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Distance Education Through the Eyes of Disabled Students and Their Teachers: Advantages, Problems and Suggestions

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Abstract: The purpose of this study is to examine the distance education experiences of visually, hearing, and physically disabled middle school and high school students and their teachers. A case study from the interactive designs of qualitative research methods was used and semi-structured interviews were conducted for data collection. The study group consisted of 10 physically disabled, 10 visually impaired, 10 hearing impaired students and 25 branch teachers enrolled in 18 middle and high schools in a large city in Turkey, totaling 55 people. Visually impaired students stated that they did not find online content sufficient, that their motivation decreased when they could not communicate face to face with their teachers and friends, but they found the course videos interesting. Hearing impaired students stated that they could not benefit from distance education because the voices of the students attending the live lesson were mixed and that they had difficulty in learning because the video lectures were not prepared in sign language. Students with physical disabilities find it advantageous to receive education comfortably from home, but they stated that distance education negatively affects their health. Teachers stated that there are various problems in distance education, as well as various advantages for students with disabilities. Distance learning has been found to offer limited advantages and more disadvantages for students with disabilities. In this context, comprehensive efforts can be made to address these disadvantages through suggestions submitted by students with disabilities and their teachers.

Keywords: distance education, e-learning, disabled students, teachers, middle and high schools

Highlights

- Distance education offers advantages such as creating time for visually impaired students to read books and making better use of Eğitim Bilişim Ağı (EBA).
- Distance education offers advantages such as providing hearing-impaired students and students with physical disabilities with more opportunities to interact with their teachers, spending more time reading books, providing the opportunity to receive education without leaving home, and creating more opportunities for individual online learning.
- In general, distance education for students with disabilities has disadvantages such as weak internet connection, communication with teachers', lack of motivation, and lack of technical equipment.

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Introduction

Distance education is an educational model that can be carried out in a virtual environment through correspondence, audio or video calls, independent of time and space, and where past information can be obtained at any time (Clark, 2020). Distance education, which is today's most promising and fastest growing educational system, provides individual or group learning in a virtual environment using electronic tools such as computers and smartphones. Distance education is an important educational model for individuals of all ages, with and without disabilities. Disability, which is a disease in medical science, can be defined as mental or physical deficiencies at a social level (Dominelli, 2021). In the age of developing technology, open and distance learning opportunities for vulnerable groups of people/students are increasing exponentially (Majeed, 2020). The rate of disabled individuals in society shows that attention should be paid to their education and investment should be made. According to UNICEF (2021), approximately 240 million children in the world are disabled. The physical difficulties, lack of time and cost problems that students with physical disabilities experience when they come to school can be eliminated by using computers or phones. Learning needs can be met with systems created with various software and hardware for students with visual and hearing impairments.

The Covid-19 pandemic has caused a sudden change in daily life worldwide (Papagiannidis et al., 2020; WHO, 2020). With such unpredictable situations, alternative education methods may be needed at all levels of education. The Covid-19 pandemic has affected students with disabilities the most in the global education system. Many studies have found that students with disabilities are negatively affected by the pandemic due to reasons such as intellectual development, healthy living, and lack of access to academic resources (DeMatthews et al., 2023; Hawamdeh, 2023). Distance education can be an excellent opportunity for students with disabilities as it provides flexibility, convenience and facilitates communication (Leporini & Buzzi, 2007). However, it is known that individuals with special education needs have cognitive, emotional, and behavioral problems. Considering the developmental characteristics of these individuals, it is clear that they have difficulty adapting to distance education (Schuck & Lambert, 2020). In the learning environment that emerged as emergency distance education during the pandemic, special education teachers did not have an alternative education plan because their teaching plans were designed for face-to-face education (Kritzer & Smith, 2020). In addition, the lack of a suitable learning environment at home, technical tools and equipment, and internet access are the main problems experienced by students with disabilities in distance education (Ayda et al., 2020). Regarding this situation, Krishnan et al. (2020) reported that 80% of children with disabilities could not continue their education under these conditions.

Emergency distance learning, developed to quickly respond to the negative impacts of the pandemic on educational environments, has become a concept that provides urgent and temporary solutions to disrupted educational activities. These temporary solutions can also be defined as bringing teachers and learners together in the same online environment in an unplanned manner using various communication technologies (Hodges et al., 2020). In this context, while distance education reflects planned, systematic learning and teaching activities, emergency distance education has emerged as an educational communication method born out of necessity brought on by the pandemic (Bozkurt et al., 2020). The challenges that educators faced during emergency distance education, such as developing digital content and using the right technologies, can be considered indicators that distance education is not ideal, despite its long-term appeal to all age groups and its established position within the educational community. Given that educational institutions have not previously faced a similar negative experience comparable to the pandemic, emergency distance education can be considered an educational tool that can be used solely to prevent disruptions in learning (Sangster et al., 2020). In this context, a study conducted by Akar and Yapıcıoğlu (2025) investigated how distance education was experienced by teachers during the Covid-19 pandemic period, and it was emphasized that the pandemic process increased the digitalization transformation in education in addition to the systemic problems it caused for students and teachers.

During the Covid-19 pandemic in Turkey, online content provided to primary and secondary school students and teachers via the “Eğitim Bilişim Ağı (EBA)” platform at www.eba.gov.tr has become a learning tool that contributes to distance education. The EBA system has modules such as a useful screen feature, a student-specific work schedule, videos containing course content, academic support for teachers, and a question-answer section. During the pandemic, course notes at all levels were shared with TRT EBA and EBA TV channels and broadcast at each grade level. Since no precautions were taken for situations such as the low attention levels of disabled students and long preparation times in distance education, the course duration, start and end times were carried out with programs that each student would comply with.

