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CHALLENGES IN ONLINE LEARNING ENVIRONMENTS: FROM THE PERSPECTIVE OF HEARING-IMPAIRED UNIVERSITY STUDENTS AND THEIR LECTURERS

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Abstract

The global COVID-19 pandemic has led to significant challenges in Turkey, as in many other countries, in the transition from face-to-face to online education at all levels of education. This shift has brought forth numerous obstacles, particularly for d/Deaf and hard-of-hearing (d/Dhh) university students. Hence, this research aims to identify the challenges encountered during online learning amidst the pandemic at the School for the Handicapped (SfH), the only institution in Turkey providing vocational higher education to hearing-impaired students. Conducted as a qualitative case study at the SfH, the research involved 20 hearing-impaired students and 19 faculty members as participants. Data obtained from the Mergen Anadolu Learning Management System platform, WhatsApp Platform and other platforms, was used for online education. Interviews, open-ended questionnaires, and the researcher's journal were compiled and analyzed inductively. Findings from the study highlighted a multitude of challenges encountered in the online learning process, affecting both faculty members and students at the SfH. The challenges encountered by participants in online learning at the SfH were found to be related to difficulty in understanding lessons, lack of subtitles and sign language translation, difficulty accessing computers and software, Internet problems, low camera usage, low motivation, and lack of interaction.
Keywords: *covid -19 pandemic, case study, hearing impaired, online learning*

Introduction

The coronavirus (COVID-19) pandemic has emerged as a global crisis, impacting various facets of society, notably education. In accordance with the World Health Organization (WHO, 2021), COVID-19 is an infectious disease triggered by a new coronavirus, capable of transmission from person to person. The swift dissemination of the virus and its repercussions on public health have compelled numerous countries to adapt their educational systems, leading to the suspension of in-person schooling for students. Like nearly all countries, Turkey transitioned from face-to-face education to online education across all educational levels during the pandemic. This shift from the traditional classroom setting to online platforms presented numerous challenges. This was also the case for deaf and hard-of-hearing (d/hh) students. For most of the d/hh students, the social distance and the absence of physical gestures made the learning environment difficult (Alsadoon & Turkestani, 2020).

The education system was not prepared for such a pandemic because most teaching and learning strategies were developed to ensure students' physical presence (Kritzer & Smith, 2020). Most educators, including special educators, had no alternative educational plans for such a crisis. Teachers had to reverse their usual teaching practices and suddenly adapt to online learning (Acikgoz et al., 2023; Kirmizigul, 2020; Ritella & Sansone, 2020). Therefore, all stakeholders in the education system have faced many challenges.

Abushammala et al. (2021) administered research aimed at comprehending the challenges faced during the pandemic within higher education institutions. The results highlighted decreased student satisfaction and increased workload as primary obstacles. Furthermore, Wilson et al. (2020) investigated the experiences of higher education students amid the pandemic, conducting an in-depth analysis of reflections from four students. Their findings underscored that the pandemic not only detrimentally impacted learning experiences but also fostered social distancing. Moreover, the main problems faced by educators in online education during the Covid-19 quarantine process are communication, infrastructure, technical and hardware problems, lack of motivation, lack of online materials, difficulties in students' learning, and online assessment (Acikgoz et al., 2023; Balaman & Hanbay Tiryaki, 2021; Cakin & Kulekci Akyavuz, 2020; Kultas & Caliskan, 2021; Ozbey & Keles, 2023; Turker &Dundar, 2020). In addition to these studies, Guangul et al. (2020) explored the challenges associated with online evaluation conducted in higher education institutions amid the COVID-19 quarantine duration. Their study revealed that technical issues and maintaining academic integrity were the primary hurdles encountered in online assessment.

Also, many problems were encountered in conducting practical courses in online education. Students stated that they had difficulty in realizing the applications (Kahraman, 2020) and that they saw the lack of experimentation as a major deficiency (Pinar & Donel-Akgul, 2020). The inability to present theory and practice together, the lack of mutual communication between faculty members and students, the inability of students to learn professional practices sufficiently and the inability to transfer what they have learnt in theoretical courses to practice are the main problems of practical courses (Kahraman, 2020; Yalcinturk & Bakir, 2022).

Similar problems to those experienced in distance education with normal hearing individuals were also experienced by deaf and hearing-impaired individuals. In a study conducted on what kind of instructional difficulties d/hh students experience in online education, it was revealed that individualized teaching for hearing impaired students could not be provided in online education, technological support could not be provided at home, and teachers had problems in evaluating d/hh students in online education (Pacheco et al., 2020). Another challenge faced by d/hh students in online education is that many d/hh students are unable to maintain the required instructional attention at home during online courses (Ayas et al., 2020).

