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Determining needs and priorities of learners with special needs for support services in an open and distance learning context in Turkey

Hakan Genç ID & Serpil Koçdar ID
Anadolu University (Turkey)
hakangenc@anadolu.edu.tr & skocdar@anadolu.edu.tr

Abstract

This study aims to identify needs and priorities of learners with special needs for support services in an open and distance teaching university in Turkey based on disability type. Exploratory sequential design was adopted. In the qualitative phase, semi-structured interviews were performed with six individuals from each group, including hearing impairment, visual impairment, and physical disability to determine the needs of the learners. Data were coded based on a thematic framework involving managerial, pedagogical, social, and technical support. To determine the priorities of the learners with special needs for support services in the quantitative phase, surveys were developed separately for three groups with disabilities based on the qualitative findings. A total of 703 learners took part in the surveys. The quantitative data were analyzed using descriptive statistics. Findings of the study revealed that learners with special needs require a wide variety of services regarding managerial, pedagogical, social, technical and vocational support. Existing support systems need to be improved and awareness for these systems should be increased to make services more inclusive.

Keywords: open and distance learning, learner support services, exploratory sequential design, mixed method, learners with special needs, inclusion at higher education

Introduction

ODL is defined as planned learning and teaching in which the instructors and learners are separated by place or time or both, and communication established through technologies (Moore & Kearsley, 2011). Geographical distance between learner and instructor that is underlined in the definition of distance learning may make it difficult for learners to find answers to problems occurring before, during and after the learning process. In eliminating such adverse effects and creating an effective distance learning program support services play a crucial role (Thorpe, 2002).

Rumble (2000) has suggested ODL institutions should initiate the process of planning support services for distance learners by identifying learner needs. However, in this planning process, one should not ignore the fact that ODL programs are focused on providing educational opportunities to individuals who are unable to attend traditional education due to various reasons; in other words, the learner group has a heterogeneous structure. One of the groups constituting this structure is learners with special needs.

Special Educational Needs refer to "learners with learning, physical, and developmental disabilities; behavioural, emotional, and communication disorders; and learning deficiencies" (Kryszewska, 2017). These learners may require accommodations, or in other words, assistance or arrangements meeting the needs of them (Genc & Kocdar, 2020). Thus, in the context of ODL, it would not be useful to organize support services without considering the learner characteristics (Fiege, 2010). Therefore, this study aims to determine the needs and priorities of students with special needs for support services at Anadolu University, which is a distance teaching university in Turkey. The following research question guided this study:

1. What are the support service needs and priorities of the learners with special needs who are enrolled in the Open Education System of Anadolu University regarding a) managerial, b) pedagogical, c) social and d) technical support?

The study is intended to guide researchers, practitioners, managers and administrators who are interested in serving learners with special educational needs in the field of open and distance learning.

Study Framework

Moore (1997) has theorised that the establishment of quality interaction and dialogue is a crucial component in eliminating barriers to success in ODL. Moore (1989) also defined three types of interaction in ODL: learner-content, learner-instructor and learner-learner. Moore's framework was expanded by Hillman, Willis and Gunawardena (1994) by adding the fourth interaction: learner- system interface.

Disability is not seen as an attribute of a person but a result of the interaction and barriers that prevent them from full participation (Shakespeare, 2006; WHO, 2001; UN, 2008; Jalovcic, 2017). Learners with special needs may face some barriers while interacting with content, other learners, instructors and the system and require support for them. In this context, the study was based on Moore's expanded interaction framework.

Literature Review

Classification of support services in open and distance learning

In a broad sense, learner support in ODL refers to all activities that support learners' progression in their studies as well as producing and presenting course materials (Simpson, 2002). The support services in ODL are classified in different ways in the literature (Bozkurt, 2013; Keast, 1997; Rekkedal & Qvist-Eriksen, 2003; Keegan, 2003; Simpson, 2012). Berge (1995) categorized the necessary conditions for online tutoring into four areas: managerial, pedagogical, social and technical. This classification is also discussed as types of support services and among the most commonly used ones in ODL literature (Aydın, 2011; Durak, 2017; Okur, 2012). According to the classification by Berge (1995), services related to academic skills and course contents can be discussed under pedagogical support; improving human affairs, increasing the dynamics of the group, enhancing learner-learner or learner-instructor non-academic interaction and minimizing the sense of isolation can be discussed under social support; services related to registration procedures, administrative affairs, timetable, organization, evaluation, and procedures can be discussed under managerial support; services for eliminating hardware and software problems encountered by distance learners can be discussed under technical support (Durak, 2017; Okur, 2012).

Learners with special needs in open and distance learning

ODL is believed to play an important role in providing accessibility to higher education opportunities for learners with special needs. The flexibility in the structure of ODL regarding time and place allows for convenience of learner needs and demands in education. Based on the existence of the needs and personal choices of individuals with special needs, ODL should be deemed as a higher education option for those individuals. The facts and figures of some leading open universities also support this claim. For instance, 24,709 learners with special needs studied with the Open University in 2017/18 (The Open University, 2020). Similarly, 22.767 learners with special needs were studying with The Open Education System of Anadolu University in 2018 (Anadolu University,

2018a). However, learners with special needs may face barriers in ODL systems regarding accessibility and e-accessibility. Accessibility in the general sense refers to the extent to which a service, device, product or environment is available and navigable for learners with special needs (Kulkarni, 2019). E-accessibility, on the other hand refers to the ease of use of information and communication technologies by learners with special needs (World Health Organization [WHO], 2013). Researches show that learners with special needs require some accommodations for an accessible ODL environment.

Bunch (2016) examined the experiences of students with learning disorders enrolled in online degree programs. Phenomenological research design was used in the study. 17 students with disabilities participated in the focus group discussion and the interview. The study suggested that the most frequently mentioned challenge was obtaining accommodations. In the study, it is also stated that participants shared examples of difficulty in obtaining the allowable accommodations from instructors. Additionally, participants faced challenges due to lack of timely communication between the department course schedulers, academic advisors, office of disability and academic support.

Massengale and Vasquez (2016) examined the accessibility of online courses. To evaluate the accessibility of six courses presented through the Webcourses platform, WAWE toolbar was used. The study revealed 13 types of challenges. In the study, it was stated that content incompatible with screen readers, use of JavaScript, content opens in pop-up windows, problematic links to text and tables without headers were the most prevalent challenges.

Jalovcic (2017) examined the structure of experience of interaction for learners with disabilities in online university programs. Descriptive method was used and 16 participants were interviewed in the study. The study revealed that learners received a wide variety of accommodations including assistive technologies, materials in alternative formats, alternative assessment formats, cue sheets, extra time to complete a course/exam, tutor, reduced course load, a single contact person at the university, funding and advocacy with instructors. The study also suggested that learners experiences barriers in the system such as tiring processes of accessing accommodations, inconsistencies in providing accommodations, a lack of awareness of disability, accommodations, rights and obligations among instructors, responsiveness of the system to students' inquiries, and over-reliance on text and text based interactions in the design of courses.