In Turkey, it is recommended that students with disabilities receive education at the same level as their peers and be able to interact (Fazlı, 2022) and special education classes, hospital classes, special education schools and rehabilitation centers are being put into operation. Since it was observed that EBA and EBA TV applications used in distance education in Turkey were inadequate for students with disabilities and that the video contents did not take into account individual differences (Mengi & Alpdoğan, 2020), system regulatory technical staff and teachers attempted to hold live lessons on the Zoom platform, which was expected to be more efficient in individual and collective communication. Language and speaking skills, analytical learning, applications to develop daily life skills for hearing impaired students, and special learning tools for visually impaired students have been uploaded to the EBA Library section. The lack of auxiliary programs in these applications that will allow students to use the Braille alphabet, which they can learn by touching objects in live lessons, or the lack of videos prepared in sign language for hearing impaired students has negatively affected their education. Given the importance of distance education in learning environments and its role as a preferred educational method when needed, this study considers the need to examine a number of issues to ensure that disadvantaged students can effectively benefit from distance education. The primary objective of this study is to determine the general opinions of middle and high school students with disabilities and their teachers about distance education. The specific objectives of the study are to analyze the advantages and disadvantages of distance education for students with disabilities and to offer recommendations for improving distance education among middle and high school students with disabilities and their teachers. It is expected that this study will benefit instructional designers, ministries of education, schools, and teachers.

The main objectives of this study are as follows:
1) To determine the general opinions of middle and high school students with disabilities regarding distance education.
2) To determine the general opinions of teachers regarding distance education of middle and high school students with disabilities.
The specific objectives of this study are as follows:
1) To analyze the advantages and disadvantages of distance education and present recommendations for improving distance education among middle and high school students with disabilities.
2) To analyze the advantages and disadvantages of distance education for students with disabilities and present recommendations for improving distance education among middle and high school teachers.

Literature

There are studies in the literature on distance education of individuals with disabilities, but there is no comprehensive study examining the views of students and teachers from different disability groups. For example, Alqraini and Alasim (2021) interviewed parents of hearing-impaired students to determine the difficulties encountered in distance education and support methods. As a result, they stated that families

should be informed and motivated in distance education. They also suggested that visual materials, subtitled videos, and sign language should be used to support learning in distance education for hearing-impaired students. Majeed (2020) examined the distance education of disabled university students in Pakistan. It was stated that disabled students were not satisfied with distance education and faced a lack of appropriate materials and technological tools.

This study, which is carried out with the principle of equal opportunities in education, is important in terms of finding solutions to the specified problems. In addition, the opinions and suggestions of disabled students are important in terms of transforming distance education into an alternative education method (Sonnenschein et al., 2022). In the study conducted to understand the distance education needs of disabled students, it was argued in interviews with ten primary school teachers that distance education should provide these students with the right to education. It was also argued that communication technologies that support direct interaction between teachers and students should be encouraged in distance education (Santamaria-López & Ruiz, 2023). It is suggested that teachers' thoughts on the contribution of distance education to students with disabilities will guide their teaching activities. In this way, a better distance learning environment can be designed for students with disabilities (Kinash, Crichton, & Kim-Rupnow, 2004). In general, more research is needed on how to include students with disabilities in distance education. New regulations should be made regarding assistive technologies to ensure that these students have access to the same educational opportunities as their peers and are successful in online learning environments. The absence of a program for students with disabilities in current curriculum causes them to fall behind in terms of knowledge and skills, and to learn course topics incompletely or late (Akbayrak & Ağar, 2021). It is thought that student opinions and suggestions are important in terms of transforming distance education into an alternative education due to the low perception skills of visually and hearing impaired students and the limited mobility of physically disabled students. In addition, teachers' suggestions on the problems they experience in distance education with disabled students and how the distance education design should be structured will be valuable. For all these reasons, it can be said that this study is of critical importance.

The research questions sought to be answered in this context are as follows:

- What are the general opinions of middle school and high school students with disabilities and their teachers regarding distance education?

o What are the advantages and disadvantages of distance education for middle school and high school students with disabilities?
o What are the suggestions for improving distance education from middle school and high school students with disabilities?
o What are the advantages and disadvantages of distance education from the perspective of teachers who teach students with disabilities in middle and high schools?
o What are the suggestions for improving distance education from teachers who teach students with disabilities in middle and high schools?

Methodology

Research Model/Design

In this study, the opinions of disabled students and their teachers who received distance education in middle and high schools were investigated using the longitudinal design of the case study, which is one of the qualitative research models. This study examined the views of students with disabilities and their teachers receiving distance education in middle and high school using a case study design, a qualitative research model. Merriam and Tisdell (2016) defined a case study as an in-depth examination and

description of a system with specific boundaries. The qualitative research design was used in this study because it provides an in-depth examination of the experiences and judgments of students with disabilities and their teachers regarding distance education, obtains comprehensive data, interprets these within the context of research problems, and clearly reveals individuals' thoughts and attitudes, thus eliminating a superficial examination of the subject (Merriam & Tisdell, 2016).

Data Collecting Tools

Data were collected in two stages. Pilot interviews were conducted in the preliminary study of the research, and real interviews were conducted with the participants in the second stage. Questions were determined by conducting a literature review for two separate structured interview forms created for disabled students and teachers. In addition, experts were consulted to determine the content of the semi-structured interview forms. The data collection tools were finalized with the results obtained from the pilot interviews and expert opinions. Some of the questions in the final student interview form are as follows:

- Did you have any difficulties while taking courses in distance education?
- Were there any advantages to taking courses in distance education?
- What would you say about your access to course materials in distance education?
- What would you recommend to teachers for better distance education?
- Can you summarize your distance education experience in one word or sentence? Why did you choose this sentence or expression?

In addition, some of the questions in the final teacher interview form are as follows:

- Can you summarize your distance education experience in one word or sentence? Why did you choose this sentence or expression?
- Have you experienced any technical issues while teaching distance learning? If so, can you share the reasons?
- Do you have any suggestions to improve the distance learning of your students with disabilities? Can you explain them?