The transition to distance education, as at all levels of education, has required d/hh students and lecturers of d/hh students at the university level to adapt and innovate rapidly in order to provide distance education that is as effective as possible. In addition to their efforts to adapt to this situation, many problems have arisen. Identifying these problems may allow for the design of an online learning environment that accommodates the preferences and abilities of d/hh students and pays attention to the unique social and emotional challenges that many of these students experience. Hence, the purpose of this study was to identify the challenges encountered in online learning during the pandemic within the School for the Handicapped (SfH), which stands as the sole institution in Turkey providing vocational higher education tailored to hearing-impaired students. The research question was:

According to faculty members and students at the School for the Handicapped (SfH), what were the challenges in online learning during the pandemic?

Research Methodology

Model

This qualitative research is designed as a case study. The qualitative case study serves as an approach to research, enabling an in-depth exploration of a phenomenon within its context by leveraging various data sources. This approach ensures a comprehensive examination of the

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issue, avoiding a singular perspective and instead allowing for the illumination and understanding of multiple facets of the phenomenon under research (Baxter & Jack, 2008; Creswell & Poth, 2018; Yin, 2018). The online learning environments designed for d/hh students at the SfH were thoroughly examined in accordance with the requirements of the case study design.

To achieve the current study's purpose, the researcher gathered data using semi-structured interviews, open-ended questionnaires, and the researcher's journal in the 2020-2021 Spring Term.

Environment

The research took place at the School for the Handicapped (SfH), located within Anadolu University, which stands as the sole higher education institution in Turkey offering vocational education specifically tailored to hearing-impaired students. The environment at SfH is designed to meet the educational needs of d/hh individuals who require special education. Educational programs implemented at the SfH since 1993 encompass a range of offerings, including the Graphic Arts Bachelor's Degree Program and the Ceramic Arts Bachelor's Degree Program. Additionally, there is the Computer Operator Training Associate Degree Program and the Architectural Drafting Associate Degree Program. Furthermore, the SfH hosts a one-year Turkish Preparation Class, allowing students to enhance their language proficiency. Upon passing the Turkish Competence Exam, students commence their educational journey from the first year of their program. Each year, the quota of SfH is 40 students, consisting of 10 students per department.

The researcher, who is also a lecturer in the Computer Operator Training Associate Degree Program at SfH, used her online classes as a research environment during the COVID-19 pandemic. The online Mergen Anadolu Learning Management System (LMS) platform, WhatsApp Platform and other online communication platforms were used for online education. Mergen LMS is an open-source learning management system used throughout Anadolu University for online courses during the pandemic. Mergen LMS can be accessed via desktop computers and mobile devices (mobile phones, tablets, etc.). At the time the research data were collected, there was no infrastructure in the Mergen system to enable real-time transcription and captioning of what the teacher said on camera during real-time lessons using video conferencing.

Participants

All participants in the study were affiliated with the SfH, comprising 20 hearing-impaired students, 19 faculty members and the researcher- who is also a lecturer in the Computer Operator Training Associate Degree Program at SfH. Since the researcher's courses conducted online during the pandemic period were examined, all of the d/hh students participating in the study were from the Computer Operator Training department. At the time of the research, there were a total of 20 students in the Computer Operator Training department. Among the 20 students, 12 were male, and 8 were female. 10 were attending the first class, and 10 were in the second class. Most of the students wore hearing aids, or they had cochlear implants. They interacted both orally and in sign language. At the time of the research, there were a total of 25 lecturers teaching courses at SfH. 19 of them consented to participate in the study. Among the lecturers who participated in the research, four are from the Graphics Department, three from the Computer Department, two from the Architectural Drafting Department, six from the Ceramics Department and four of them teach courses related to language courses. All participants were informed about the research and all of them voluntarily attended the study. The research was approved by the Anadolu University Social and Human Sciences Scientific Research and Publication Ethics Board.

Data Collection and Analysis

The data were collected in the "online education environment" in the Fall and Spring terms of the 2020-2021 academic year at the SfH through the Mergen Anadolu LMS course records, WhatsApp conversations, semi-structured interviews, open-ended questionnaires, and researcher's journal. Open-ended questionnaires were developed based on the literature and research questions by the researcher. The validity of the open-ended questionnaires was assessed by two experts.

While preparing the open-ended questions, the literature on the problems experienced in online education was examined. Based on the literature and research questions draft open-ended questionnaire was prepared by the researcher. The questions in the draft form were finalized by taking the opinions of 2 faculty members, who are experts in the field of curriculum and instruction and education of hearing-impaired students and making necessary corrections in terms of meaning. Then, a pilot study was conducted with 2 teachers working in the field of education of the hearing impaired to confirm that the questions in the open-ended questionnaire were clear and understandable. The open-ended questionnaire was conducted online due to the Covid-19 pandemic. For this purpose, with the approval of the school administrator, the lecturers in the whole school were informed about the research via a common group e-mail, and the volunteer lecturers returned to the researcher online via e-mail. Some lecturers expressed that they wanted to be interviewed voluntarily. For this purpose, an appointment was made before the interview, and the interview was audio recorded. For the validity of the open-ended questions prepared for the students, an expert teaching language courses for hearing impaired students was consulted. The open-ended questionnaire for the students was also sent via e-mail. Students were informed before the open-ended questionnaire. All students responded via e-mail or WhatsApp application.