Lago and Acedo (2017) investigated inequalities in access to e-learning by learners who are deaf or hard of hearing. The study was conducted via an electronic survey with a non-probabilistic sample. The sample consisted of 484 deaf and hard-of-hearing individuals. The study suggested that lack of accessibility is the reason why 28% do not participate in e-learning activities and the main reason for dropping out for 38. 8%. Additionally, the most frequently mentioned requirements are: subtitling of videos, instructors' proficient in sign language, the translation of texts into sign language, and the availability of texts at different levels of reading difficulty.

Kimmons (2017) evaluated the basic Priority 1 web accessibility of university websites. Web scraping and automated content analysis was used in the study to retrieve and analyze the homepages and first-level subpages of websites of 3141 colleges and universities in the US. The study revealed that web developers are not aware of requirements regarding frames and tables on the websites and do not generally implement them in their designs. In the case of images, many institutions try to provide text equivalency but errors rates were still at 15%. As a conclusion, the study suggested that institutions do not meet accessibility requirements as it should be even when they are aware of some of them.

Cole (2019) investigated the experiences of students with physical disabilities in online courses. In this qualitative study, interviews were conducted with 8 learners with disability. The study revealed that learners face some barriers ranging from psychological (anxiety, isolation) to academic (unclear assignment expectations, reluctance of teachers to accommodate) to financial (increased costs

due to unclear understanding of available accommodations). Additionally, lack of the knowledge of available resources, miscommunication in relation to interactions with teachers and peers, and the feeling of being overwhelmed are the other barriers learners face.

ODL institutions offer a wide variety of support services for learners with special needs. In this context, some categories such as assistive technologies, additional arrangements for exam services and learning materials in alternative formats, come into prominence. All the services related to these categories vary according to disability type, as well (Burgstahler, 2002; Edmonds, 2004; Hirose, 2014; The Open University [OU], 2017; Universitat Oberta de Catalunya [UOC], 2017; University of South Australia [UniSA], 2017; Genc & Kocdar, 2020). However, the early studies in related literature show that a variety of challenges for learners with special needs still exist in ODL environments.

Methodology

This exploratory study is based on data collected from a distance teaching university in Turkey. Exploratory sequential design which is characterized by an initial qualitative phase of data collection and analysis, followed by a phase of quantitative data collection and analysis, and finally integration or linking the data from the two was used in the study. In the first phase of this study, qualitative data were collected using a semi-structured interview technique to determine support services needs of the learners with special needs enrolled in the Open Education System of Anadolu University. At the second phase of the study, quantitative data were collected using three surveys developed specifically for each disability type, *Determining the Priorities of Learners with Special Needs in Support Services (DPLSNSS).* To determine the support services priorities of the participants, descriptive statistics were used such as frequencies, mean scores and standard deviation

Participants

In the qualitative phase, 18 volunteer learners with special needs enrolled in the Open Education System of Anadolu University were included in the study using convenience sampling. According to this sampling, which is a type of nonrandom sampling, members of the target population meeting certain practical criteria, such as geographical proximity, availability at a given time, or the willingness to participate are included in the research (Dörnyei, 2007; Etikan, Musa & Alkassim, 2016). In this research, learners with hearing impairment, visual impairment and physical disability were involved as these groups were available. Six learners with hearing impairment and six learners with visual impairment from Eskisehir province, one learner with physical disability from Ankara province, one learner with physical disability from Antalya province and four learners with physical disability from Eskisehir province participated in the qualitative phase of the study. The online surveys, *DPLSNSS,* developed in the quantitative phase were sent to all learners in three disability types enrolled in the Open Education System via email and SMS. 703 volunteer learners responded to the survey. 314 learners with visual impairment, 289 learners with physical disability and 100 learners with hearing impairment took part in the surveys.

Data collection

In the first phase, the data were collected through semi-structured individual interviews. In the semi-structured individual interviews, some questions are prepared before the interview, so the themes

to be discussed are put in order of precedence (Kvale, 2008). Open-ended questions were included in the interviews to determine participants' needs for support services. In the interviews, students were asked about problems they encountered, their needs and suggestions regarding managerial, academic, social or technical issues. Interview questions were checked by 3 distance education experts who are academicians having a PhD in the field and revised according to their suggestions. In addition, 2 pilot interviews were conducted.

To determine learners' priorities in support services in the quantitative phase, three different surveys for each disability type, *DPLSNSS,* were developed by the researchers based on the data obtained from the qualitative phase and the services already offered by some ODL institutions. Four common items already offered by some ODL institutions added in all surveys. These are "offer online exam opportunity", "offer secondary exam for learners who could not take the exam at the normal schedule due to valid excuses", "provide information on the university website about alternative sources of funding for equipment, devices, software, etc.", "provide an online form allowing learners to indicate their needs". Apart from these four items, determined items in the qualitative phase which is not special to any disability type directly were used in common on all surveys. The participants were required to rate the support services in terms of their importance ranging from 1 (not important at all) to 5 (very important). To ensure face and content validity, the surveys were checked by 3 experts and revised before the implementation phase. Moreover, they were tested by a few students.

Data analysis

In the first phase, the data obtained from the semi-structured interviews were analyzed under three steps: (1) Audio records were transcribed to a computer, analyzed and categorized considering the themes of the research: managerial, pedagogical, social and technical support; (2) An additional theme was determined as *vocational support* which refers to services such as job announcements etc.; (3) Statements of the participants were provided with direct quotations for the needs for support services. The responses to three different *DPLSNSS* questionnaires were analyzed using SPSS Statistics 23.0 software.

The following section comprises qualitative findings obtained from the semi-structured interviews and the quantitative findings obtained from the surveys.

Qualitative findings

This section presents the needs for support services of the learners with physical disability, hearing impairment and visual impairment.

The needs for support services of learners with physical disability

Based on the research findings, in the context of managerial support, learners with physical disability require information about the services offered by Open Education System and reminders for registration and exam schedule via SMS or e-mail. Participant 1 and 2 stated that:

> "Actually, I am not informed much about new programs or new services. I think they can support us by sending an e-mail or SMS."
> "We do not receive any information about exam and registration renewal dates. These are more important issues. Instead, we receive "good luck with your exams" messages."

Additionally, some of the participants noted that the accessibility of exam halls, buildings where face-to-face tutorials take place, exam locations and local offices need to be improved and course books should be delivered to the addresses. Some examples from learners' statements are as follows:

> Participant 3: "The biggest problem is the exam centers. The exam centers are out of town. We are disabled individuals. Sometimes, Exam halls are down stairs."
> Participant 1: "Face to face teaching sessions are given at some universities in cooperation with our University. If the accessibility requirements are met, a learner with physical disability may have access to these sessions."
> Participant 2: "My family is also allowed to get my course books but I could not get one of the course books once. Why do I have to go get my course books? Why do not they send them to me?"

Research findings show that in the context of pedagogical support, learners with physical disability require tutor support and academic support for courses including practice. Participant 1 and 2 stated that:

> "Assign an academician for us to help and give infos about our program."
> "My program requires learning software programs. Books do not work. It is really hard to learn how to use a computer program on your own."

Additionally, participant 1 also noted that they need coursebooks with simplified language.

> "Course books are too complicated. I do not prefer studying them."

In the context of social support, one of learners with physical disability noted that social activities can be organized.

> Participant 4: "Maybe, they can support us with a little more interactive education. For example, different clubs can be created, yet I am not sure about learners' interest in this. Activities can be organized."