Study Group

In this study, the purposive sampling method was used. The sample group of the study consists of 55 participants, including 10 physically disabled students, 10 hearing impaired students, and 10 visually impaired students, studying in 18 different secondary and high school institutions in a province in the east of Turkey, and 25 teachers from various branches who teach these students. In this study, disabled students who attended live lessons and teachers who taught lessons in a live lesson environment and shared homework and social activities on digital platforms were taken into account. In addition, ethics committee approval and parental consent forms were obtained for this study. Accordingly, the demographic characteristics of the participants are presented in Table 1 and Table 2.

Table 1. Demographic characteristics of disabled students participating in the study

Study Group			%	*f*
Student	Gender	Male	47	14
		Female	53	16
	Grade	6th grade	17	5
		7th grade	13	4
		8th grade	13	4
		9th grade	10	3
		10th grade	20	6
		11th grade	13	4
		12th grade	13	4
	Type of disability	Visually impaired	33	10
		Hearing impaired	33	10
		Physically disabled	33	10
	Disability level	Severely disabled	20	6
		Moderately disabled	50	15
		Mildly disabled	30	9

Table 2. Demographic characteristics of teachers participating in the study

Study Group			%	*f*
Teacher	Gender	Male	28	7
		Female	72	18
	Branch	Guidance	16	4
		Turkish language and literature	12	3
		Mathematics	8	2
		Special education	8	2
		Visual art	8	2
		English	8	2
		Philosophy	4	1
		Geography	4	1
		Accounting and finance	4	1
		Turkish	4	1
		Mapping and cadastre	4	1
		History	4	1
		Chemistry	4	1
		Social sciences	4	1
		Biology	4	1
		Science	4	1
	Type of school	Formal education school	64	16
		Special education school	36	9
	School level	High school	56	14
		Middle school	44	11

Data Analysis

In this study, conducted within the framework of qualitative research principles, the data were analyzed using the content analysis method. In the pilot interview, which was a preliminary study for the research, interviews with students with disabilities and their teachers were recorded using a voice recorder. The audio recordings were converted into text, the conversations were transcribed and coded into themes aligned with the research questions. The themes, which were checked for consistency with the research questions, were reclassified. Microsoft Excel was used to code the qualitative data in this way. After analyzing the pilot interviews, the data obtained from the face-to-face interviews were coded and analyzed separately for the students who constituted the research sample, into three categories: visually impaired students, hearing impaired students, and students with physical disabilities, and other category: teachers. The findings from the data analysis were presented in a clear manner by tabulating them numerically, and participant opinions regarding each data point were included. Microsoft Excel was used to code the qualitative data in this manner, and the entire data analysis took approximately one month to complete.

Validity and Reliability

To ensure the validity of the study, the sample group was diversified, and interview forms were prepared and administered separately for students with disabilities and teachers. The method used in the study and the reason for choosing this method are explained in relation to the literature. Furthermore, to ensure the validity of the data collection tool, the interview forms were developed based on data obtained from the pilot study and a literature review. To prevent data loss, the interviews were audio-recorded with the participant's permission.

To ensure the reliability of the study, data obtained from the interviews were compared with the research questions. Findings from the data analysis process were compared with the literature to identify similar results and limitations, and significant relationships were identified. The audio recordings from the interviews were listened to by the researcher and transcribed, and the analyzed data were reviewed by an expert. The data collection instruments were reviewed by a faculty member and a teacher specializing in special education. Based on the coding of the two researchers, Cohen's Kappa coefficient was calculated to ensure inter-rater reliability. In this direction, Cohen's Kappa value was found to be 0.83, and it can be said that inter-rater reliability was achieved (Viera & Garrett, 2005).

Research Procedures

Students deemed suitable to stay home entirely during the brief periods during which face-to-face education was interrupted due to the Covid-19 pandemic were interviewed by phone using interview questions, with permission from their parents and school administrators. Teachers deemed suitable to provide distance education from home during the pandemic were interviewed by phone using interview questions. This process was completed by visiting schools halfway through the academic year and conducting phone interviews. During the brief suspension of in-person education due to the Covid-19 pandemic, students deemed suitable to stay home entirely were interviewed using telephone interview questions with the permission of their parents and school administrators. Teachers deemed suitable to provide remote instruction from home during the pandemic were interviewed using telephone interview questions. This process was completed by visiting schools and conducting phone interviews midway through the academic year. This study includes the evaluation of distance education implemented in educational institutions during the global Covid-19 pandemic by students with disabilities and their teachers in Turkey. Therefore, the data obtained is limited to the experiences experienced during the pandemic and reflects the effects of distance education provided during this period on students with disabilities and their teachers. Interviews with hearing-impaired students were conducted face-to-face with the assistance of their sign-language teachers. A total of 55 interviews were conducted: 10 by phone and 45 in personel. These interviews were recorded on a voice recorder and later transcribed and analyzed.

Limitations

This study was conducted within the limitations outlined below. The study was conducted over the course of one academic year with students with disabilities attending middle and high schools in three central districts of a large city in Türkiye. The study included a total of 30 students with visual, hearing, or physical disabilities, and 25 teachers who teach students with disabilities via distance learning. The study was limited to a pilot interview with one student with multiple disabilities, one teacher, and one school administrator. Due to the Covid-19 pandemic, the interviews were limited to face-to-face and telephone interviews conducted in the school setting.

Findings

Disabled Students' Views on Distance Education

The opinions of disabled students on distance education are presented under three headings: visually impaired students, hearing impaired students, and physically disabled students.