In qualitative research, a researcher's journal, also known as a researcher's diary, is a journal where the researcher records their experiences, thoughts, decisions, emotions, and observations throughout the research process. In this study, the researcher's journal was used to record interactions during data collection, details of interviews with some lecturers, observations of student behavior in online courses, and the researcher's reflections.

The research data were analyzed inductively via the NVivo14 qualitative data analysis program. Inductive analysis is a method used to identify exploratory and meaningful patterns in qualitative data. This type of analysis is structured based on patterns extracted from the data rather than a predetermined framework. While using NVivo14, the data were first prepared for analysis. For this purpose, all data, such as audio recordings and written texts, were transferred from the computer environment to the NVivo 14 qualitative data analysis program. Afterwards, all the data were analyzed holistically and in a general sense. Each document was read and coded by the researcher. The analysis involved scrutinizing code labels, followed by the aggregation of similar codes to form overarching themes, each representing a significant concept or idea. The validity of the themes was checked by two experts, one of whom is an expert in qualitative research and the other an expert in educational technologies (Bazeley & Jackson, 2013; Creswell & Creswell, 2018; Gibbs, 2007).

Trustworthiness

Validity and reliability in qualitative research are expressed by the term trustworthiness. Trustworthiness refers to the credibility, dependability, confirmability, and transferability of the research findings (Lincoln & Guba, 1985; Stahl & King, 2020). To enhance the credibility of the research findings, multiple strategies were employed (Creswell & Creswell, 2018). First, prolonged engagement with participants was maintained through a two-semester period of data

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collection, allowing for in-depth exploration of the research. Additionally, member checking was conducted, where participants were given the opportunity to review and validate the researcher's interpretations of their experiences. Furthermore, peer debriefing sessions were held with colleagues experienced in qualitative research to critically reflect on and refine the analysis process. These strategies contributed to the credibility of the findings by ensuring that they accurately reflected the perspectives and experiences of the participants (Lincoln & Guba, 1985; Patton, 2015). The dependability of the study was established through careful documentation and transparency in the research process. Audio recordings and transcripts were maintained to document data collection procedures and facilitate auditability. Additionally, an audit trail was created to track the decision-making process throughout data analysis, allowing for transparency and consistency in the interpretation of findings. By maintaining clear documentation and an audit trail, the study ensured the dependability and reliability of its findings (Creswell & Creswell, 2018; Morse et al., 2002; Tracy, 2010). Confirmability was achieved through efforts to minimize researcher bias and maintain objectivity in the study. A reflective researcher's journal was written throughout the research process, with the researcher continuously reflecting on their own assumptions, biases, and values. Additionally, multiple coders were involved in the data analysis process, and an inter-coder agreement was established to ensure consistency and reliability in the interpretation of data. These measures helped mitigate the influence of researcher bias on the study findings, enhancing the confirmability of the research (Baskale, 2016; Merriam & Tisdell, 2016; Tracy, 2010). To enhance the transferability of the study findings, research context, participants, and phenomena under study were provided. The researcher engaged in a thorough discussion of the study limitations and similarities and differences between the study context and other contexts, enabling readers to assess the applicability of the findings to their own settings (Lincoln & Guba,1985; Tracy, 2010).

Research Results

Problems Experienced by the Faculty Members

The problems experienced by the faculty members in online education were thematized as shown in Figure 1.

Figure 1
Problems Experienced by the Faculty Members
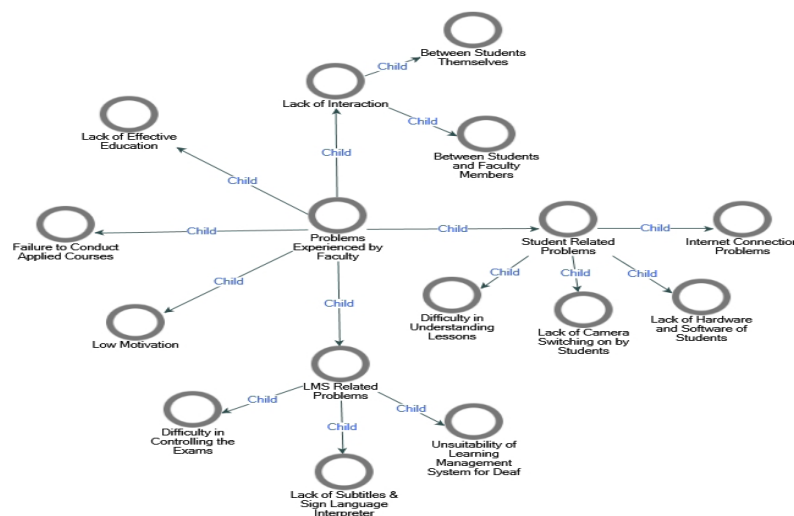
As shown in Figure1, the themes that emerged from the views of faculty can be expressed as:

- Failure to Conduct Applied Courses
- Lack of Effective Education
- Student Related Problems
- Difficulty in Understanding Lessons
- Lack of Camera Switching on by Students
- Lack of Hardware and Software of Students
- Internet Connection Problems
- LMS Related Problems
- Difficulty in Controlling the Exams
- Lack of Subtitles & Sign Language Interpreter
- Unsuitability of Learning Management System for Deaf
- Lack of Interaction
- Between the Students Themselves
- Between the Students and Faculty Members
- Low Motivation

Failure to Conduct Applied Courses

The first theme that emerged from the faculty members' responses is related to the difficulties in conducting applied courses. All of the faculty members at the SfH conducting applied vocational courses stated that they had difficulties in implementing applied courses in online education with hearing impaired students, and even stated that they could not realize their applications. One of them who teaches courses in the Computer Usage Department stated this situation as follows:

"There were problems in downloading and using the programs to be used in application courses. I have taken all the necessary precautions to ensure that the applications are effective for hearing impaired students. Although I tried to support them with long and additional courses, I think that distance education processes are not sufficient for applied courses for hearing impaired students".

Another faculty in the Graphic Art department also stated that;

"Even though I conducted the lessons through different versions of the programs I taught, which were online and used pre-made templates, I can still say that they could not gain the application experience they should have. Everything they learnt theoretically could not be grounded properly due to templates and online applications".

Another lecturer who teaches program courses in the Ceramics Department expressed this situation as follows:

"Since there was no camera view in the screen sharing in Mergen LMS, they could not hear what I was saying due to hearing impairment. Since they did not have the chance to listen to the application, it was not possible for them to both listen to the narration and see it. In this case, practical teaching was very challenging for me in online education."

Another faculty in the Ceramics Department who teaches applied ceramics courses also stated that:

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"They could not do the mud applications of the ceramic workshop course. Because technical equipment is needed to make and finalize ceramics. They prepared sketches of the ceramics they would make."

Lack of Effective Education

Another challenge reported by faculty members was about the quality of education. They stated that they could not provide effective education in online education. One of them who teaches courses in the Architectural Drafting Department stated this situation as follows:

"I do not think that there is a fully effective education. As a lecturer, although I try to create a supportive and effective learning environment for the students, I do not think that this is fully achieved. While working with first year students in the Basic Information Technology course, I gave enough homework topics for them to type on the keyboard. It is debatable how much it is enough because our students have a lot of reading comprehension and writing deficiencies. For effective education, it is important to do the assignments and applications, and for this, it is important that the students believe in it and work together. However, these conditions necessary for effective teaching could not be adequately addressed in online education."

She also added:

"The learning dimension was not complete in distance education. In order to overcome this gap, I think that we need students who know that learning is important and who have become individuals doing their work not for grades but for learning. Students should develop an awareness of self-learning".

Among the faculty who expressed the opinion that effective education could not be provided in online education, one faculty member who teaches language courses said:

"I cannot find a good aspect for distance education due to the lack of effective education", while another faculty teaches courses in the Graphics department stated that *"Problems were experienced in online learning due to the inability to provide the classroom environment required for effective teaching".*

Student Related Problems

According to the experiences of the faculty members, the problems related to students in distance education were categorized under four sub-themes. They are: difficulty in understanding lessons, lack of camera switching on by students, lack of hardware and software for students, and internet connection problems.

Difficulty in Understanding Lessons

The first sub-theme that emerged from the faculty members' opinions is related to the difficulties arising from the characteristics of hearing-impaired students during distance education. In particular, in addition to underlining the communication difficulties between students and lecturers, a lecturer who teaches language courses highlighted several factors that hinder the success of d/hh students during distance learning:

"Most of our students are severely and profoundly hearing impaired. There are students whose reading comprehension and writing skill levels are very limited. This is why I think I cannot fully reach all my students in online education."

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Another lecturer who teaches courses in the Ceramics Department expressed this situation as follows:

"Although the degree of hearing loss of the student is important, we were able to communicate only by writing in the Mergen LMS. Considering the fact that some students also have problems with reading comprehension, I can say that online education is problematic for hearing impaired students."

Lack of Camera Switching on by Students

It is seen as an important communication problem by faculty members that students do not switch on their cameras in the learning management system in online education. The opinions of the two faculty members teaching the language courses on this issue are similarly as follows:

"*The fact that students switch off the camera according to their mood creates difficulties in communicating.*"
"*I asked the students to switch on their cameras all the time, but I could not achieve this. This created problems in communicating*".

A lecturer who conducts vocational courses in the Architectural Drafting department expressed this situation as follows:

"*I have always switched on the camera in my lessons. I think the use of the camera is important for mutual interaction. I explained this situation to my students and asked them to always switch on their cameras. However, some students made excuses such as their environment was not suitable, or the camera connection could not be set. This situation disrupted the communication processes*".

Lack of Hardware and Software for Students

The fact that the students did not have the hardware and software, which are important elements of distance education, hindered the teaching process. This situation created a problem, especially for the lecturers of applied courses. One of the computer department faculty members expressed this situation as follows:

"*The students did not have computers, the capacities of the computers were not sufficient, and the software to be used in the course could not be downloaded to the computers were important problems.* "

Similarly, a faculty member who conducts applied Graphics courses stated, "*I have experienced a very problematic process in distance education, especially because of the technical hardware problems that students do not have / cannot have*".