Finally, within the context of technical support, one of the participants stated that usability of university websites need to be improved.

> Participant 5 "Indeed, the e-campus or the grading system is insufficient on the web. I suppose that they are complex, you cannot find things easily. The site explanation or complexity can be reduced, I think."

The needs for support services of learners with hearing impairment

Based on the research findings, in the context of managerial support, learners with hearing impairment require support for basic needs such as restroom, etc. in the waiting period before the on-site exam and rest breaks during the exam. Participant 2 and 3 stated that:

> "We are allowed in 30 minutes before the exam. When we come earlier, I regret to say but, we cannot even go to the toilet."
> "I used medication for a certain period of time due to my illness, there was an increase in my hearing problem. I often used to go to the toilet, I got thirsty. Because of that, I could not answer some questions in the last exam. I wrote and sent a petition for this issue to allow us to go to the toilet at least once, but they did not reply to me in time."

In the context of pedagogical support, some of the participants noted course books need to be simplified in terms of language, sign language interpretation for video contents on e-campus and recordings of webinars and face to face tutorials and captioning of all video contents and webinars should be provided. Some examples from learners' statements are as follows:

> Participant 1: "Sincerely, too many details are not useful, but are distracting for us. This is because individuals with hearing disabilities cannot concentrate on one thing for a long time. They can shorten subjects and increase the number of chapters."
> Participant 4: "There are videos of tutorials. I think that those videos will be more useful if they include sign language interpretation."
> Participant 1: "Recorded videos should include subtitles too. Otherwise, nothing can be understood."

Moreover, one of the participants stated that academic support for courses including practice, tutor support and more access to library services can be offered.

> "Learning outcomes can be achieved by reading in cultural courses. But, software programs such as Offices are different. You may need a tutorial while learning them."
> "Learners may not know why they need to master some learning outcomes. Guidance can be offered while studying."
> "As far as I know, any distance learner cannot benefit from the library borrowing system. Neither can learners with hearing impairment."

In the context of social support, one of the participants noted that social activities can be organized and another learner stated that psychological support can be offered for learners with hearing impairment.

> Participant 3: "Apart from the courses, social activities can be organized much more."
> Participant 5: "Indeed, those people may have psychological problems. Psychological support can be provided with expressing himself /herself, and establishing communication."

Within the context of technical support, some of the participants stated that technical support for using e- campus and easy access to e-campus from university website should be provided and links to necessary programs such as Java, Office should be included on the university website.

> Participant 4: "Some people cannot use e-learning portals. People still do not know how to use."
> Participant 1: "You need to get two different passwords to login e-campus and the open education system. This is tiring. All of them can be accessed on the same webpage."
> Participant 1: "University website should include links to essential programs such as Office 365."

Based on the research findings, in addition to managerial, pedagogical, social and technical support, vocational support can be provided. One of the participants noted that vocational guidance can be useful for learners.

> Participant 1: "Guidance sounds good for the next step after graduation. It will be useful to know which professions or branches to select after graduation."

The needs for support services of learners with visual impairment

Based on the research findings, in the context of managerial support, one of the learners with visual impairment stated that she needs to register independently. Another learner noted that they

need support for meeting their attendants or relatives accompanying them after the on-site exam. Additionally, one of the participants stated that accessibility of the university buildings should be improved.

> Participant 1: "Unfortunately, I have to ask my brother/sister, cousin, or anyone who has no visual impairment as not to make any mistake, as registration renewal, etc. is a bit more official."
> Participant 2: "My friends with visual impairment have difficulty meeting their parents after the exams, because phones are not allowed in. We have some problems in this regard."
> Participant 3: "Accessible classrooms must be created. Tactile paving and tactile room number signs must be provided."

In the context of pedagogical support, learners with visual impairment require course book with simplified language, audio books vocalized by the related experts and with natural sound, course books cleared from distracting factors and details perceived by screen readers and tutor support. Some examples from learners' statements are as follows:

> Participant 5: "Course book contents are too complicated. They should be simplified."
> Participant 3: "I study international relations. The readers should be experts in the related field. For example, there are many foreign words in the international relations department. If readers do not pronounce the terms accurately we may get it wrong."
> Participant 1: "Screen readers read some details such as in-text citations. This can make the information difficult to follow and make us confused."
> Participant 5: "Some audio books are provided with mechanical sounds. This does not sound natural, that robotic sound is... You know it is unattractive."
> Participant 2: "Being in a contact with an instructor to talk about what we can do would be fine. I am under the impression that so many learners with disabilities have difficulty in studying."

Additionally, one of the participants stated that all learning materials need to be compatible with screen readers and learning materials in word and audio format should be provided on e-campus. Another learner noted that library services should be accessible and audio novels and stories should be offered.

> Participant 3: "The whole system must be accessible. They all must be compatible with screen readers."
> Participant 3: "Each book should have an audio version and Word format and actually, this can be present in the system and accessible any time."
> Participant 3: "The books in the library must be accessible. Apart from the course books, audio novels and stories should be offered."

Moreover, participant 6 stated that course exemption can be offered for learners with visual impairment because he had difficulty in learning Ottoman Turkish Language. Participant 4 noted that learners should have an opportunity to utilize document conversion services such as Word and Braille converter.

> "Braille printer or the software programs converting text into Word format can be utilized. Learners should be aware of these things."
> "Ottoman Turkish language was very difficult to me. The manuscript is in Arabic. The Ottoman Turkish exam was very difficult for me."

In the context of social support, one of the participants noted that social activities can be organized and another learner stated that psychological support can be offered and social responsibility projects under the leadership of university can be conducted.

Participant 3: "Some cultural or sports activities can be organized to integrate disabled learners into community."

Participant 2: "In fact, they can provide us with psychological support for the problems we face outside."

Finally, in the context of technical support, participant 1 stated that accessibility and usability of university websites can be improved.

Participant 1: "Unfortunately, we interact by computers and screen reader programs. The screen reader programs may not read some of the contents and sometimes unexpected things may happen because of the complexity. The online contents and the design of the internet environment can be simplified."

Quantitative findings

This section comprises number of answers in each item and arithmetic mean and standard deviation of the responses that learners with special needs gave to managerial (Table 1), pedagogical (Table 2), social (Table 3), technical (Table 4) and vocational (Table 5) support. The standard deviation for the five point Likert ranged between 0. 84 and 1. 56 for participants with physical disability, 0. 67 and 1. 55 for participants with hearing impairment and 0. 71 and 1. 51 for participants with visual impairment. It showed that the responses did not deviate much from the mean score and did not contain risk.