Visually Impaired Students' Views on Distance Education

Table 3. General opinions of visually impaired students on distance education

Theme	Category	Code	*f*
General views	Positive	Being fun	1
	Negative	Being boring	5
		Difficult to learn information	2

The views of visually impaired students on distance education are given in Table 3. One of the visually impaired students expressed a positive view on distance education (Table 2). The view regarding this finding is as follows:
"Using the computer is very fun." (Student 4, Middle School, Male)
7 of the visually impaired students have negative views on distance education (Table 3). The view regarding this finding is as follows:
"Being at home all the time bored me; distance education was mostly bad for me." (Student 20, High School, Male)
"Even though I can see very little, everyone can see each other at school; I learn better at school." (Student 14, Middle School, Male)

Table 4. Advantages of distance education from the perspective of visually impaired students

Theme	Category	Code	*f*
Positive aspects of distance education	Advantages	Making time to read books	2
		To benefit more from the EBA system	1

The views of visually impaired students on the advantages of distance education are given in Table 4. Three visually impaired students stated the advantages of distance education as finding time to read books and benefiting more from EBA. Their views on this finding are as follows:
"It didn't help me because I can't look at the screen for a long time, but I created a program for myself to do my homework at home. I spend more time reading books and doing homework; my eyes are not affected much while reading." (Student 3, Middle School, Male)
"Distance education didn't help me much, but I saw that there were good videos on EBA and I benefited from them." (Student 4, Middle School, Male)

Table 5. Disadvantages of distance education from the perspective of visually impaired students

Theme	Category	Code	*f*
Negative aspects of distance education	Disadvantages	Poor internet connection in live classes	6
		Lack of communication with the teacher	3
		Unclear reading of text on the computer screen	3
		Occurrence of health problems	2
		Lack of technical equipment	1
		The short duration of the course	1

The views of visually impaired students on the disadvantages of distance education are given in Table 5. These disadvantages are the poor internet connection in live lessons, the inability to communicate with the teacher, and the inability to read the texts on the computer screen (Table 5). Their views on this finding are as follows:

"When the internet went out, I could not talk to the teacher and sometimes there was no sound." (Student 22, High School, Male)

"When I looked at the tablet too much, my eyes hurt from the rays. I never left the live lesson, but I had to rest my eyes during breaks." (Student 20, High School, Male)

"I did not have a tablet to connect to the live lesson. I could connect to the internet from my mother's and father's phones, but I had to wait for them to finish their work." (Student 1, Middle School, Female)

Table 6. Visually impaired students' suggestions for the development of distance education

Theme	Category	Code	*f*
Suggestions for improving distance education	Recommendations for implementation	Arrangement of starting times for classes	2
		Using blended teaching methods	1
		Improving screen settings	1
		Encouraging participation in live classes	1

Visually impaired students' suggestions for improving distance education are given in Table 6. These suggestions include arranging the start times of classes, using blended teaching methods, improving screen settings, and encouraging participation in live classes (Table 6). Their views on this finding are as follows:

"Live class hours can be arranged better. We wake up early, get ready for school, walk, and burn off energy." (Student 2, Middle School, Female)

"We would understand better if we took some of our classes at school and some online." (Student 4, Middle School, Male)

"We can work on a more readable screen for our friends with low vision." (Student 1, Middle School, Female)

Hearing Impaired Students' Views on Distance Education

Table 7. Hearing impaired students' general views on distance education

Theme	Category	Code	*f*
General views	Positive	Being fun	1
		Being easy	1
	Negative	Being boring	3
		Being tiring	2
		Being distracting	1

The opinions of hearing impaired students regarding distance education are given in Table 7. Two hearing impaired students expressed positive opinions about distance education (Table 7). Their opinions regarding this finding are as follows:

"I liked distance education, it was very fun." (Student 24, Middle School, Female)

"It was easy and good. Homework was easy. I could talk to my teachers and friends via EBA." (Student 7, High School, Female)

Six hearing impaired students expressed negative opinions about distance education (Table 7). Their opinions regarding this finding are as follows:

"It was very boring. I felt lonely." (Student 5, High School, Female)

"Sometimes I can't connect to the internet, I'm tired." (Student 16, Middle School, Female)

"Sometimes the teacher asks something. Everyone answers at the same time, I get confused. Someone else is drawing a picture or showing something else on the screen. That's why I get distracted in class." (Student 25, High School, Male)

Table 8. Advantages of distance education from the perspective of hearing impaired students

Theme	Category	Code	*f*
Positive aspects of distance education	Advantages	More interaction with the teacher	2
		Making time to read books	1
		Saving time	1

The advantages of distance education for hearing impaired students are shown in Table 8. These students stated the advantages of distance education as follows: more interaction with the teacher, more time to read books (Table 8). Their views on this finding are as follows:

"Some of my teachers called me after class and asked me about the topics I did not understand. At school, they did not ask me questions after class. Sometimes they sent me video lessons, I tried to learn the topics I did not understand this way." (Student 12, Middle School, Female)

"We had more classes this semester and we took extra lessons, I got support." (Student 21, High School, Female)

Table 9. Disadvantages of distance education from the perspective of hearing impaired students

Theme	Category	Code	*f*
Negative aspects of distance education	Disadvantages	Poor internet connection in live classes	5
		Lack of communication with the teacher	3
		Lack of motivation	2
		Inadequate access to EBA	2
		Lack of technical equipment	1
		Electricity outage	1

The opinions of hearing impaired students regarding the disadvantages of distance education are given in Table 9.

Hearing impaired students listed the difficulties they experienced in distance education as follows: poor internet connection during live lessons, lack of communication with the teacher, low motivation, inadequate EBA access, lack of technical devices and power outages (Table 9). Their opinions regarding this finding are as follows:

"Sometimes my internet would go out, sometimes I couldn't connect when I entered the classroom from my phone." (Student 25, High School, Male)

"I couldn't speak much in sign language during the live lesson. I could understand them when I talked to them via video after the lesson was over." (Student 17, Middle School, Male)

"I couldn't take all the courses I took at school through distance education. I couldn't meet with the teachers often. My motivation decreased when no one could attend the live lessons." (Student 5, High School, Female)

Table 10. Hearing impaired students' suggestions for the development of distance education

Theme	Category	Code	*f*
Suggestions for improving distance education	Recommendations for implementation	Including visual materials	2
		Providing distance education with a Zoom connection	1
		Providing additional private tutoring through distance education	1
		Use of sign language in live classes	1
		Increasing technical facilities	1