Internet Connection Problems

In addition to hardware and software problems, all of the faculty members stated that students had problems connecting to the Internet. This situation is due to the fact that some students live in villages or smaller regions. The lecturers conducting applied courses stated that the students did not have enough Internet capacity to run the programs together with the online courses.

LMS Related Problems

According to the experiences of the faculty members, the problems related to LMS in distance education were categorized under three sub-themes: *lack of subtitles & sign language interpreter, difficulty in controlling the exams, and unsuitability of the learning management system for the deaf.*

Lack of Subtitles & Sign Language Interpreter

The first problem stated by all of the SfH faculty members about the Mergen LMS is the lack of subtitles and sign language interpreters.

According to the faculty members, in the Mergen system, the fact that what the teacher says in front of the camera during real-time lessons using video conferencing cannot be transcribed and subtitled in real time is seen as an important problem for d/hh individuals. This situation expressed by a faculty member of language courses is as follows:

"There are no special arrangements for hearing impaired students in the system. Mergen system should have subtitle support and sign language support".

Difficulty in Controlling the Exams

The second problem with the learning management system is the difficulty in controlling the exams. Almost all of the faculty members stated that they had difficulties in measurement and evaluation. Faculty members who somehow conduct their exams in the Mergen system have concerns about the security of the exams. In general, many problems, which are expressed as the lack of academic honesty, were encountered, such as *students cheating in exams, taking homework assignments from each other, using the same lecture notes during the exam,* and *having someone else take the exam instead of the student.* One of the faculty members from the Architectural Drafting expressed it as, "*But I'm worried about the reliability of the exams. After all, the lecture notes are at hand, they may have copied and pasted them*", while another faculty teaches courses in the Graphics department stated that "*I do not think that measurement and evaluation with the Mergen system is suitable*".

Unsuitability of Learning Management System for Deaf

Faculty members who stated that the Mergen system is not suitable for deaf students expressed that, *it is difficult to switch between menus, students cannot see each other in live lessons, the system is generally cumbersome, there is no subtitle or sign language interpreter,* and *the recorded lessons cannot be downloaded.* One of the faculty members from the computer department expressed it as, "*It is an important deficiency that students cannot see each other when the cameras are switched on. Hearing impaired students also learn from each other. Interaction was not realistic in the Mergen system*". Two other faculty members teach Graphics lessons stated following respectively,

"I would describe the Mergen system as cumbersome rather than easy. It could have been designed in the form of menus that would be much more useful and shortcuts would be emphasized according to the needs".
"The system is not easy for deaf students. They said that they had difficulty in switching between menus".

Lack of Interaction

According to the experiences of the faculty members, the problems about the lack of interaction in distance education were categorized under two sub-themes: between the students themselves and *between the students and faculty members*.

Between the Students Themselves

The first sub-theme is the lack of interaction between the students themselves. Faculty members emphasized that the lack of interaction between students in distance education negatively affects the teaching environment. One of the faculty members teaching in the computer department stated that the lack of interaction between the students did not give them the opportunity to learn from each other.

Between the Students and Faculty Members

The second sub-theme is the lack of interaction between the students and faculty members. Most faculty members stressed that teaching d/hh students in a face-to-face classroom setting is significantly preferable to distance education, citing enhanced interaction and communication possibilities. Additionally, they noted that in face-to-face classrooms, they are better able to attend to individual differences among students, a task they find challenging in distance education.

Low Motivation

According to the faculty members, the lack of interaction in online education is the most important reason for low motivation. Low motivated students also demotivate the faculty members. A faculty member who teaches Architectural Drafting expressed this situation as follows:

"*I could not get answers to the questions I asked in the online lesson except for a few students. When the students were not motivated, my motivation also decreased* ".

Another faculty member who teaches graphics courses expressed a similar experience as follows:

"*Students asked the question when face-to-face education would be started in every lesson. I observed that they got frustrated and their motivation decreased because they could not practice in online education. This situation also decreased my motivation*".

Problems Experienced by the Students

The problems experienced by the students in online education were thematized with NVivo14, as shown in Figure 2.

