

Views of students with visual impairment on distance education during the covid-19 pandemic

Research Article

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Abstract: This study investigates the views of students with visual impairments on distance education during the COVID-19 pandemic. The research design of the study is qualitative research. The participants of the study include students with visual impairments. They are studying at different universities where distance education was offered in the fall semester of 2020 in Turkey. We collected the data of the study through a semi-structured interview form. In the analysis of the data collected, content analysis was carried out. According to the results, it has been determined that distance education during the COVID-19 pandemic has both advantages and disadvantages. The benefits of distance education are that the system and course contents used are accessible, the course contents can be listened to again, it is physically easy to listen to the lesson, the evaluations are made in the form of assignment, additional time is given and communication with the instructors is easily facilitated. The disadvantages stated by the students can be as follows: factors related to the distance education system, factors related to the content, aspects concerned with in-term assignments, factors related to exams, psychological and social factors, and communication-related factors.

Keywords: *Students with visual impairment; Distance education; COVID-19; Special education*

Introduction

COVID-19 was first identified in December 2019 in Wuhan, the capital of China's Hubei province, and has since spread globally. Then, the World Health Organization (WHO) declared COVID-19 as a pandemic (World Health Organization [WHO], 2020). Since late January 2020, the world has been trying to deal with the COVID-19 pandemic. The COVID-19 pandemic has affected many areas that directly concern human life, such as health, culture, economy, education and social life. After the health sector, the education sector is one of the most affected by the COVID-19 pandemic (Telli Yamamoto & Altun, 2020). Specific studies are carried out to adapt to the new order caused by the COVID-19 pandemic. For example, the COVID-19 pandemic has affected educational systems worldwide, leading to the widespread closures of schools and universities. According to UNESCO monitoring, many students have been affected by school closures in response to the pandemic (UNESCO, 2020). With students, teachers and administrators, the field of education has also been affected by the COVID-19 pandemic and has tried to transform itself in this period (Cakin & Kulekci

Akyavuz, 2021). In the COVID-19 pandemic, the rapid transition to distance education in higher education has forced instructional strategies to develop (Yılmaz Ince et al., 2020). The pandemic has caused many unexpected higher education changes (Yucesoy-Ozkan et al., 2020). New systems and new approaches have been used in education. Distance education is one of these alternative systems (Dilmac, 2020). As a result, educational institutions such as schools and universities have switched to distance education to provide necessary infrastructure services. The use of several apps for distance education has also begun, such as Google Meet, Google Hangouts, Zoom, Cisco Webex, Bigbluebutton, Skype and Microsoft Teams (Telli Yamamoto & Altun, 2020).

There are many definitions of distance education from the literature. For example, researchers defined distance education as a method or model of teaching where students and teachers are physically separated (Kentnor, 2015; Yılmaz Ince et al., 2020). Other researchers described distance education as an education model that allows geographically distant learners to access the learning process (Moore et al., 2011). And, according to this model, pedagogical materials that are planned and developed by an educational institution are

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employed. Distance education is not a novel approach, and it dates far back in time. Especially nowadays, with the introduction of satellite and cable broadcasting, personal computers and the Internet, radio and television, distance education became an important instrument. Thus, the scope of distance education has expanded. Distance education can be held everywhere through technological connections without time and place limitation (Ilhan et al., 2021; Isman, 2011). The most crucial feature of distance education in learning is its flexibility (Bates, 2005). Distance education includes multidimensional operations such as programmed texts, TV, computer software and web-based learning. Also, distance education might be conducted either simultaneously or asynchronously.

There are many studies in the related literature on the advantages and restrictions of distance education. In this aspect, it can be stated that distance education has some limitations as well as benefits. One of the most critical advantages of distance education can be expressed as an absence of time and place constraints. In this aspect, distance education can make it possible to reach a wide range of students (Fedyinch et al., 2015), provides an equal opportunity in education (enhances learning opportunities), tries to eliminate obstacles through the means of communication uses and offers education to large masses (Dilmac, 2020). Additionally, distance education also serves the purposes of integrating instruction with technology (using technological developments), contributing to individual learning, removing barriers to access to information, facilitating collaboration and eliminating educational limitations. On the contrary, Valentine (2002) states that despite having several advantages, there are some problems in distance education, including the quality of instruction, cost and the misuse of technology. Also, absence or lack of social interaction in distance education may minimise the motivation and exchange of students (Ainoutdinova et al., 2017). Similarly, Mirkholikova (2020) asserts limited communication (face-to-face communication) as one of the disadvantages of distance education.