Table 1: The priorities for managerial support services of the learners with special needs

Managerial supports	Physical disability				Hearing Impairment				Visual impairment			
	Item Value	N	$\bar{x}$	SD	Item Value	N	$\bar{x}$	SD	Item Value	N	$\bar{x}$	SD
(1) Inform learners about the services offered by Open Education System via SMS	1 2 3 4 5	7 3 19 20 240	4.67	0.84	1 2 3 4 5	2 0 7 10 81	4.68	0.77	1 2 3 4 5	11 4 15 22 262	4.66	0.90
(2) Inform learners about the services offered by Open Education System via e-mail	1 2 3 4 5	23 13 42 34 177	4.14	1.28	1 2 3 4 5	9 3 11 13 64	4.20	1.28	1 2 3 4 5	32 18 45 44 175	3.99	1.36
(3) Remind learners about registration and examination dates via SMS	1 2 3 4 5	8 3 11 16 251	4.73	0.81	1 2 3 4 5	2 1 0 7 90	4.82	0.67	1 2 3 4 5	7 1 10 15 281	4.79	0.72
(4) Remind learners about registration and examination dates via e-mail.	1 2 3 4 5	24 13 39 28 185	4.17	1.29	1 2 3 4 5	13 2 9 12 64	4.12	1.40	1 2 3 4 5	35 14 43 35 187	4.04	1.38

(Continued)

Table 1: (Continued)

Managerial supports	Physical disability				Hearing Impairment				Visual impairment			
	Item Value	N	$\bar{x}$	SD	Item Value	N	$\bar{x}$	SD	Item Value	N	$\bar{x}$	SD
(5) Provide support with basic needs such as restroom, etc. in the waiting period before the on-site exam	1 2 3 4 5	24 4 25 27 209	4.36	1.22	1 2 3 4 5	10 4 15 16 55	4.02	1.33	1 2 3 4 5	22 9 36 32 215	4.30	1.20
(6) Offer online registration opportunity compatible with screen readers									1 2 3 4 5	15 5 26 35 233	4.48	1.04
(7) Allow rest breaks during the exam if it is necessary	1 2 3 4 5	52 25 54 28 130	3.55	1.55	1 2 3 4 5	18 6 17 12 47	3.64	1.54	1 2 3 4 5	47 21 58 45 143	3.69	1.47
(8) Offer secondary exam for learners who could not take the exam at the normal schedule due to valid excuses	1 2 3 4 5	30 7 19 17 216	4.32	1.32	1 2 3 4 5	11 6 7 9 67	4.15	1.40	1 2 3 4 5	28 9 29 32 216	4.27	1.27
(9) Improve the accessibility of examination rooms	1 2 3 4 5	25 7 13 17 227	4.43	1.23					1 2 3 4 5	17 9 24 28 236	4.46	1.10
(10) Offer online exam opportunity	1 2 3 4 5	32 11 28 27 191	4.16	1.37	1 2 3 4 5	16 2 11 5 66	4.03	1.52	1 2 3 4 5	37 11 33 40 193	4.09	1.38
(11) Improve the accessibility of buildings where face-to-face tutorials take place	1 2 3 4 5	23 11 27 31 197	4.27	1.25					1 2 3 4 5	27 14 35 27 211	4.21	1.30

(Continued)

Table 1: (Continued)

Managerial supports	Physical disability				Hearing Impairment				Visual impairment			
	Item Value	N	$\bar{x}$	SD	Item Value	N	$\bar{x}$	SD	Item Value	N	$\bar{x}$	SD
(12) Improve the accessibility of exam locations	1 2 3 4 5	24 6 10 20 229	4.47	1.20	1 2 3 4 5	9 6 6 5 74	4.29	1.33	1 2 3 4 5	20 7 23 17 247	4.48	1.13
(13) Improve the accessibility of local offices	1 2 3 4 5	23 5 18 27 216	4.41	1.19					1 2 3 4 5	14 7 32 36 225	4.44	1.05
(14) Support learners with special needs in meeting their attendants or relatives accompanying them after the on-site exam	1 2 3 4 5	26 12 27 35 189	4.21	1.29	1 2 3 4 5	17 5 10 11 57	3.86	1.55	1 2 3 4 5	20 12 43 37 202	4.24	1.20
(15) Deliver course books to the address	1 2 3 4 5	43 8 36 20 182	4.00	1.47	1 2 3 4 5	16 7 6 9 62	3.94	1.55	1 2 3 4 5	48 17 32 32 185	3.92	1.51
(16) Provide an online form allowing learners to indicate their needs	1 2 3 4 5	29 10 31 30 189	4.18	1.33	1 2 3 4 5	12 2 11 13 62	4.11	1.37	1 2 3 4 5	20 7 30 41 216	4.36	1.15
(17) Provide information on the university website about alternative sources of funding for equipment, devices, software, etc	1 2 3 4 5	32 9 27 36 185	4.15	1.35	1 2 3 4 5	9 1 12 12 66	4.25	1.25	1 2 3 4 5	23 10 38 36 207	4.25	1.22

Based on the mean scores, ($\bar{x}$ = 4. 73 to 3. 55) for participants with physical disability, ($\bar{x}$ = 4. 82 to 3. 64) for participants with hearing impairment and ($\bar{x}$ = 4. 79 to 3. 69) for participants with visual impairment, all disability groups designated the items "remind learners about registration and examination dates via SMS" and "inform learners about the services offered by Open Education System via SMS" as most important and "allow rest breaks during the exam if it is necessary" as least important within the context of managerial support.

Table 2: The priorities for pedagogical support services of the learners with special needs

Pedagogical supports	Physical disability				Hearing Impairment				Visual impairment			
	Item Value	N	x̄	SD	Item Value	N	x̄	SD	Item Value	N	x̄	SD
(1) Simplify course books in terms of language	1 2 3 4 5	28 12 39 30 180	4.11	1.33	1 2 3 4 5	9 5 9 12 65	4.19	1.31	1 2 3 4 5	30 5 34 47 198	4.20	1.27
(2) Provide course books cleared from distracting factors and details sensed by screen readers									1 2 3 4 5	14 11 32 38 219	4.39	1.09
(3) Include course books in Word format on e-campus									1 2 3 4 5	13 5 31 34 231	4.48	1.02
(4) Offer audio books vocalized by the related experts to ensure correct pronounce of foreign words in the related field									1 2 3 4 5	18 7 29 41 219	4.39	1.11
(5) Provide audio books with natural sound instead of mechanic sound									1 2 3 4 5	19 6 34 32 213	4.29	1.20
(6) Offer learning materials compatible with screen readers on e-campus									1 2 3 4 5	16 8 31 42 217	4.39	1.09
(7) Provide audio learning materials apart from course books on e-campus									1 2 3 4 5	17 16 28 38 215	4.33	1.16

(Continued)

Table 2: (Continued)

Pedagogical supports	Physical disability				Hearing Impairment				Visual impairment			
	Item Value	N	$\bar{x}$	SD	Item Value	N	$\bar{x}$	SD	Item Value	N	$\bar{x}$	SD
(8) Provide learning materials in Word format apart from course books on e-campus									1 2 3 4 5	17 17 29 53 198	4.27	1.16
(9) Provide audio novels and stories apart from the course books									1 2 3 4 5	41 17 51 41 164	3.86	1.43
(10) Offer an opportunity to convert materials into Braille format (Braille printer)									1 2 3 4 5	41 21 48 54 150	3.80	1.42
(11) Offer an opportunity to convert written materials into Word format									1 2 3 4 5	21 7 47 56 183	4.19	1.18
(12) Provide sign language interpretation for video contents on e-campus					1 2 3 4 5	13 7 9 14 57	3.95	1.45				
(13) Provide captioning for all video contents					1 2 3 4 5	8 3 11 8 70	4.29	1.25				
(14) Provide captioning for webinars					1 2 3 4 5	9 3 6 10 72	4.33	1.27				

(Continued)

Table 2: (Continued)