Figure 2
Problems Experienced by the Students
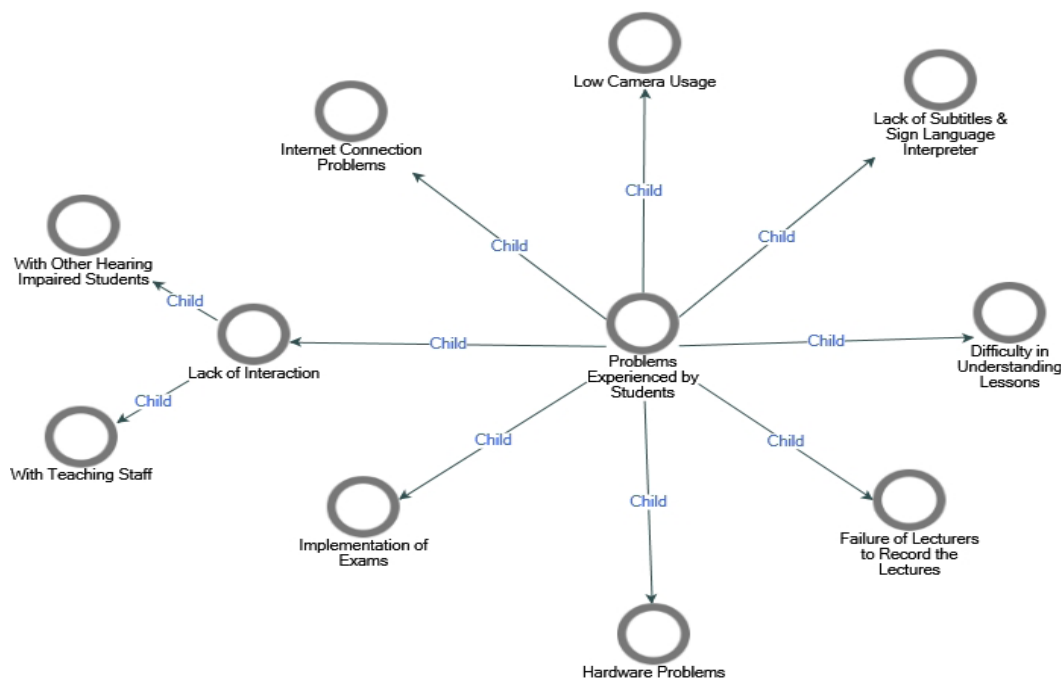
As shown in Figure 2, the themes that emerged from the responses of students can be expressed as:

- Difficulty in Understanding Lessons
- Lack of Subtitles & Sign Language Interpreter
- Low Camera Usage
- Failure of Lecturers to Record Lectures
- Implementation of Exams
- Hardware Problems
- Internet Connection Problems
- Lack of Interaction
- With Other Hearing-Impaired Students
- With Teaching Staff

Difficulty in Understanding Lessons

The first theme related to the problems experienced by the students in distance education is the difficulty in understanding the lessons. All of the students stated that they had difficulty understanding the lessons in distance education. For example, one student said,

"I never liked distance education. I want schools to open. I don't understand the lessons in distance education",

while another student said,

"I didn't understand my lessons from Mergen. I had a lot of difficulty. Mergen is not for hearing impaired students".

In addition, students stated that they could not see their teachers in the system when there was screen sharing in practical lessons and that they could not fully understand the lesson because they could not see their teachers.

Lack of Subtitles & Sign Language Interpreter

Students stated that the most important reason for not being able to understand the lessons was the lack of subtitles or sign language interpreters. The students expressed this situation as follows:

"I couldn't understand what they(teachers) were saying. I couldn't make a solution because I didn't understand. Teachers turn on the camera but they speak without using sign language, and we were very upset because some of them use novice sign language. If sign language is not used, we will definitely not develop. I can read lips, but I could not understand the lesson because I could not see the teacher in practical lessons. If there was a sign language interpreter, we could understand".

"The lessons are good, but since the hearing impaired cannot hear, it is important for the learning opportunity if there is a sign language interpreter".

"I could understand my lessons better if there were subtitles in the Mergen system. There are many subjects that I do not understand because I cannot see the teacher when there is screen sharing".

Low Camera Usage

One of the problems experienced by students in distance education is the low usage of cameras in some courses. Students stated that the camera feature in live lessons in the Mergen LMS was not used by some faculty members. This situation made the process, which students described as difficult, even more difficult. One of the students expressed this situation as follows:

"For some of our teachers, conducting lessons with hearing impaired individuals is a significant problem. We have a teacher who only loads a presentation on the screen and continues to explain something even though he knows that we cannot hear his speech. Since he did not switch on the camera in any of his lessons, we had lessons in a cold environment where we did not see his face and speech and did not even have the opportunity to meet him".

Failure of Lecturers to Record Lectures

Similar to the problem in the usage of cameras, the failure of some lecturers to record their lectures is another problem experienced by the students. Students stated that most of the lectures were recorded by the lecturers, but some lecturers did not record their lectures. One of the students stated this situation as *"Some courses are not recorded. If they were recorded, of course, we could watch them again, so we could learn better".*

Implementation of Exams

One of the difficulties that students experience in distance education is the implementation of exams. The students stated that some faculty members do assignments and some of them do short exams. They stated that some teachers who conducted short exams wanted them to use a mirror to see the keyboard, which was quite challenging.

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Hardware Problems

Another problem that students experience in distance education is that they do not have the necessary equipment to follow their lessons and do their practices. One of the students said this:

"I sometimes connected to the lesson with my mobile phone because my computer was not working properly" while another said,
"I do not have a computer. I attended the lesson with my mobile phone. At first, I could not practice in the practical classes. Then I borrowed a computer".

Internet Connection Problems

All of the students stated that they had some kind of problem with the Internet during distance education. They stated that *"they cannot turn on the camera when they connect to live lessons", "the screen freezes", "the image may freeze when teachers share the screen"*, and their *"internet capacity is not sufficient"*.