Several researchers have highlighted areas of potential benefits regarding distance education for students with special needs (Schuck & Lambert, 2020). However, students with special needs are among those who, even under the usual conditions of a university study, face significant barriers since the support and learning tools they need are not always available (Denisova et al., 2020). While this is the case, the questions of how and to what extent distance learning environments can improve students' learning processes with special needs are not clear (Okur & Demir, 2019). Considering the pandemic experienced at the international level,

students with special needs are at a higher risk in this period (Akca & Basgul, 2020). For example, students with special needs can be disadvantaged if they do not have the opportunity to participate in distance education. One of the student groups involved in this risk is students with visual impairments.

Thanks to today's developing technology, students with visual impairments can benefit from the services provided by information and communication technologies effectively using various software/hardware devices (assistive technologies). Some of these technologies are JAWS, NVDA, Windows Eye and Voiceover. These technologies can eliminate the difficulty of accessing computers and help improve the functions that students with visual impairments need while using computers (Bhavna et al., 2021). However, it can be claimed that the availability of these technologies does not necessarily guarantee a positive learning experience for students with visual impairments (Mokiwa & Phasha, 2012). In this context, distance education can facilitate the inclusion of students with visual impairments in classrooms of higher learning (Fichten et al., 2009). Additionally, distance education can play a critical role in offering these students access to education and learning materials (Mokiwa & Phasha, 2012). Jacko (2011) asserted that distance education could be a significant advantage for students with visual impairments. However, according to Liakou and Manousou (2015), distance education does not fully respond to the needs of these students. Distance education is not as usable or accessible for students with visual impairment as it is for sighted peers. The most important problems they faced in distance education are (Liakou & Manousou, 2015) the lack of access to graphic materials such as diagrams, charts etc., use of non-trustworthy supportive equipment, the lack of intermediary persons, the inability of libraries to address the demands, and the lack of educational personnel specialised on students with visual impairment.

In the literature, most of the research on distance education has focussed on general education students. Fewer studies have looked at the impact of distance education on students with visual impairments (e.g. Fitzpatrick & McMullen, 2008; Jacko, 2011; Liakou & Manousou, 2015; Mokiwa & Phasha, 2012; Pavithran, 2017; Tanyeri & Tufekci, 2010; Ucus, 2017). When current research is reviewed, for example, Liakou and Manousou (2015) aimed to define higher education standards for people with a visual impairment. Mokiwa and Phasha (2012) aimed to seek the learning experiences of the students with visual impairments who were registered at an Open Distance Learning institution. In another study, Pavithran (2017) identified the barriers

that blind and low-vision college and university students face when accessing online education courses. The literature has indicated that little thought has been given to asking students with visual impairments about their experiences in distance education. The need for more research on the extent to which distance education would be a useful tool for application in these students' learning is quite apparent. The need to identify the problems of distance education for students with visual impairments during the pandemic, which is so far lacking in the scientific literature, is the main focus of this research. In this context, this study aims to determine the views of students with visual impairments on distance education during the COVID-19 pandemic. With this aim in view, answers were sought to the following questions:

1. What are the views of students with visual impairments about distance education during the COVID-19 pandemic?
2. What are the difficulties experienced by the students with visual impairments in distance education during the COVID-19 pandemic?
3. What are the suggestions of students with visual impairments regarding achieving an increase in the quality of distance education during the COVID-19 pandemic?

Methodology

Research model

The research design of the study is qualitative research. Accordingly, the study was carried out with phenomenology, one of the qualitative research methods. This research model depicts an understanding of data based on the actual experiences of the participants. In other words, the phenomenology model aims to

reveal individuals' perceptions, their experiences and the meanings they attribute to phenomena and/or a case (Yıldırım & Simsek, 2014). The selection of the phenomenology model in this study is motivated by the need to try to obtain an in-depth understanding of the views of students with visual impairments about distance education during the COVID-19 pandemic. Also, it is the most applicable method in the investigation of phenomena of interest. The collected data of this study will be analysed with content analysis.

Participants

The participants of the study include students with visual impairments. They are studying at different universities where distance education was offered in the fall semester of 2020 in Turkey. In this context, we reached 10 students with visual impairments and interviewed them. It is seen that the students are not over the age of 30 years (the minimum age is 21 years), and the number of courses taken through the mode of distance education does not exceed 10 (at least 6 courses were taken). The majority of the students with visual impairments were male. The demographic information of the students with visual impairments is shown in Table 1.