The suggestions of hearing impaired students for the development of distance education are given in Table 10. Hearing impaired students suggested using visual materials, providing remote private lessons via Zoom, using sign language in live lessons, and increasing technical facilities to improve distance education. Their views on this finding are as follows:
"I want them to use more illustrated materials while teaching." (Student 16, Middle School, Female)
"Some of our teachers did not make any sound during the live lesson. We were connecting from Zoom instead of EBA so that we could hear the lessons more easily. Let's always connect from Zoom." (Student 25, High School, Male)
"I want to speak sign language in live lessons like in school. I want to learn by speaking, not writing." (Student 17, Middle School, Male)

Physically Disabled Students' Views on Distance Education

Table 11. General views of physically disabled students on distance education

Theme	Category	Code	*f*
General views	Positive	Meeting the need for education	1
		Developing responsibility	1
	Negative	Being boring	4
		Being difficult	3
		Failure to provide a school environment	1
		Challenged by technical impossibilities	1

The general views of students with physical disabilities regarding distance education are given in Table 11. Two students with physical disabilities expressed positive views regarding distance education. Their views regarding this finding are as follows:
"It was the best way to receive education during the pandemic; I did not experience any difficulties." (Student 11, High School, Male)
"I felt that I grew up and that my responsibilities increased." (Student 27, High School, Female)
Nine students with physical disabilities expressed negative views regarding distance education (Table 11). Their views regarding this finding are as follows:
"School is better; distance education is boring and difficult." (Student 28, High School, Female)
"I want to experience the exam environment at school. Everyone at home is included in distance education." (Student 10, High School, Male)
"It was not good because I always had problems in live lessons." (Student 13, Middle School, Female)

Table 12. Advantages of distance education from the perspective of physically disabled students

Theme	Category	Code	*f*
Positive aspects of distance education	Advantages	No need to leave the house	2
		Having time for individual learning at home	2
		Learning more from the internet	1

The advantages of distance education for students with physical disabilities are shown in Table 12. Students with physical disabilities stated the advantages of distance education as not having to leave home, spending time on individual learning, and learning more from the internet (Table 12). Their views on this finding are as follows:
"It was comfortable for me to take lessons from home with my tablet." (Student 19, High School, Male)
"I leave school at 16:00. Both school and physical therapy were taking up my time. I went to physical therapy right after the live lesson and was able to spend more time for myself in the evenings." (Student 10, High School, Male)

Table 13. Disadvantages of distance education from the perspective of physically disabled students

Theme	Category	Code	*f*
Negative aspects of distance education	Disadvantages	Poor internet connection in live classes	4
		Failure to understand the course topics	3
		Inability to use the computer for long periods	2
		Lack of technical devices	2
		Inadequate access to the EBA system	2
		Lack of motivation	1
		Class hours are not at appropriate times	1

The views of students with physical disabilities on the disadvantages of distance education are in Table 13. The main problems stated by students with physical disabilities are the poor internet connection in live lessons and not being able to understand the lesson topics (Table 13). Their views on this finding are as follows:

"Since we had to use the computer very actively, I had to do physical therapy with my hands. I could not use the keyboard and mouse for a long time." (Student 23, High School, Male)

"I got distracted after a while while listening to the lesson. Problems connecting to the internet affected me negatively." (Student 28, High School, Female)

Table 14. Physically disabled students' suggestions for the development of distance education

Theme	Category	Code	*f*
Suggestions for improving distance education	Recommendations for implementation	Compatibility of class hours with school hours	2
		More comprehensible teaching of course topics	1
		Introducing compulsory attendance	1
		Increasing technical facilities	1

The suggestions of students with physical disabilities for the development of distance education are given in Table 14.

These suggestions are as follows: Lesson hours should be compatible with school hours, lesson topics should be covered more clearly, attendance should be mandatory and technical facilities should be increased (Table 14). Their opinions regarding this finding are as follows:

"If lesson hours are at more convenient times, there will be time to review the topics." (Student 23, High School, Male)

"It would be better if the lesson were taught a little slower, we could solve the questions with the teacher and the lesson notes would be sent to us in advance like in biology class." (Student 27, High School, Female)

"It would be better if everyone had a tablet." (Student 28, High School, Female)

Teachers' Views on Distance Education for Students with Disabilities

In order to determine teachers' opinions on distance education of students with disabilities, interviews were conducted with 25 teachers who teach these students via distance education.

Table 15. Teachers' general views on distance education for students with disabilities

Theme	Category	Code	*f*
General views	Positive	An application that ensures the sustainability of education	1
		An education method that enables access to digital materials	1
		A training method that comes easy as you gain experience	1
		A training method that does not victimize the person under adverse conditions	1

	A training method that increases achievement	1
Negative	Low student participation	3
	Lack of communication with students	3
	Keeping the student cameras off	2
	Poor internet connection	1
	Lack of physical contact	1
	Lack of attention of the student	1
	Failure to provide a school environment	1

The general views of teachers regarding distance education of students with disabilities are given in Table 15. Six teachers expressed positive views. Their views regarding this finding are as follows:
"I found it useful in terms of multimedia use and access to documents." (Teacher 9, Turkish Language and Literature, Female)
"When I first heard about it, I was horrified. My anxiety decreased as I gained experience." (Teacher 22, Chemistry, Female)
"Although it is not as good as face-to-face education, it is the best education that can be done at home without victimizing the student under adverse conditions." (Teacher 1, Guidance, Female)
13 teachers expressed negative views regarding distance education. These views are; low student participation and lack of communication with students. Their views regarding this finding are as follows:
"It was inefficient because there was no regular attendance and due to financial constraints, there was little attendance in live lessons." (Teacher 14, Special Education, Male)
"You don't know how many people are listening to you on the other side, what they are doing, it's like you're teaching to a wall." (Teacher 21, Guidance, Male)
"Distance education is not suitable for hearing impaired children; since they can't hear anyway, their attention is scattered and they can't concentrate when the sound from the computer is not at the desired level." (Teacher 13, Visual Arts, Female)