Lack of Interaction

One of the important problems that students experience in distance education is the lack of interaction. According to the experiences of the students, the problems about the lack of interaction in distance education were categorized under two sub-themes: with other hearing-impaired students and with the teaching staff.

With Other Hearing-Impaired Students

The first sub-theme is the lack of interaction with other hearing-impaired students. Students stated that they could not communicate with other students or ask questions about the lessons to each other because they could not see them in distance education. Also, some of the students who had just started the first grade stated that they could not interact with their friends because they had not met them yet. One of these students explained this situation as follows:

"We have not met, and I have not interacted with my hearing-impaired friends in distance education yet. I hope I can meet my hearing-impaired friends when the school opens".

Additionally, the students stated that they did not feel the school atmosphere due to the lack of interaction with their friends in online education.

With Teaching Staff

The second sub-theme is the lack of interaction with the teaching staff. Similar to the lack of interaction between students, students stated that it was very difficult to interact with the teaching staff just by looking at the screen in distance education. One student stated that this situation is more difficult, especially in applied courses, as follows:

"In applied lessons, there needs to be interaction between us and our teacher. I had difficulty in distance education due to the lack of interaction with teachers while doing applied lessons".

Another student, who thought that the lack of interaction with teachers was due to their hearing impairment, expressed this situation as follows:

> *"Some of our teachers did whatever they could to interact. They gave lectures, asked questions, and warned our friends who did not turn on cameras. But it is very difficult for hearing-impaired students to interact in distance education".*

Discussion

In this study, the challenges encountered in online learning at the SfH, the solitary educational institution in Turkey offering vocational higher education exclusively tailored to hearing-impaired students, amid the pandemic era, were determined from the perspectives of the academic staff and the students. The challenges encountered by participants in online learning at the SfH were found to be related to *difficulty in understanding lessons, lack of subtitles and sign language translation, difficulty accessing computers and software, Internet problems, low camera usage, low motivation,* and *lack of interaction*.

Both academic staff and d/hh students stated that the students had difficulties in understanding online courses due to the characteristics of hearing-impaired students. Hearing impaired students have difficulties with communication because they cannot hear properly. They also have difficulties in reading comprehension and writing skills. For this reason, unlike in face-to-face education, there is little or no individual instruction in distance education, making it difficult for hearing impaired students to understand the lessons. This finding of the study is in line with the study revealing that the lack of communication in distance education makes it difficult for students to understand the lesson (Altun Yalcin et al., 2021; Ozdogru, 2021).

Like Godber and Atkins's (2021) study, this study reveals the need for a sign language interpreter or subtitles on distance education platforms. Even students who have mild hearing loss and can communicate by lip-reading stated that they could not fully lip-read due to some technical problems in distance education and that there is a need for subtitles or a sign language interpreter in real time lessons (Arnaiz-Sánchez et al., 2023; Mantzikos & Lappa, 2020).

Both academic staff and d/hh students stated that the students encountered challenges in accessing computers and software, as well as experiencing Internet connectivity issues. The lack of the necessary infrastructure for distance education is one of the most important factors that hinder teaching (Arnaiz-Sánchez et al., Arslan & Sumuer, 2020; 2023; Octaberlina & Muslimin, 2020; Ozdogan & Berkant, 2020; Terzioglu, 2020). In the absence of technological infrastructure in the environment where online learning will take place, it is not very meaningful to talk about other things. There is a need for national education policies to provide hearing impaired students with the necessary computer and internet access for online education.

Another common problem experienced by both students and lecturers is the low use of cameras in the Mergen LMS. This situation has made the already difficult communication process in distance education even more difficult. In distance education, unlike face-to-face education, the student is not in the school/classroom environment. He/she attends the online course from his/her current environment. This is even more difficult for hearing impaired students. In order to achieve learning goals in distance education, it is indispensable for the hearing impaired student to see the lecturer in order to lip read and communicate fully. Therefore, not turning on the camera by the lecturers can be considered as a direct hindrance to learning. In addition, the fact that students also do not turn on the camera in distance education courses hinders the lecturer's communication with the student. Since the lecturer cannot provide individualized education for hearing impaired students, he/she is not able to teach effectively. On the other hand, when students and lecturers turn on their cameras, communication through nonverbal cues will increase. Lecturers derive valuable insights from nonverbal cues exhibited

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by their students, including smiles, frowns, head nods, expressions of confusion, and signs of boredom. These cues enable lecturers to assess their teaching effectiveness in real time and make necessary adjustments to enhance student learning (Castalli & Sarvary, 2021).

Similar to other studies, the findings obtained in this study show that one of the difficulties experienced in online education is low student motivation (Gulder & Deger, 2023; Means & Neisler, 2021; Sen & Kizilcalioglu, 2020; Tan, 2021). Students with high learning motivation have a great desire to undertake learning activities or respond positively to the learning activities that are being followed. On the other hand, students with low motivation will not take learning activities seriously. In this study, d/hh students expressed a decline in their motivation due to lecturers' inability to conduct online courses with the same level of effectiveness and efficiency, largely attributed to lecturers being unprepared for the sudden transition to online learning. Also, they could not establish a bond with their lecturers. According to academic staff, not being physically on the university campus and not being able to socialize face-to-face were the most important demotivating factors. Being away from the social environment and lack of support from friends was also found to be an important problem (Means & Neisler, 2021).