Data collection tool

In phenomenology studies, data are generally obtained through interviews (Yıldırım & Simsek, 2014). Accordingly, we collected the data of the survey through a semi-structured interview form. For this, we prepared a question protocol in semi-structured interviews. Additional (sub-) questions may also be asked to the participants to deeply probe the topic under consideration (Cohen et al., 2007). Under this scope, researchers prepared the interview forms for students with visual impairments. The interview form consists of

Table 1. Demographic information of the participants

Student	Gender	Age (years)	Grade	Department	Number of courses
S ₁	Female	21	3	History Education	10
S ₂	Male	21	3	History Education	10
S ₃	Male	22	3	Science Education	9
S ₄	Male	30	2	Public Relations	6
S ₅	Male	27	4	Sport Sciences	9
S ₆	Male	21	2	Public Administration	8
S ₇	Male	28	3	Trainer Education	8
S ₈	Male	27	3	Sport Sciences	7
S ₉	Male	26	1	Public Administration	9
S ₁₀	Female	23	3	Music Education	9

two parts. In the first part, there are questions seeking to collect demographic information pertaining to the students with visual impairment (gender, age, grade, department, number of distance education courses taken and course names). The second part includes seven open-ended questions and additional (sub-) questions developed by the researchers. For this, the researchers first examined the studies in the literature on the subject of distance education. Then, they prepared draft interview questions to determine the views of students with visual impairment on distance education during the COVID-19 pandemic. Secondly, researchers designed an expert opinion form. It was arranged for that the interview questions would be evaluated by four experts, namely two specialists in special education, one expert in qualitative research and one specialist in computer education and instructional technology. The researchers made the final revisions on the interview questions in line with the opinions of the field expert. Finally, we conducted a pilot interview with a student with visual impairment, who was not included among the participants. Once the results of the pilot interview were obtained, we undertook the necessary actions to rectify the deficiencies and corrected the errors seen. Also, we revised some questions, thus finalising the form. Additionally, we realised the importance of the questions being asked by the same person during the pilot interview. For this reason, we decided to ask the questions in the same style and in the same order during the interview process. Thus, we aimed to minimise subjective judgements and the interviewer effect.

Data collection

Interviews were conducted online (via Zoom) to maintain social distancing, owing to the fact that the COVID-19

pandemic was ongoing during the research process. Accordingly, the researchers established contact by phone with the students with visual impairment deemed eligible to constitute the study's participants, and obtained information about whether or not they could participate in the study. An appointment was made for online interviews with the students who agreed to participate in the study. On the interview day, researchers invited the relevant students to the meeting by sending a Zoom link. Students with visual impairment were also present with the technologies they preferred for use in the distance education process (Table 2). Later, they entered the meeting using the incoming link and participated in the interview process. Students with visual impairment used technology for various purposes such as taking notes, seeing the screen and taking an exam in the distance education process (Table 2). Additionally, it is observed that students with visual impairment receive assistance from various people during the distance education process. For example, Table 2 provides an illustration of these aids and the respective purposes for which they were received.

The researchers interviewed 10 students with visual impairments, and completed the data collection process of the research in the academic year 2020–2021. They conducted interviews with students between the dates of 08/01/2021 and 11/01/2021. An in-depth interview was conducted for each student, and each interview session lasted between 25 min and 40 min. All the interviews were audio-recorded with permission from the students. Additionally, it was emphasised that the identity of the participants would be kept confidential, and they were also clearly informed that their answers obtained as part of the research would be used exclusively for scientific purposes. The researchers used nicknames instead of

Table 2. Technologies students with visual impairments need and use for effective acquisition of distance education

Technological tools	Computer	10	Technology purpose of use	To take notes	1
	Screen reader program	10		To take the exam	1
	Mobile phone	5		To see the screen	1
	Recorder	2		To attend the course	1
	Voiceover	2			
	Tablet	1			
	Magnifier	1			
Obtaining help from someone	From friends	2	Purpose of obtaining help	To access course content	5
	From someone who is sighted	2		To understand the usage of system	4
	From technical personnel	2		To upload files	3
	From husband or wife	2		To prepare tasks such as slides	3
	From brother or sister	2		To be sure of the work done	1

the actual names of the students. According to the order of interviews, they coded students as S₁, S₂, S₃ and so on.

Data analysis

In the analysis of the data collected, the researchers carried out content analysis. Content analysis is a method that is effective in classification and in comparing texts to make theoretical inferences (Cohen et al., 2007). The author G. transcribed all the data verbatim, which was followed by cross-checking of the tapes with the transcript to establish the accuracy of the information. Then, the researchers reviewed the interviews for the richness of information and variations. The views of students were examined in detail by the researchers. Later, they grouped the answers given by the students with visual impairment and presented some solutions in the same way. Then, the authors created themes and sub-themes. The first and second authors separately analysed the data and conferred to agree on the themes. After the first author coded one of the interviews in the study, another author independently coded the same interview. We resolved differences through discussion. As a result, we created codes reflecting the views of the students with visual impairment. We display these codes and categories in Table 3.