Table 16. Advantages of distance learning for students with disabilities, according to teachers

Theme	**Category**	**Code**	***f***
Advantages of distance education for students with disabilities	Advantages of distance education for hearing impaired students	Visual applications make learning easier	2
	Advantages of distance education for physically disabled students	Avoiding difficulties for students coming and going to and from school	6
		Students are not deprived of learning	1

According to teachers, the advantages of distance education for students with disabilities are shown in Table 16. None of the teachers stated that distance education provides an advantage for visually impaired students.
Teachers stated that the advantage of distance education for hearing impaired students is that visual applications make learning easier (Table 16). Their views on this finding are as follows:
"We do not do many activities for visual learning for these students at school, but there is more content for visual learning on EBA." (Teacher 20, Turkish Language and Literature, Male)
Seven teachers stated that the advantages of distance education for students with physical disabilities are that students do not have difficulty reaching school and are not deprived of learning (Table 16). Their views on this finding are as follows:
"Distance education is useful when a physically disabled student living in a village cannot reach a school in the city." (Teacher 21, Guidance, Male)
"While there is an emotionality in the child due to his physical disability, the feeling of failure while learning is prevented thanks to distance education." (Teacher 23, Biology, Female)

Table 17. Disadvantages of distance education for students with disabilities from teachers' perspective

Theme	Category	Code	*f*
Challenges in distance education for students with disabilities	Challenges in distance education for visually impaired students	Lack of materials	2
		Prolonged learning time	1
		Lack of control of the student	1
		Progression of eye disorders	1
		Lack of motivation	1
	Challenges in distance education for hearing impaired students	Failure to communicate with students in the live class	2
		Failure of the student to follow the lesson	1
		The student is left behind in the live lesson	1
	Challenges in distance education for physically disabled students	Lack of assistive technology to use the computer comfortably	1
	Common challenges	Low attendance to live classes	13
		Poor internet connection during live classes	11
		Low motivation level of students	8
		Inadequate access to EBA	6
		Lack of technical equipment	4
		Electricity outage	4
		Too many class hours and not at appropriate times	4
		Inadequate sound and image quality	4
		Lack of teacher-student interaction	3
		Keeping the cameras off	2
		Distraction of attention	2

According to teachers, the disadvantages of distance learning for students with disabilities are shown in Table 17.

Six teachers described the following challenges encountered in distance learning for students with visual impairments: a lack of materials, extended learning time, inability to control students, worsening eye health problems, and decreased motivation. Their opinions on this finding are as follows:

"Since students with visual impairments cannot touch the materials, they cannot understand the material, and their motivation decreases." (Teacher 2, Social Studies, Male)

"Long-term staring at the screen caused increased eye health problems." (Teacher 3, Mathematics, Female)

Four teachers described the following challenges experienced in distance learning for students with hearing impairments: inability to communicate with students during live lessons, students' inability to follow the lesson, and students falling behind during live lessons. Their opinions on this finding are as follows:

"Due to the noise in the live lessons, students were unable to communicate, so they were falling behind in the lesson." (Teacher 20, Turkish Language and Literature, Male)

One teacher described the difficulty students with physical disabilities face in distance learning as follows: inadequate assistive technology to comfortably use the computer. His opinion on this finding is as follows:

"It would be better if I had assistive technology when teaching my students with muscular disorders." (Teacher 25, Science, Female)

Table 17 also illustrates the general difficulties teachers face when teaching students with disabilities remotely. Problems such as low attendance and poor internet connection are prominent in online classes. His opinion on this finding is as follows:

"I didn't have any problems with my internet at home, but children who came to our school from remote villages didn't have internet access, and when they couldn't connect, they would get bored and drop out of class." (Teacher 20, Turkish Language and Literature, Male)

"The Ministry provided free internet access between 1:00 PM and 4:00 PM, and after that, no one wanted to go to class. They didn't want to attend online classes, especially because it was so early in the morning, around 8:00 AM and 9:00 AM." (Teacher 9, Turkish Language and Literature, Male)

As seen in Figure 1, it can be said that distance education creates more disadvantages than advantages for disabled students

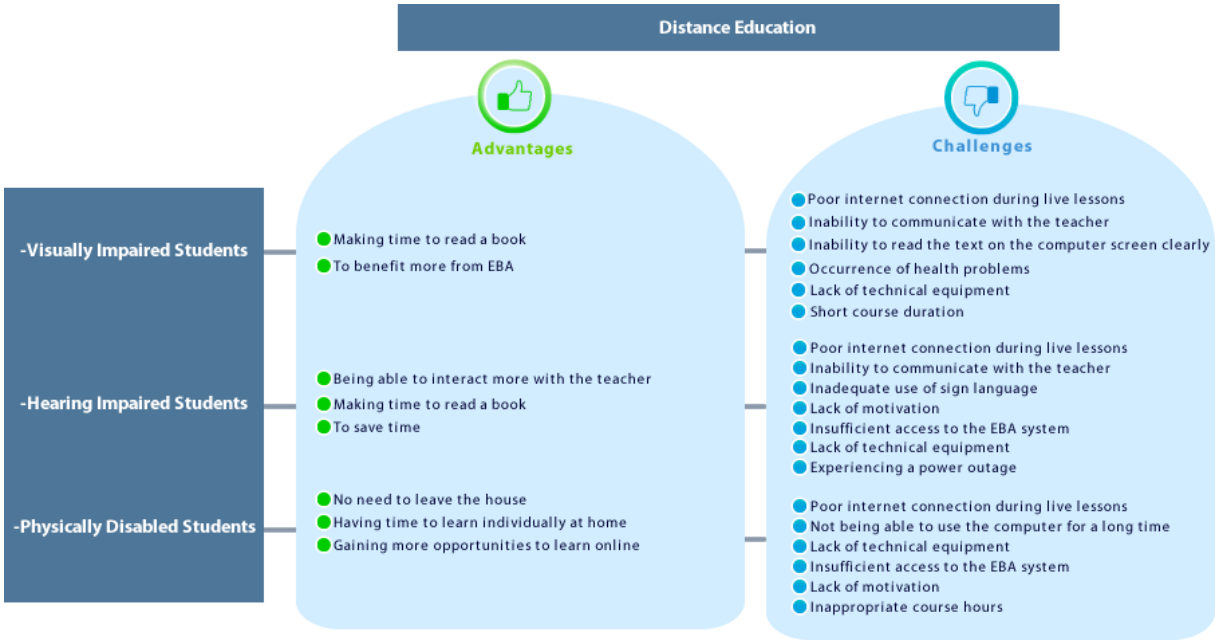

Figure 1. Advantages and disadvantages of distance education for students with disabilities