Another problem stated by both academic staff and students in distance education was the lack of interaction. Interaction is at the heart of the learning process and plays a critical role in helping students achieve their learning goals. Interaction helps to develop knowledge and empower learners, as well as provide a context for people in a community to express their views and interests to each other. Learner-instructor interaction is seen by many educators as important and desirable in learning environments. The lecturer engages learners with the content, but also helps and supports learners in their learning. The lack of interaction in online education has directly affected d/hh students' learning. Because interaction aims to enable learners to make the best use of the system and, as a result, to positively affect their success. If there are problems in the interaction dimension of the distance education system, learners will not be sufficiently satisfied, and therefore, there will be unsuccessful learning. In this study, as in the study by Riva et. al. (2021), the participants stated that the lack of interaction between both learner-instructor and learners negatively affected their understanding of the lessons in online learning.

While this study provides valuable insights into the challenges of online education for deaf university students and their lecturers, it is important to acknowledge some limitations that may have influenced the findings and interpretations. Firstly, this study was conducted using a qualitative approach with a small participant group from a specific school. The findings of this study are context-bound and may not be easily transferable to other settings or populations. The data were collected within a specific context and may be influenced by unique contextual factors. Therefore, caution should be exercised when attempting to generalize the findings to different contexts. In addition, the generalizability of the findings to broader populations may be limited. Future research with larger and more diverse samples could enhance the external validity of the findings. Secondly, the scope of this study was limited during the Covid-19 pandemic and the d/hh students in the researcher's classes. While every effort was made to collect and analyze comprehensive data, limitations may have affected the depth and breadth of the study. Certain aspects of the phenomenon under investigation may not have been fully explored due to these constraints. Additionally, qualitative research inherently involves subjective interpretation. The findings of this study are based on the perceptions, experiences, and interpretations of the participants, as well as the researcher's analysis of the data. While efforts were made to ensure rigor and reliability in data analysis as stated in the trustworthiness section, different interpretations are possible. Despite these limitations, the findings of this study contribute to the existing literature on online learning environments of d/hh students and provide a foundation for future research in this area.

Conclusions and Implications

This study has shown that in online education during the Covid-19 pandemic, hearing impaired college students and their lecturers at the SfH face various challenges. It was seen that the challenges were caused by the faculty members, hearing-impaired students and the learning management system used in distance education. In addition to the limitations in the language and communication skills of d/hh students, the lack of learning due to the lack of motivation caused by being away from face-to-face education in the classroom environment emerged as the biggest problem in online education. Furthermore, the limitations in students' access to computers and internet at home is one of the most important obstacles in providing the important infrastructure in online education. Inadequate or absent communication tools provided on online education platforms hinder effective communication between d/hh students and lecturers or other students. This impedes students from fully understanding course materials and engaging in interactions. Also, the absence of text-based transcripts or captions for speech content presented in video materials emerges as a major issue. The results are mostly consistent with previous studies and the literature. In conclusion, d/hh students and lecturers found online education very challenging. Although the lecturers did their best to adapt quickly to the situation, this was not enough to overcome the problems. Failure to overcome the problems leads to the fact that the competencies of the students in a school where vocational education is provided at the university level are not at the desired level and are below the skills required by the profession.

Depending on the results of the present study, some important implications emerged. Firstly, educational materials should be made more accessible for hearing-impaired students. Captions or text-based transcripts should be provided for video content to enhance accessibility. Secondly, online education platforms should offer more effective communication tools for hearing-impaired students. Investments should be made in communication tools that facilitate easy interaction between students and lecturers. In addition, d/hh students and also lecturers should be provided with technical support and training. They should be guided on how to effectively use online education platforms and assisted in dealing with technical issues.

Recommendations

This study was conducted with all volunteer lecturers at SfH and only with students in the Computer Operator Department. The research can be conducted next time with students from all departments at SfH. The problems revealed by the findings of this research are important in terms of creating an effective distance education model for hearing impaired students with action plans and design based on the findings of this research. To develop an effective distance education model for d/hh, the model must focus on eliminating these challenges.

Hence, to address the challenges uncovered in this study and to establish an efficient distance education model for SfH, additional initiatives and research endeavors are imperative. In the development of the distance education model at SfH, employing "Design Based Research" could be undertaken with collaboration from administrators and faculty members. Moreover, to extend the applicability of the study's findings, replication of the same study in diverse educational settings with varying participants by different researchers could be pursued.

Note

This paper is an extended version of the virtual presentation presented at EDULEARN23 (15th Annual International Conference on Educational and New Learning Technologies), 3-5 July 2023 in Palma de Mallorca (Spain) and published as an abstract in the EDULEARN23 proceedings.

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