Table 3. Codes and categories obtained in the study

Code	Category
Positive Experiences	Distance Education System
	Course Content
	Assignment
	Evaluation
	Communication
Difficulties Experiences	Distance Education System
	Course Content
	Assignment
	Evaluation
	Psychological and Social
	Communication
Suggestions	Informing
	Distance Education System
	Course Content
	Assignment – Evaluation

Checking was employed by sharing the preliminary findings with the students. Also, the researchers have

taken some quotations from the expressions given by the participants. In other words, they supported the analyses by the direct views of the students. More than one person should evaluate data to increase the validity of qualitative research (Buyukozturk et al., 2015). For this reason, data obtained during the student interviews were cross-checked by two researchers. The researchers calculated the consistency of the analysis with the 'Reliability = Agreement/Agreement + Disagreement' formula (Miles & Huberman, 1994). They found the inter-rater agreement as a 0.91 coefficient. Miles and Huberman (1994) state that an inter-rater agreement of 370% is acceptable.

Findings

Some students with visual impairments expressed positive opinions on issues such as the distance education system, course content, assignment, evaluation and communication. The results obtained concerning the positive experiences of students with visual impairments in the distance education process are summarised in Table 4.

Table 4. The positive experiences of students with visual impairments in the distance education process

Category	Sub-category	f
Distance Education System	Use of the system provided by the university	8
	Accessibility of the system	8
Course Content	Accessible course contents	6
	Listening to the course contents again	6
	Comfortable in attending courses physically	3
Assignment	No problems with assignments	2
Evaluation	Preparing assignment	7
	Exams	7
	Additional time given in the exams	4
	No problem with exams	3
Communication	No problem with the communication with the instructor	2

Below are some excerpts from the expressions of the students with visual impairments. For example, about the accessibility of the system:

'Our system is easier to access. I like it in general.' (S2)

'I had no problems with the system.' (S10)

According to Table 4, six students stated that they

did not have any difficulties accessing the course contents. Two of them indicated that they did not have any problems with assignments and four with the exams. Samples from the students' direct expressions about the positive experiences in the distance education process are presented below:

'I can access the course content in general.' (S9)

'I have no problem accessing the course contents.' (S7)

Other issues for which the students expressed positive opinions were listening to the course contents again, being comfortable attending courses physically, having additional time and communicating. Sample expressions on listening to the course contents again are given below:

'It's good to listen to the lessons again. You can watch the lesson fifty times until that semester ends.' (S2)

'I'm looking at the record again. Play it for forty times. I think it's easy to take notes in this way.' (S3)

Comfortable in attending courses physically:

'Generally advantageous for me. It's good to have lessons from home in distance education.' (S6)

'Watching anywhere regardless of location. This is a great advantage.' (S7)

Additional time:

'I did not have any problem about the additional time.' (S1)

'They give additional time.' (S4)

Communication:

'They share some content whenever I want. There are phone numbers I can call and ask.' (S7)

In this study, six categories and their sub-categories emerged concerning the difficulties experienced by the students in the distance education process. We display the results in Table 5.

When Table 5 is analysed, it is seen that students with visual impairments have difficulties in the distance education process in terms of the distance education system, course content, assignment, evaluation and psychological, social and communicational issues. Additionally, there are sub-problems related to each

Table 5. The difficulties experienced by the students with visual impairments in the distance education process

Category	Sub-category	f
Distance Education System	System problem	5
	Incompatibility problem with the screen reader program	5
	File upload difficulty (drag and drop)	4
	Connection problem	3
	System access problem	3
	Technical support issue	3
Course Content	Visual content access problem (e.g. picture, figure, PowerPoint)	9
	The problem of accessing course materials and resources	7
	Not verbally describing the content	4
	Noise problem	2
Assignment	Visual content preparation difficulty (e.g. assignment, slide, table)	7
	Submission of assignments via announcements	3
	Page layout problem	2
	No braille option	1
Evaluation	Additional time problem	6
	Assessment in the same way as sighted students	3
	Exam types	2
Psychological and Social	Socialisation problem	6
	Distractibility	4
	Dependence on someone else	3
	Low motivation	2
Communication	Failure to communicate with the instructors	6
	Instructors' attitudes	4
	Having problems with non-departmental instructors	4
	Being ignored by the instructors	2

case encountered. Below are some excerpts from the expressions of the students:

System problem:

'I don't think the infrastructure of our university is excellent. There is no alternative.' (S5)