Table 18. Teachers' suggestions for the development of distance education for students with disabilities

Theme	Category	Code	*f*
Suggestions for improving distance education	Recommendations for implementation	Elimination of material deficiencies for students with disabilities	5
		Implementation of an individualized distance education program	4
		Increasing technical facilities	3
		Enriching EBA content	2
		Creation of special education classes in distance education	2
		Providing in-service training to teachers	2
		Providing training to parents	2

Teachers' suggestions for improving distance education of students with disabilities are in Table 18. Teachers' views on this finding are as follows:

"Sign language should be encouraged urgently. Materials in sign language should be prepared." (Teacher 6, Geography, Male)

"If there is no problem with internet speed and technical devices, students with disabilities can receive good distance education." (Teacher 1, Guidance, Female)

"Audio versions of books should be added to EBA. There should be rich textual content in EBA." (Teacher 8, Turkish Language and Literature, Female)

"Distance education can be provided by creating special education classes for disabled children." (Teacher 25, Science, Female)

"First of all, teachers need to be trained. We must be equipped with the teaching methods to be used in the distance education of these children." (Teacher 22, Chemistry, Female)
"Efforts can be made to raise awareness of parents about distance education. Parents play a primary role in reaching these children." (Teacher 5, Philosophy, Female)

Conclusion, Discussion and Suggestions

According to the results of this study, visually impaired students stated the advantages of distance education as spending time reading books and benefiting from the EBA platform. These students stated the disadvantages of distance education as inadequacy of technical tools, problems in accessing the internet, inability to read text on the computer screen, and health problems experienced when spending long hours in front of the screen. This study is consistent with studies in the literature. For example, in Amponsah's (2021) study on online learning of visually impaired students, it was found that students had difficulty accessing course materials and interacting with their peers. In the study conducted by Zia et al. (2021), the views of visually impaired university students on distance education were examined. As a result of the study, insufficient technical equipment, power outages and some health problems were determined as negative. In this context, it can be said that distance education is seen as disadvantageous for visually impaired students (Persichitte et al., 2000). Teachers stated that the disadvantages of distance education for visually impaired students are more: lack of materials, long learning time, lack of student control, deterioration of eye health and low motivation. This finding is consistent with studies in the literature (Kim & Fienup, 2021; Parmigiani et al., 2020). Visually impaired students made the following suggestions to improve their distance education: adjusting the start time, using blended teaching methods, improving screen settings, and encouraging participation in live lessons. In this context, a study conducted in schools quarantined during the Covid-19 pandemic in Morocco suggested integrating distance education and face-to-face education for students with disabilities (Fahmi, 2023). Accessible online learning systems that meet the needs of visually impaired students can be developed. Teachers should provide special support to visually impaired students and receive training that encourages student participation (Amponsah & Bekele, 2023). One way to meet the needs of visually impaired students is to prepare course materials using Braille (Liakou & Manousou, 2015). This can be achieved by translating course content into easily accessible formats. In this context, Koustriava (2022) stated that distance education provided to visually impaired students through audio and system streaming will improve their motivation. In a study aimed at revealing the experiences of visually impaired students in the distance education process, Firat and Bildiren (2025) analyzed the reasons for their preference for distance education using case study and content analysis techniques, using data collected through semi-structured interviews. This analysis determined that distance education creates both challenges and numerous advantages for visually impaired students.

Distance education has advantages such as interacting with the teacher and spending time reading books for hearing impaired students. The difficulties of distance education for these students are the inability to communicate with the teacher due to weak internet in live lessons, lack of motivation, lack of technical devices and power outages. Gamarra Choque et al. (2021) stated that distance education can negatively affect the learning of disabled students because it reduces the special attention they need. For this reason, it is important for disabled students to include activities that involve eye contact and physical stimulation in distance education. Hearing impaired students stated that they could not benefit enough from distance education and that their attention was distracted by the mixing of the voices of those attending the live lesson. Since visual signs and directions are important for these students, the element that needs to be arranged in distance education is that the sounds are clear and fluent (Akbulut & Esen, 2020). The study conducted by Sanchez et al. (2024) revealed that the assistive technologies used to assist hearing-impaired students are effective in scientific activities shaped around distance education at all educational levels. Teachers stated that distance education is advantageous for hearing impaired students and that learning becomes easier with visual material. Teachers, on the other hand, stated that distance learning is advantageous for hearing-impaired students because visual materials

make learning easier. However, teachers also noted a disadvantage in distance learning, such as sometimes not being able to communicate with hearing-impaired students and not being able to follow the lesson. This finding is consistent with studies in the literature (Alqraini & Alasim, 2021; Kokhan et al., 2021).

Pacheco et al. (2020) reported that lack of communication with hearing-impaired students is a significant obstacle in teaching, and that they do not evaluate these students in distance education due to lack of attention and health problems in online lessons. Gamarra Choque et al. (2021) reported that hearing-impaired students are not given enough attention at home and meaningful learning cannot be achieved despite the synchronous interaction between teacher-student-parent. Hearing-impaired students made the following suggestions to improve distance education: using visual materials, providing distance education via Zoom use of video conferencing software using sign language in live lessons, and increasing technical facilities. Alqraini and Paul (2020) reported that hearing-impaired students' reading skills are impaired and they cannot use subtitles well. Materials can be developed for hearing-impaired students using universal design principles in distance education (Kritzer & Smith, 2020).