Pedagogical supports	Physical disability				Hearing Impairment				Visual impairment			
	Item Value	N	x̄	SD	Item Value	N	x̄	SD	Item Value	N	x̄	SD
(15) Provide sign language interpretation for recordings of live online tutorials					1 2 3 4 5	14 3 15 14 54	3.91	1.44				
(16) Provide sign language interpretation for recordings of face to face tutorials					1 2 3 4 5	14 6 12 14 54	3.88	1.47				
(17) Offer course exemption and similar arrangements in the curriculum based on learner needs	1 2 3 4 5	26 9 26 40 188	4.23	1.27	1 2 3 4 5	5 8 7 11 69	4.31	1.20	1 2 3 4 5	23 10 24 35 222	4.35	1.20
(18) Assign an academic supervisor for each learner with special needs (tutor support)	1 2 3 4 5	37 12 50 45 145	3.86	1.40	1 2 3 4 5	12 9 15 12 52	3.83	1.45	1 2 3 4 5	38 12 51 43 170	3.94	1.39
(19) Provide learners with online academic support for courses including practice	1 2 3 4 5	26 11 31 40 181	4.17	1.29	1 2 3 4 5	7 3 10 20 60	4.23	1.18	1 2 3 4 5	21 12 25 47 209	4.31	1.18
(20) Offer access to library services	1 2 3 4 5	30 14 33 43 169	4.06	1.35	1 2 3 4 5	14 2 11 15 58	4.01	1.43	1 2 3 4 5	19 10 32 65 188	4.25	1.14

Based on the mean scores, participants with physical disability designated the item "offer course exemption and similar arrangements in the curriculum based on learner needs" as most important ($\overline{x}$ = 4.23) and "assign an academic supervisor for each learner with special needs" as least important ($\overline{x}$ = 3.86), participants with hearing impairment designated the item "provide captioning for webinars" as most important ($\overline{x}$ = 4.33) and "assign an academic supervisor for each learner with special needs" as least important ($\overline{x}$ = 3.83), participants with visual impairment designated the item "include course books in Word format on e-campus" as most important ($\overline{x}$ = 4.48) and "offer an opportunity to convert materials into Braille format as least important ($\overline{x}$ = 3.80) within the context of pedagogical support.

Table 3: The priorities for social support services of the learners with special needs

Social supports	Physical disability				Hearing Impairment				Visual impairment			
	Item Value	N	$\overline{x}$	SD	Item Value	N	$\overline{x}$	SD	Item Value	N	$\overline{x}$	SD
(1) Organize social activities	1 2 3 4 5	55 34 46 35 119	3.45	1.56	1 2 3 4 5	17 3 19 12 49	3.73	1.51	1 2 3 4 5	45 24 68 40 137	3.64	1.45
(2) Provide psychological counseling and guidance	1 2 3 4 5	45 22 44 40 138	3.71	1.50	1 2 3 4 5	15 7 17 13 48	3.72	1.49	1 2 3 4 5	38 20 61 49 146	3.78	1.40
(3) Conduct responsibility projects for the learners with special needs under the leadership of the university	1 2 3 4 5	34 20 31 54 150	3.92	1.40	1 2 3 4 5	13 4 16 18 49	3.86	1.40	1 2 3 4 5	32 11 43 44 184	4.07	1.33

Based on the mean scores, ($\overline{x}$ = 3. 92) for participants with physical disability, ($\overline{x}$ = 3. 86) for participants with hearing impairment and ($\overline{x}$ = 4. 07) for participants with visual impairment, all disability groups designated the item "conduct responsibility projects for the learners with special needs under the leadership of the university" as most important within the context of social support.

Table 4: The priorities for technical support services of the learners with special needs

Technical supports	Physical disability				Hearing Impairment				Visual impairment			
	Item Value	N	$\bar{x}$	SD	Item Value	N	$\bar{x}$	SD	Item Value	N	$\bar{x}$	SD
(1) Increase usability of university website	1 2 3 4 5	16 7 19 40 207	4.44	1.09	1 2 3 4 5	8 2 2 19 69	4.39	1.77	1 2 3 4 5	12 5 26 32 239	4.53	0.98
(2) Increase the usability of e-campus website	1 2 3 4 5	19 4 33 33 200	4.35	1.15	1 2 3 4 5	8 1 8 16 67	4.33	1.19	1 2 3 4 5	11 9 18 36 240	4.54	0.97
(3) Provide technical support for the use of e-campus	1 2 3 4 5	21 13 42 43 170	4.13	1.24	1 2 3 4 5	8 5 18 13 56	4.04	1.29	1 2 3 4 5	17 15 43 46 193	4.22	1.17
(4) Offer easy access to e-campus from university website	1 2 3 4 5	20 4 20 38 207	4.41	1.14	1 2 3 4 5	4 3 5 14 74	4.51	1.01	1 2 3 4 5	7 9 23 43 232	4.54	0.91
(5) Include links to essential programs such as Java, Office, screen reader, etc. on the university website	1 2 3 4 5	25 8 36 45 175	4.17	1.26	1 2 3 4 5	8 5 11 18 58	4.13	1.26	1 2 3 4 5	20 17 34 44 199	4.23	1.21
(6) Increase the accessibility of university website for screen reader users									1 2 3 4 5	18 10 33 38 215	4.34	1.14

Based on the mean scores, participants with physical disability designated the item "increase usability of university website" as most important ($\bar{x}$ = 4. 44), participants with hearing impairment designated the item "offer easy access to e-campus from university website" as most important ($\bar{x}$ = 4. 51) and participants with visual impairment designated the items "offer easy access to e-campus from university website" and "increase the usability of e-campus website" as most important ($\bar{x}$ = 4.54) within the context of technical support.

Table 5: The priorities for vocatioanal support services of the learners with special needs

Vocational supports	Physical disability				Hearing Impairment				Visual impairment			
	Item Value	N	$\bar{x}$	SD	Item Value	N	$\bar{x}$	SD	Item Value	N	$\bar{x}$	SD
(1) Include links to internship announcements for the learners with special needs on the university website	1 2 3 4 5	27 7 34 45 176	4.16	1.28	1 2 3 4 5	10 5 13 15 57	4.04	1.34	1 2 3 4 5	21 17 40 42 194	4.18	1.23
(2) Include links to job announce-ments for the learners with spe-cial needs on the university website	1 2 3 4 5	24 8 32 42 183	4.22	1.24	1 2 3 4 5	11 3 10 14 62	4.13	1.35	1 2 3 4 5	25 15 35 52 187	4.15	1.26

Based on the mean scores, ($\bar{x}$ = 4. 22) for participants with physical disability and ($\bar{x}$ = 4, 13) for participants with hearing impairment, participants with physical disability and hearing impairment designated the item "include links to job announcements for the learners with special needs on the university website" as most important. On the other hand, participants with visual impairment designated the item "include links to internship announcements for the learners with special needs on the university website" as most important ($\bar{x}$ = 4. 18) within the context of vocational support.