Incompatibility problem with screen reader program:

'Screen reader program doesn't always work as intended. It is limited when it is not licensed.' (S5)

'The screen reader program doesn't read everything.' (S10)

File upload difficulty (drag and drop):

'There is a part called select files and drag and drop. I'm having trouble installing it there alone.' (S2)

'I can't do the drag and drop while uploading files.' (S3)

Connection problem:

'There are problems about connecting to the lessons.' (S2)

'There is an Internet problem. Most of the time, I disconnected from the lesson.' (S6)

Visual content access problem:

'The lessons are visual. It is also difficult to read the attached slides. Visual things are a problem for a student with visual impairment.' (S2)

'The screenshot is shared. I cannot see these slides. Everything visual is a problem for me. That's why the whole distance education is a problem anyway.' (S7)

The problem of accessing course materials and resources:

'When asked to research a topic, we may have problems in accessing resources.' (S1)

'There is a lack of material. Accessing information and accessing resources is a problem.' (S5)

Not verbally describing the content:

'The visual objects on the screen are not described to us.' (S5)

Noise problem:

'Our instructor gives the lesson at home. Then I don't understand at all.' (S6)

'Sometimes too much sound is heard from the outside. This is also difficult for us.' (S7)

Visual content preparation difficulty:

'They are asking us to observe the assignments and do the assignment with pictures.' (S2)

Page layout problem:

'My only problem when preparing homework is the style. Page layout is a problem. I find it difficult to do stylistic things.' (S4)

Submission of assignments via announcements:

'The biggest problem is that they make written announcements of the assignment.' (S6)

Additional time problem:

'There is a problem about time.' (S2)

'Time is not enough for me. They do not give additional time.' (S8)

Exam types:

'Sometimes it is difficult to write in written exams. It is difficult to look at the keyboard or open JAWS.' (S3)

Assessment in the same way as sighted students:

'Our instructors consider us equal with the others.' (S2)

'They take the general as the basis and compare us with those who are sighted.' (S5)

Low motivation:

'Our motivation is shallow. Therefore, this process was not good for us.' (S5)

'I lost my motivation. This process made us unhappy.' (S7)

Distractibility:

'When we look at the distance education process, it is not as good as face-to-face education. It is not as efficient as face-to-face education for us. We get distracted, for example.' (S2)

Socialisation problem:

'The biggest disadvantage is that it takes away our social environment.' (S6)

'The biggest disadvantage was that distance education kept us at home and we became antisocial. I got away from my friends.' (S10)

Dependence on someone else:

'Distance education, when I look at it from my point of view, did not give me good things. I am dependent on my family again. I think that is the biggest damage to me.' (S8)

Failure to communicate with the instructors:

'The instructors are hard to reach. Sometimes there is a problem with the instructors; you cannot have a dialogue.' (S5)

Instructors' attitudes:

'In face-to-face education, the instructors were more understanding, and there were alternatives. Now there are no such things.' (S5)

Having problems with non-departmental instructors:

'The instructors in the other department have never seen me. They do not know me. These cause problems for us.' (S2)

Being ignored by the instructors:

'In distance education, instructors do not see and ignore us.' (S1)

In this study, four categories and their sub-categories emerged concerning the suggestions of students with visual impairments on the distance education process. The results are shown in Table 6.

When Table 6 is analysed, it is seen that students with visual impairments have suggestions on the distance education process in terms of informing, distance

Table 6. Suggestions of students with visual impairments on the distance education process

Category	Sub-category	f
Informing	Training of instructors	9
	Training of students with visual impairments	6
Distance Education System	Providing technical tools and equipment	5
	Solving connection problems	3
	Use of alternative systems	3
	Fixing file upload system	1
	Giving resources before the course	6
Course Content	Braille content delivery	3
	Use of alternative methods	7
Assignment – Evaluation	Paying attention to individual features	6
	Time reminder	3

education system, course content and assignment-evaluation issues. There are also sub-recommendations for each offer. Below are some excerpts from the expressions of students:

Training of instructors:

'I wish the instructors were informed, especially with pieces of training about what they would do about us.' (S4)

Training of students with visual impairments:

'They should have given us information about the access to this system, maybe a training. If the distance education would take this long, we should have been given training on these systems.' (S8)

Solving connection problems:

'Universities resolve problems related to the internet need to, they need to provide unlimited internet. When I finished my internet package, I use my mother's and my father's.' (S8)

Providing technical tools and equipment:

'Council of Higher Education can give us computers with JAWS installed. This situation is our biggest problem.' (S4)

Use of alternative systems:

'Universities could offer alternative programs to students.' (S5)

'The infrastructure should allow the use of few programs. Everything is very limited in this way.' (S7)

Braille content delivery:

'Universities should provide braille books.' (S6)

'Council of Higher Education could have printed the textbooks for us in braille.' (S10)

Giving resources before the course:

'Instructors should upload the resources in the Word

format and send us the visuals they will use in the lesson beforehand.' (S9)

Paying attention to individual features:

'There can be individuals with different features in the classroom. It will be more efficient for teachers to teach their lessons by considering inclusive education. If attention is paid to such things, everyone will be equal.' (S1)

Use of alternative methods:

'Assignments can be requested from us in the Word format without pictures. We can be allowed to shoot videos and tell verbally.' (S5)

'At least instructors can prepare separate questions for us. Instead of being exempt from the visual, questions equivalent to the given visual can be prepared.' (S4)

Time reminder:

'It would be nice to have an audible reminder of the last minutes on the exam screen.' (S3)

Discussion

This study investigates the views of students with visual impairments on distance education during the COVID-19 pandemic. In this context, the researchers interviewed 10 students with visual impairment. In the data analysis, they used content analysis and developed categories from the answers. Then the results obtained were presented in tables and with selected excerpts.

According to the findings, the researchers determined that distance education during the COVID-19 pandemic has both advantages and disadvantages. In line with the opinions received from the students with visual

impairments, distance education has some advantages. These advantages are that the system and course contents used are accessible, the course contents can be listened to again, it is physically easy to listen to the lesson (regardless of the time and place), the evaluations are made in the form of homework, additional time is given and communication with the instructors is readily facilitated. By examining various studies in the literature that pertain to distance education, the following essential advantages also become available for consideration: being able to teach regardless of time and place (e.g. DeNeui & Dodge, 2006; Dilmac, 2020; Horspool & Lange, 2012; Katane et al., 2015; Oliveira et al., 2018; Ozdogan & Berkant, 2020; Yolcu, 2020), the ability to watch course contents over and over (e.g. Ozdogan & Berkant, 2020; Yolcu, 2020) and diversity in access to information (e.g. Alpaslan, 2020; Oliveira et al., 2018). In addition to these studies, the students with visual impairments who participated in the study of Liakou and Manousou (2015) stated that everything could be done from home, resulting in a situation wherein the need to be physically present in the university did not arise; this same study also reported that fully accessible educational materials were provided to the students with visual impairments. Based on our analysis of the participants' responses, we infer that the results obtained from the present study are consistent with those drawn in various researches in the literature. In other words, the issues mentioned in the present study by the students with visual impairments as advantages in the distance education process are similar to those encountered in the literature. These advantages apply to students with visual impairment as well as all students involved in the distance education process. In distance education, all students derive the benefits we discussed above.

In the study, the disadvantages and difficulties stated by the students can be summarised as follows: (a) Factors related to the distance education system (limited system, connection problem, file upload problem, incompatibility with screen reading programs); (b) Factors related to content (problem of accessing visual content and resources, not describing the content, noise/sound); (c) Factors related to in-term assignments (requesting visual content, not having braille option, page layout); (d) Factors related to exams (additional time problem, to be considered the same with the sighted peers); (e) Psychological and social factors (low motivation, distraction, socialisation problem, dependency); and (f) Communication-related factors (failure to communicate with the instructor, instructors from other departments, being ignored).

Despite the distance education system being characterised by the difficulties mentioned above, most

of the students with visual impairments who participated in this study indicated that they received education through the distance education system provided by their universities. They primarily benefitted from some technologies for various purposes such as taking notes, taking exams and looking at the screen to participate in distance education. For example, in the present study, the researchers determined that all the students used computer and screen reading programs (e.g. JAWS, NVDA) in the distance education process. Additionally, they discovered that they used technological devices such as phones, voice recorders and tablets. Similar to this finding, in the study of Kalac et al. (2020), students with visual impairments preferred computer and screen reader programs to other technological tools in the distance education process. In the study of Bhavna et al. (2021), JAWS software is the most preferred assistive computer software used. Fichten et al. (2009) reported that almost all participants used screen reader programs. Therefore, it is normal for students with visual impairments to benefit from these technologies during distance education. However, it can be stated that these technologies do not necessarily guarantee a positive learning experience for these students (Mokiwa & Phasha, 2012).