When the views of students with physical disabilities on distance education are examined, it is evaluated positively in terms of meeting their educational needs and developing a sense of responsibility. However, these students stated that distance education is boring and complicated, cannot provide a school environment, and technical difficulties make the education process difficult. These students stated that the positive aspects of distance education are not having to leave home and spending time for individual learning at home. They stated the disadvantages of distance education as weak internet connection in live lessons, not being able to fully understand the course topics, not being able to stay in front of the computer for a long time, inadequacy of technical devices, inadequacy of EBA access, low motivation, and inappropriate lesson hours. These difficulties can cause students to feel socially isolated and lead to symptoms such as depression and low academic achievement (Paramasivam et al., 2022). Educators and educational institutions should be made aware of these issues and disabled students should be provided equal access to education. It is important to provide social support to students with physical disabilities and to use assistive technologies in distance education. Majeed (2020) stated that a separate communication device can be developed to provide environmental control in distance education for students with physical disabilities. Students with physical disabilities made suggestions such as aligning lesson hours with school hours, making lesson topics more understandable, making participation mandatory, and increasing technical facilities. Teachers stated that distance education is advantageous for students with physical disabilities because they can receive education without leaving their homes. They considered the lack of assistive technologies to support these students' computer use as a disadvantage. Examples of assistive technologies include alternative keyboards for students with physical disabilities. Spell-checking programs and word prediction software are also some of the assistive technologies used for these disability groups.

According to the results of this study, although it is seen that educational activities in Turkey are carried out meticulously and efforts are made to support them with technological developments, it is understood that studies in the field of special education should be accelerated. It is valuable to determine the basic needs of disabled students and teachers in adverse living conditions. It is expected from the education community that distance education in Turkey is designed to prevent inequality of opportunity in education, access to the internet is increased, and materials are enriched. It can be said that due to the restrictions experienced during the Covid-19 pandemic in Turkey, solutions were sought by making a sudden transition to distance education, the process was planned, and successful applications were produced in learning environments. However, according to the results of this study, the planning to be carried out together in special education and distance education should be evaluated comprehensively for disabled students.

The advantages of distance education for students with disabilities are listed as being independent of time and place, encouraging the use of technology, being able to spare time for oneself, protecting one's

health in adverse situations, learning with fun and educational course content. In terms of teachers; being independent of time and place, increasing technology use skills, being able to apply lesson hours at the desired time are stated as the advantages of distance education. The disadvantages of distance education are the lack of effective participation, socialization problems, lack of technological infrastructure and equipment, lack of materials that will facilitate learning, lack of attention, and the inability to apply individualized education programs. In this context, considering the abundance of disadvantages, it can be said that studies should be conducted to increase the facilitating effect of distance education for students with disabilities and teachers (Karnas et al., 2023).

The results obtained from this study are in the direction of detailed examination of variables affecting the educational lives of disabled students, urgent completion of missing studies in the literature, and improvement of distance education in line with opinions and suggestions. It is hoped that distance education to be received by disabled students will be transformed into a more effective and useful lifelong learning framework. This study includes the evaluation of distance education implemented in educational institutions during the global Covid-19 pandemic by students with disabilities and their teachers in Turkey. Therefore, the data obtained is limited to the experiences experienced during the pandemic and reflects the effects of distance education provided during this period on students with disabilities and their teachers.

This study is limited to a total of 55 participants, 30 disabled students and 25 teachers studying in middle and high schools in Turkey. Only semi-structured interviews were used in the data collection process. In order to overcome these limitations, data can be collected through a survey and the distance education processes of disabled students can be examined. As a result, it is thought that this study will be useful in evaluating the experiences of disabled students in distance education, the advantages of distance education, the difficulties they face and the suggestions on the subject. Therefore, necessary measures should be taken to ensure that the distance education of disabled students can be continued more effectively and conveniently within the framework of lifelong learning. As seen in Figure 1, it can be said that distance education creates more disadvantages than advantages for disabled students.

Based on the findings of this study, the following recommendations were developed for practitioners:

Recommendations for practitioners

1. The results of this study are limited to students with disabilities receiving distance education in Türkiye and their teachers. Therefore, future studies could be conducted using quantitative research methods by expanding the study group with the participation of school administrators and parents, and by using quantitative research methods with students with various disability groups (such as speech and language disorders, hyperactivity, mental and emotional disorders, and those receiving education in hospitals with chronic illnesses) for whom qualitative interviews are not possible. Furthermore, more valid and comprehensive information could be obtained through data diversification in future studies.
In addition, more valid and comprehensive information can be obtained through data triangulation in future studies.
2. As a result of this study, it was seen that the disadvantages of distance education for disabled students outweigh its advantages. Therefore, various studies can be conducted using the design-based research method to improve distance education environments for disabled students.
3. In future studies, a guide can be provided to teachers for the distance education of disabled students. In-service training on digital content/material preparation can be provided before and during the distance learning process to increase teachers' technological knowledge and skills. Teachers can also receive training with guidance counselors to improve crisis management in the distance learning of students with disabilities.

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Author's Contributions (CRediT)

Semra Korkmaz: Conceptualization, Methodology, Investigation, Data Curation, Writing – Original Draft, Writing – Review & Editing; Zeynep Turan: Investigation, Conceptualization, Writing – Review & Editing. All authors have read and agreed to the published version of the manuscript.

Sustainable Development Goals (SDGs)

This study is linked to the following SDG(s): Quality education (SDG 4), reduced inequalities (SDG 10), and Partnerships for the goals (SDG 17).

Data Accessibility Statement

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics and Consent

The data collection processes carried out within the scope of this research were approved by the Atatürk University Social and Human Sciences Ethics Committee Educational Sciences Unit Ethics Committee with the document numbered 06/32 dated 18.06.2021.

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