Discussion, Conclusions and Suggestions

In this study, we explored the needs and priorities of learners with special needs for support services in a distance teaching university. The Open Education System of Anadolu University offers many support opportunities for learners with different special needs. However, the study revealed that learners with special needs require a wide variety of services in the context of managerial, pedagogical, social, technical and vocational support. Additionally, the arithmetic means indicating the priorities of support services range from ($\bar{x}$ = 4. 82) to ($\bar{x}$ = 3. 45). Research findings show that within the context of managerial support, participants prioritize "reminding about registration and examination dates" as well as "providing information about the services offered by distance learning via SMS" and attach the least importance to "allowing rest breaks during the exam if it is necessary". The services that are deemed the most and the least important do not differ by disability groups. The finding showing the need for information about available services confirms the research of Cole (2019) who reported the lack of knowledge of available accommodations as a barrier for students with disability. However, it is surprising that students report their need for a reminder about registration and exam dates and information about the existing services in this study as they are frequently reminded by SMS, email, social media and website announcements. It can be concluded that more attention should be paid to giving information about existing and new support services. In the context of examination services,

one of the important components of managerial support, some ODL institutions provide equipment like ergonomic chairs and foot stools, extra time during the exams, rest breaks up to 30 minutes, online exam services, secondary exam, larger font size texts, Braille texts, the opportunity to use assistive technologies, amanuensis support, alternative exam centers, special parking spaces, exam centers with elevator and ramp, easily accessible large classrooms, wheelchair-compatible desks. Open Education System of Anadolu University offers an opportunity to take exam at home for bed bound learners, exam centers with elevator, ramps, scribe support and an opportunity to take the exams on the ground for learners with physical disability; scribe and/or reader support, an at least two question exemption in each course, an exam paper and answer key with large font for learners with visual impairment (OU, 2017; UOC, 2017; UniSA, 2017; Anadolu University, 2018b). However, some participants in the study noted that physical accessibility of exam locations and rooms still need to be improved. Additionally, arithmetic means of priorities given by participants for services like online exam and secondary exam which are already offered by some ODL institutions are above (4.03) in all disability groups. Therefore, it can be concluded that these services might also be included in ODL environments. One of the other requirements revealed in the study is e-accessibility for screen reader users. One of the participants noted that systems compatible with screen readers need to be designed. Thus, they can register without getting help from anyone.

Research findings show that within the context of pedagogical support, the needs of the participants differ by disability groups. The findings reveal that participants with visual impairments need more learning materials compatible with screen readers and in alternative formats such as audio, Word and Braille. Some of the ODL institutions provide learners with visual impairment with alternative learning materials such as e-books, Daisy digital audio versions of learning materials, audio and text versions of printed materials, Braille products, learning materials in Word and pdf formats. All these services, the statements of some participants in this study and the services offered in Anadolu University share similarity (Anadolu University, 2018b). In their study, Oh and Lee (2016) reported that devices such as screen readers and Braille note-takers are not always compatible with the latest computers and software, and this problem prevents learners with visual impairment from interacting in e-learning environments. Therefore, interactions with the course content can be a stressor for them. Interaction with the course content may act as a premise variable when increasing the impact of learning-related anxiety on intention to persist in an e-learning environment. Considering the importance of content interaction and the participants' statements in this study, it can be concluded that the services already offered in this context need to be improved. Furthermore, the participants prioritize Word format in learning materials while they find Braille format least important. This is believed to stem from participants' Braille illiteracy (Anadolu University, 2017).

ODL offers an alternative learning experience to learners with hearing impairment who may have disadvantages in terms of verbal communication in conventional education. Within the context of pedagogical services, some of the ODL institutions provide learners with hearing impairment with real time captioning, transcripts for video/audio content, captioning of all videos and online resources, sign language interpretation, printed version of online modules, environments suitable for lip-reading and induction loops for on-site activities (UniSA, 2017; OU, 2017). The results of this study suggest that learners with hearing impairment need and prioritize captioning for webinars, while they attach the least importance to sign language interpretation in videos. This is believed to stem from learners' sign language illiteracy (Anadolu University, 2017). Additionally, the findings show that participants need simplified course books in terms of language. The study shares similarities with findings of a study by Lago and Acedo (2017) who reported that some of the most frequently mentioned requirements by learners with hearing impairment are subtitling of videos and the availability of texts at different levels of reading difficulty. It also shares similarities with findings of another study by Mpofu, Chimhenga

and Mafa (2013) who reported that to some extent the language used in the modules in Zimbabwe Open University should be simplified for learners with hearing impairment.

One of the pedagogical services determined as a need in this study and offered by some ODL institutions is library services. In this context, the Open University provides services such as remote access to library services, a library web site and online librarian chat accessible to screen reader users, explanations on the accessibility of databases, a guidebook on searching for resources with screen readers and links to accessible formats (e.g., audio books, talking newspaper, Braille books) presented by other organizations (OU, 2017). It shows that some ODL institutions offer remote access to library services and also attach importance to accessibility. Anadolu University also offers open library services including e-books, audio books, videos, online databases, journals and digital magazines. Based on the research findings it seems reasonable to conclude some learners were not aware of the library opportunities. Because the arithmetic means of the responses given by the participants for the "provide access to library services" in terms of priority are above (4.00) in all disability groups. Additionally, one of the participants noted that borrowing books from the library is not available for distance learners. Thus, it can be concluded that accessibility of library services which is an integral part of education needs to be improved and more awareness for the existing support services should be developed via presentations, social media or orientation sessions.

According to the research findings, learners with special needs enrolled in the Open Education System require course exemption and similar regulations, as well. However, pursuant to the decree of Turkish Council of Higher Education, the Course Matching and Adaptation Commission gathered in 2016 at the Anadolu University Open Education System and settled on course adaptation or course matching instead of course exemption (Anadolu University, 2017). Similarly, Universitat Oberta de Catalunya has a Curriculum Adaptation Committee which makes modifications on the content, method, and skills in the curriculum based on learner needs (UOC, 2017). Jalovcic (2017) who examined the structure of experience of interaction for learners with disabilities in online university programs reported that learners received a wide variety of accommodations and reduced course load was one of them. To conclude, curriculum or content can be functionally arranged based on the learners with special needs in ODL environments.

"Providing learners with academic support for courses including practice" and "assigning an academic supervisor for each learner with special needs" are other pedagogical requirements determined in the study. Examination of the services offered by some ODL institutions within this context show that the Open University, Universitat Oberta de Catalunya and University of South Australia offer tutor support to all learners to provide them with academic support. The Open University offers tutor support by arranging meetings with instructors and learners in an online platform in some module activities and provides contacts for the learners with special needs to express their demands to be able take part in these sessions (OU, 2017; UOC, 2017; UniSA, 2017). In his research, Richardson (2016) suggested that learners with special needs should have access to both face to face and online tutorial support. Additionally, Oh and Lee (2016) reported in their study that learning-related anxiety negatively affects intention to persist with e-learning among students with visual impairment and interaction with instructors have a buffering effect on the relation between learning related-anxiety and intention to persist. Heindel (2014) reported that feelings of isolation in the disabled population can be compounded by a perceived lack of interaction in the online courses by the instructors and other students. Findings in this study show that learners with special needs give more importance to interaction with an instructor in courses including practice, compared to an academic supervisor (tutor support). In the light of findings of earlier studies and this study, it can be concluded that these services might be improved in ODL environments.