Students with visual impairments may have problems with technological tools and the distance education system. This study observed that these students were having difficulties in the distance education process regarding approach, incompatibility with screen reader program, file upload, connection, system access and technical support issues. To elaborate, some of the students stated that they had connection (internet) problems, the distance education system was limited, there were no alternatives and they had difficulties obtaining technical support. Such situations can affect the learning experience of students with visual impairments. These factors can manifest as the problems encountered in the distance education process in general. These difficulties may be similar for all students participating in the distance education process, except for students with visual impairment. There are various studies on this in the literature. For example, similar to these results, it is stated in many studies in the literature that there are technical problems in the distance education process (e.g. Bakioglu & Cevik, 2020; Cakin & Kulekci Akyavuz, 2021; Dilmac, 2020; Ozdogan & Berkant, 2020; Tuma et al., 2021; Yolcu, 2020). Therefore, it can be said that the problems of the students with visual impairments primarily related to the distance education system, observed in the present study, are parallel to the findings in the literature.

In addition to the problems discussed above, students with visual impairment also encounter difficulties with screen reading programs and file uploads during the distance education process. The students reported incompatibility between screen reader programs and the distance education system as a problem. The screen reader program being unlicensed, it being unable to read everything that is present on the screen and the limitations encountered while reading are examples of these problems. Similar to these results, in the study of Ampratwum et al. (2016), the authors stated that students with visual impairments have difficulties in using the JAWS software. The researchers also explained that the JAWS software provided for the use of the students with visual impairment comprising their study's respondents was unlicensed and thus limited in its applications or functions. Kalac et al. (2020) reported that the students with visual impairments who constituted the respondents in their study could not access the content thoroughly because screen reader programs cannot read everything. The incompatibility created by the screen reader program, unreadable connections on the screen and the reading order of the links being narrated in an incorrect rendition are some of the issues mentioned by the students with visual impairment as the problems experienced by them (Menzi-Cetin et al., 2017). In another study, certain experiences of shortcoming with JAWS (e.g. software incompatibility) that were faced by students with visual impairment were emphasised (Mokiwa & Phasha, 2012). Summarising, it can be said that the results obtained from the present study are consistent with those drawn in the researches in the literature.

The screen reader program is the most common software for students with visual impairments. Students with visual impairments can benefit from the services provided by distance education effectively by using various software/hardware applications such as JAWS, NVDA, Windows Eye and Voiceover. These technologies can break the challenge of accessing and help students with visual impairments (Bhavna et al., 2021; Lone & Chawla, 2020). The fact that the students with visual impairments have problems with screen reader programs may negatively affect their computer use, especially their participation in distance education. Opinions in this direction have emerged from the students who participated in the study. Therefore, it can be said that these students have difficulties concerning the system and technical issues in the distance education process in general. This situation may lead to the limitation of the students' access to distance education content due to the inadequacy of the tools used (Kalac et al., 2020). By supporting these students effectively in their use

of computers, the effectiveness level of their distance education can be increased, and arrangements can also be made to provide technical equipment/hardware services for them. For example, some of the students who participated in the study suggested giving licensed screen reader programs. Liakou and Manousou (2015) reported a similar recommendation. However, it is necessary to solve the problems of connection (Internet), which is an essential factor for the students with visual impairments and almost all the students using the distance education system. Additionally, the use of alternative strategies and the procedures used or allowing the use of them may be beneficial for students with visual impairment.

It was observed in the present study that another factor that students with visual impairment have difficulty with in the distance education process is a communication problem, as well as psychological and social issues. The challenges experienced in line with the opinions received from the students can be summarised as follows: low motivation, distraction, socialisation problems, and inability to communicate with the instructor or limited communication. Various studies in the literature support these findings. This holds good especially when the recent studies are analysed; communication (e.g. Hebecci et al., 2020; Lall & Singh, 2020; Mirkholikova, 2020; Oliveira et al., 2018; Yolcu, 2020), distraction (e.g. Yolcu, 2020), limitation of socialisation (e.g. Fis Erumit, 2020; Yolcu, 2020) and low motivation (e.g. Bakioglu & Cevik, 2020) have been found. In the study conducted by Mokiwa and Phasha (2012), the authors stated that students with visual impairments lost their independence. It can be said that the problems faced during the distance education process by students with visual impairments who participated in this study are similar to those encountered in the literature. Also, these difficulties may be identical for all students participating in the distance education process, except for students with visual impairment.

