in Table 9.

**Table 9 Information on whether or not research participant students get assistance when using digital environment or not**

The condition of getting help	Total (f)	Percentage (%)
I get no assistance	15	48.4
Empty	6	19.4
Family members and friends	10	32.2

Visually impaired students were asked whether they get assistance when using digital media or not; 48.4 % of the students said they didn't get any assistance where as 32.2% of the students stated that they have gotten assistance from family members and friends.

## 4. Result and Discussion

In the research conducted, the problems and habit of visually impaired individuals when using digital environments in trying to access information were analyzed. The tendencies and problems of 41 students who are studying at high school, vocational school, and university levels in Kocaeli were asked questions in the form of questionnaires. Students use assistant technologies when using computers (93,5%).It can be seen that they mostly use computers (93,5 %), tablets and smart phones(90,3 %) from information technological devices. On the other hand, they have stated that they don't use scanners (book reading machines) much (9,7 %). When using digital environments 48,4 % of the students said they didn't get any assistance where as 32,2% of the students stated that they have gotten assistance from family members and friends.

From the research it can be observed that the purposes of using technology by the participant students is mostly communication (90,3 %), information(90,3 %), research(87,1 %) and to send e-



mails(87,1 %). It also draws attention to see entertainment (77,4 %), voice readers for texts(83,9 %), Office programs(80,6 %), surf the internet(80. 6 %) and social media(77,4 %) purposes being high. Students have expressed that one of the biggest problem they face when using office programs on computers is the lack of clear texts next to images (54.8 %).In addition, 19.4 % of the students stated that sound inavailability, the incompatibility of office programs with screen reading programs and having a lot of images while using office programs have made it difficult to use office programs.87.1 % of the students prefer to connect to the internet from home It is also observed that students don't prefer to connect to the internet from their mobile phones(12.9 %). 87.1 % of the students stated the problems that occur when students surf websites is due to the lack of explanative texts for graphics(images, buttons) and sound for security codes. They have also expressed that the presence of web items that aren't perceived by screen readers (80.6 %) and buttons not having titles(83.9 %) as problems they encountered. When looking at the problems faced by students when accessing information, 35.5 % of them have expressed their inability to read hand-written texts, 25.8 % of them stated the lack of Braille printers, 16.1 % of them noted the lack of sound documents as the problems they faced when trying to access information.

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