Research findings show that within the context of social support, participants require psychological counselling, social activities and social responsibility projects under the leadership of the university. Apart from that, the priority in the context of social support does not differ by disability groups. "Conducting social responsibility projects for the learners with special needs under the leadership of the university" is prioritized in all disability groups. Lapadula (2003) has discussed that distance learners need services such as book clubs, chat rooms, online peer support groups, student newspapers, online tutoring and an access to online psychologists. The counseling service specified in the study is similar to the findings of this study, also, it is included in the services offered by some ODL institutions. For instance, University of South Australia offers counseling and disability advisers for the learners with special needs (UniSA, 2017). In the context of social support, the Open University provides social media groups and forums for learners with special needs; In the Open Education System of Anadolu University, there is a choir of visually impaired and hearing impaired individuals (OU, 2017; Anadolu University, 2018b). A study conducted by Cole (2019) revealed that the level of isolation described by participants with disability in online courses seemed to reach extreme levels. Considering the findings of the related studies, the participants' statements in this study and the services already offered by some universities, it can be concluded that services like counselling, social activities and responsibility projects for learners with special needs should be included in ODL environments.

Within the context of technical support, participants noted that the usability and accessibility of university websites need to be improved. The findings of the study share some similarities with the literature. Simui et al. (2018) who explored literature to reveal enablers and disablers to academic success of students with visual impairments at higher education reported that exclusive practices such as lack of adaptive technologies, technical difficulties using e-learning and connecting to websites and course management systems, and poor use of e-learning by lecturers still exist. A study conducted by Kimmons (2017) to explore the web accessibility of university websites revealed that institutions do not meet accessibility requirements as it should be even when they are aware of some of them. Massengale and Vasquez (2016) who examined the accessibility of online courses reported that content incompatible with screen readers, table without headers, problematic links to text, content opening in pop-up windows and use of JavaScript were the most prevalent challenges. Examination of the web accessibility offered by some ODL institutions show that Universitat Oberta de Catalunya, the Open University and the University of South Australia made adaptations conforming to the World Wide Web Consortium standards on the website design. Open Education System of Anadolu University has a website conforming to the Level A Conformance to Web Content Accessibility Guidelines 2.0 available specifically for learners with special needs, as well. However, web accessibility still needs to be improved based on research findings. The other services offered in this context in some ODL institutions include expert evaluation of learners' need for assistive technologies, remote and on-site technical support for the use of assistive technologies, blogs that include frequently asked questions and where support requests can be sent regarding problems related to assistive technologies and links to programs used for reading, writing and time management (Athabasca University [AU], 2018). In this study, the other technical support requirements are links to essential programs like Java, office, screen reader, etc. and helpdesk for the use of the course management system. The arithmetic means of the responses given by the participants for the technical support services in terms of priority are over (4.00) in all disability groups. To conclude, the learners' requirements determined in this study and the services already offered by other ODL institutions might be taken into consideration in planning learner support services.

The last support service which is determined in the qualitative phase for all disability groups is vocational support. In this context, the Open University provides job seeking resources and opportunities

brochures, comprehensive information on job applications for learners with special needs, other links related to occupations, and comprehensive information on points necessary to consider during job interviews. In this study, the arithmetic means of both vocational support services are over (4.00) in all disability groups. Therefore, these types of services might also be taken into consideration in planning support services in ODL institutions.

To conclude, ODL institutions provide educational opportunities to individuals who are unable to attend traditional education due to various reasons. In other words, the learner group in ODL has a heterogeneous structure. Therefore, learner support systems need to be designed to the greatest extent possible. To be able to determine this extent, future research should explore the needs of all learners separately according to characteristics of their disability. This study focused on learners with hearing impairment, visual impairment and physical disability were involved as these groups were available. In future studies, learners having other types of disabilities can be included. Learners' satisfaction with available support services in ODL can be assessed. In addition to these, what accommodations other ODL institutions offer for learners should be explored in more detail. Based on the findings of this study, the following can be suggested:

a. providing learning opportunities involving more learner-content, learner-instructor, learner-learner and learner-system interaction to better inform disabled students and increase their satisfaction levels;
b. managerial support such as information about available services, online exam, secondary exam, rest breaks during the exam, information about alternative sources of funding for equipment, devices, software, etc., delivering course books to the address, accessible exam halls and locations, local offices and buildings can be offered in ODL for learners with special needs;
c. pedagogical support such as tutor support, interaction with instructor in the courses including practice, course exemption or arrangements in the curriculum based on learner needs and access to library services can be offered in ODL for learners with special needs;
d. pedagogical support such as captioning and sign language interpretation for audio/video contents and simplified course books in terms of language can be offered in ODL for learners with hearing impairment;
e. pedagogical support such as audio books vocalized by the related experts, course books cleared from distracting factors and details sensed by screen readers, learning materials in Word, Braille and audio format, learning materials compatible with screen readers, audio novels and stories and audio books with natural sound instead of mechanic sound can be offered in ODL for learners with visual impairment;
f. social support such as counseling services, social activities and social responsibility projects;
g. technical supports such as accessible and usable websites, links to essential programs like Java, office, screen reader, etc. and helpdesk for the use of course management systems
h. vocational support such as links to job and internship announcements can be offered in ODL for the learners with special needs
i. more awareness about the existing support services for disabled learners should be developed via various means such as one-to-one tutorials, orientation sessions, social media or frequent announcements.

Authors' note

References

Anadolu University (2017). *Engelli öğrenciler çalıştayı* [Learners with special needs workshop]. Eskişehir, 1–82.

Anadolu University (2018a). *2. Engelsiz Açıköğretim çalıştayı raporu* [The report of 2th open education disability workshop] Eskişehir: Anadolu Üniversitesi. Retrieved from http://engelsizaof.anadolu.edu.tr/pdf/2018_yili_engelli_calistayi.pdf

Anadolu University (2018b). *Açıköğretim sistemi*. [Open education system] Retrieved from http://engelsizaof.anadolu.edu.tr/#

Athabasca University [AU] (2018). *Access to students with disabilities*. Retrieved from http://asd.athabascau.ca/index.php

Aydın, H. C. (2011). *Açık ve uzaktan öğrenme: Öğrenci adaylarının bakış açısı* [Open and distance learning: The perspective of prospective learners]. Ankara: Pegem.

Berge, Z.L. (1995). Facilitating computer conferencing: recommendations from the field. *Educational Technology*, *5*(1), 22–30.

Bozkurt, A. (2013). Mega üniversitelerde öğrenci destek hizmetleri [Support services in mega universities]. *Proceedings of the Academic Informatics Conference* (pp. 395–401). Antalya: Akdeniz University. Retrieved from https://www.academia.edu/2536907/Mega_%C3%9Cniversitelerde_%C3%96%C4%9Frenci_Destek_Hizmetleri

Bunch, S. L. (2016). *Experiences of students with specific learning disorder (including ADHD) in online college degree programs: A phenomenological study* (Doctoral Dissertation). Liberty University. Retrieved from https://digitalcommons.liberty.edu/doctoral/1190

Burgstahler, S. (2002). Universal design of distance learning. *Information Technology and Disabilities E-Journal, 8*(1). Retrieved from http://itd.athenpro.org/volume8/number1/burgstah.html

Cole, A. E. (2019). *Experiences of postsecondary students with physical disabilities with online learning* (Doctoral Dissertation). Walden University. Retrieved from https://scholarworks.waldenu.edu/dissertations/6985/

Dörnyei, Z. (2007). *Research methods in applied linguistics*. New York: Oxford University Press.