In the present study, other issues that the students have difficulty with in the distance education process are course contents, assignments and exams. The students stated that they had difficulty in accessing visual course contents, course materials and resources. Additionally, they noted that the instructors did not describe the course contents. There were no braille options, there were problems with the page layout, there was difficulty in preparing visual content and no additional time was given. Liakou and Manousou (2015) pointed out the limitations that students with visual impairments experience with regard to material and communication. Kalac et al. (2020) reported similar

problems in a wide range experienced by students with visual impairments. They can list these problems as not accessing the course content, not describing the course contents, using visual content (e.g. slide, picture), and communication. Mokiwa and Phasha (2012) found that these students have problems accessing graphical materials and administering exams. Okur and Demir (2019) revealed that students with visual impairments have difficulties in symbol-based lessons. Similarly, in another study, the inability of students with visual impairments to access information about images such as pictures and posters was stated as a problem (Menzi-Cetin et al., 2017). Along with these studies, the difficulties faced by these students in the distance education process are summarised by Liakou and Manousou (2015) as follows: lack of access to visual materials (e.g. graphics, diagrams, charts), as well as lack of specialised staff, access to resources (especially library) and supporting equipment or material limitation. Based on these findings, it can be stated that the results obtained from this research support those observed in studies in the literature. Due to the nature of the visual impairment, these students use the sense of touch and hearing, along with their remaining vision, to collect information in their academic and daily lives (Haegele, 2015; Lieberman et al., 2014). For this reason, they need tactile and auditory materials and visual materials to participate in educational activities on an equal level with their sighted peers (Yalcin & Arslantas, 2020). Therefore, although the findings obtained from the research are not surprising, they show that adaptations for the needs of students were not made in the distance education process.

Some of the students participating in the study (e.g. S₅, S₇) emphasised that the distance education process is generally a problem for students with visual impairments and is not suitable. In line with this finding, Liakou and Manousou (2015) stated that distance education does not fully meet the needs of these students. Kalac et al. (2020) reported that students with visual impairments experience some problems in the distance education process. In another study, researchers stated that students with visual impairment have difficulties using information and communication technologies (Mokiwa & Phasha, 2012). Based on this, several measures should be taken to ensure that students with visual impairments participate in distance education more effectively and gain efficiency from this process. Within the scope of the study, another important finding obtained from these students is the suggestions to increase the quality of the distance education process. The students with visual impairments participating in the study made the following suggestions for a more efficient distance education

process: (a) Submission of braille content, (b) Receiving resources (course materials) or uploading to the system (especially in Word format) beforehand, (c) Training for students with visual impairments for the distance education process, and also training for lecturers, (d) Assignment and using alternative forms in exams (e.g. braille, oral exam), (e) Consideration of individual characteristics (e.g. ensuring equal opportunities) and (f) Description of visual content such as pictures, slides and tables. Consistent with these recommendations, students in the study of Kalac et al. (2020) made similar suggestions. These suggestions are briefly: (1) Uploading the course materials to the system to be accessed. (2) Use of videos, course contents, pictures, graphics, etc. (3) Equality of opportunity and provision of equal education quality. In another study, students with visual impairments suggested: (a) Receiving the content (e.g. book) in electronic media (especially in easy-to-read word/doc form with screen reader programs); (c) Consideration of individual characteristics, and suitable training for both students and educators; (d) Receiving the content in braille format (providing accessible material as an alternative); and (e) Having alternative examination methods (e.g. oral examination) (Liakou & Manousou, 2015). Pavithran (2017) emphasised that instructors should be adequately trained in developing accessible online courses, and institutions should provide necessary software for students with visual impairments.

Conclusion

It is known that the number of distance education applications has increased with the COVID-19 pandemic. This situation also brought some difficulties. Different needs of students with visual impairments have arisen because most of the distance education process is based on sighted students. Access to information comes first among these needs. Therefore, it is expected that applications that can solve such problems of students will be implemented. In this context, informing educators about the technological infrastructure used in the distance education process and applications that will support the access of students with visual impairments to all platforms, and training these students, especially on the use of auxiliary technological equipment, are seen as essential steps in improving this process. Additionally, it would be helpful to inform the instructors who teach students with visual impairment about the characteristics or education of these students.

Recommendations

This study settled that students with visual impairment experience various difficulties. Accordingly, universities, the Council of Higher Education and those who develop distance education policies should consider the challenges experienced by students with visual impairment. An effective implementation of distance education necessitates that, in addition to students with visual impairment, instructors responsible for training students with visual impairment, as well, be sufficiently informed of and prepared for these challenges. Additionally, as seen in this study, students with visual

impairment study in different departments. Therefore, the course contents, materials and teaching practices of each department may differ. Therefore, these features should be taken into account when working with students with visual impairment. In addition to these applications, it is possible to perform various distance education researches with students with visual impairment. For example, this research focussed on university students. One might research with middle school or high school students. Different dimensions of distance education can be dealt with. For this, quantitative studies with more students can be planned. Also requiring investigation is the effect of distance education on students with visual impairment or students' success in distance education.

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