Durak, G. (2017). Uzaktan eğitimde destek hizmetlerine genel bakış: sorunlar ve eğilimler. [A general outlook on the issue of support services in open and distance learning: trends and problems]. *Açıköğretim Uygulamaları ve Araştırmaları Dergisi*, *3*(4), 160–173.

Edmonds, D. C. (2004). Providing access to students with disabilities in online distance education: Legal and technical concerns for higher education. *American Journal of Distance Education*, *18*(1), 51–62.

Etikan, İ., Musa A. S., & Alkassim, R. S. (2016) Comparison of convenience sampling and purposive sampling, *American journal of theoretical and applied statistics*, *5*(1), 1–4.

Fiege, K. (2010). *Successful practices in supporting students in distributed learning; Meeting the needs of diverse students engaging in e-learning.* Calgary, Canada: Bow Walley.

Genc, H., & Kocdar, S. (2020). Supporting learners with special needs in open and distance learning. In G. Durak, & S. Çankaya (Eds.), *Managing and designing online courses in ubiquitous learning environments* (pp. 128–151). Hershey, PA: IGI Global. https://doi.org/10.4018/978-1-5225-9779-7.ch007

Heindel, A. J. (2014). *A phenomenological study of the experiences of higher education students with disabilities with online coursework* (Unpublished doctoral dissertation). University of South Florida. Retrieved from https://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=6233&context=etd

Hillman, D. C., Willis, D. J., & Gunawardena, C. N. (1994). Learner-interface interaction in distance education: An extension of contemporary models and strategies for practitioners. *American Journal of Distance Education, 8*(2), 30–42.

Hirose, Y. (2014). OUJ's New Challenge: The supporting systems for the students with disabilities in the Open University of Japan. *Journal of the Open University of Japan, 32,* 93–99.

Jalovcic, D. (2017). *Experiences of interaction for students with disabilities in online university programs* (Thesis). Athabasca University. Retrieved from http://handle.net/10791/239

Keast, A. D. (1997). Toward an effective model for implementing distance education programs. *American Journal of Distance Education*, *11*(2), 39–55.

Keegan, D. (2003). Introduction. In H. Fritsch (Ed.), *The role of student services in e-learning systems* (pp. 1–6). FeernUniversitat in Hagen: ZIFF.

Kimmons, R. (2017). Open to all? Nationwide evaluation of high-priority web accessibility considerations among higher education websites. *Journal of Computing in Higher Education*, *29*, 434–450. https://doi.org/10.1007/s12528-017-9151-3

Kryszewska, H. (2017). Teaching students with special needs in inclusive classrooms special educational needs. *ELT Journal*, *71*(4), 52–528. https://doi.org/10.1093/elt/ccx042

Kulkarni, M. (2019). Digital accessibility: Challenges and opportunities. *IIMB Management Review*, *31*(1), 91–98.

Kvale, S. (2008). *Doing interviews*. Wintshire, CA: Sage.

Lago, E. F. & Acedo, S. O. (2017). Factors affecting the participation of the deaf and hard of hearing in e-learning and their satisfaction: A Quantitative study. *The International Review of Research in Open and Distributed Learning*, *18*(7), 268–291. https://doi.org/10.19173/irrodl.v18i7.2862

Lapadula, M. (2003). Comprehensive look at online student support services for distance learners. *American Journal of Distance Education*, *17*(2), 119–128.

Massengale, L. R., & Vasquez, E. I. (2016). Assessing accessibility: How accessible are online courses for students with disabilities?. *Journal of the Scholarship of Teaching and Learning*, *16*(1), 69–79. https://doi.org/10.14434/josotl.v16i1.19101

Moore, M. G. (1989). Three types of interaction. *The American Journal of Distance Education, 3*(2), 1–7.

Moore, M. (1997). Theory of transactional distance. In D. Keegan (Ed.), *Theoretical principles of distance education* (pp. 22–38). New York: Routledge.

Moore, M. G. & Kearsley, G. (2011). *Distance education: A systems view of online learning*. USA: Wadsworth.

Mpofu, J., Chimhenga, S., & Mafa, O. (2013). Developing effective learning material to students with hearing impairment through ODL in Zimbabwe. *Turkish Online Journal of Distance Education*, *14*(1), 44–52.

Oh, Y., & Lee, S. M. (2016). The effects of online interactions on the relationship between learning-related anxiety and intention to persist among e-learning students with visual impairment. *The International Review of Research in Open and Distributed Learning*, *17*(6), 89–107. https://doi.org/10.19173/irrodl.v17i6.2581

Okur, R. M. (2012). *Açık ve uzaktan öğrenmede öğretim elemanlarına yönelik çevrimiçi destek sistemi tasarımı* [Designing online faculty support system for open and distance learning] (Unpublished doctoral dissertation). Eskişehir: Anadolu University.

Rekkedal, T. & Qvist-Eriksen, S. (2003). Internet based e-learning, pedagogy an support systems. In H. Fritsch (Ed.), *The role of student services in e-learning systems* (pp. 8–32). FeernUniversitat in Hagen: ZIFF.

Richardson, J. T. (2016). Face-to-face versus online tutorial support in distance education: preference, performance, and pass rates in students with disabilities. *Journal of Postsecondary Education and Disability*, *29*(1), 83–90.

Rumble, G. (2000). Student support in distance education in the 21st century: Learning from service management. *Distance Education, 21*(2), 216–235.

Shakespeare, T. (2006). *Disability rights and wrongs*. New York: Routlege.

Simpson, O. (2002). *Supporting students in online open and distance learning*. London: Kogan page.

Simpson, O. (2012). *Supporting students for success in online and distance education.* New York: Routledge.

Simui, F., Kasonde-Ngandu, S., Cheyeka, A. M., Simwinga, J., & Ndhlovu, D. (2018). Enablers and disablers to academic success of students with visual impairment: A 10-year literature disclosure, 2007–2017. *British Journal of Visual Impairment*, *36*(2), 163–174. https://doi.org/10.1177/0264619617739932

The Open University [OU] (2017). *Disability support*. Retrieved from https://help.open.ac.uk/topic/disability_ga=2.217584918.1492709752.1588856457779410623.1588856457

The Open University [OU] (2020). *Facts and figures*. Retrieved from http://www.open.ac.uk/about/main/strategy-and-policies/facts-and-figures

Thorpe, M. (2002). Rethinking learner support: The challenge of collaborative online learning. *Open learning*, *17*(2), 105–119.

United Nations [UN] (2008). *Convention on the rights of persons with disabilities*. New York: United Nations.

Universitat Oberta de Catalunya [UOC] (2017). *Disability services*. Retrieved from http://cv.uoc.edu/estudiant/mes-uoc/en/universitat/diversitat_funcional/index.html

University of South Australia [UniSA] (2017). *Disability hub*. Retrieved from https://www.unisa.edu.au/Disability/

World Health Organization [WHO] (2001). *International classification of functioning, disability and health. (ICF)* Geneva: World Health Organization.

World Health Organization [WHO] (2013). *What is e-accessibility*. Retrieved from https://www.who.int/news-room/q-a-detail/what-is-e-accessibility