E-learning issues and solutions for students with disabilities during COVID-19 pandemic: Al-Zaytoonah University of Jordan case study

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Article Info

ABSTRACT

In this research, approaches to making e-learning accessible to students with impairments were studied based on the authors' experience at Jordan's Al-Zaytoonah University. The educational, organizational, and instructional concerns are underlined when analyzing the university's experience in giving access to online content. Furthermore, these difficulties must be addressed in order to create the necessary organizational change to effectively solve accessibility concerns. This study looked into the e-learning issues that 56 university students with disabilities had reported. Students reported issues with: accessibility to websites and learning course management systems; accessibility to digital audio and video; time management in completing online tasks; trouble handling data during lectures; and a lack of appropriate adaptive strategies in online questionnaires. Students also noted technical issues with using e-learning, instructors' communication with e-learning, and their treatment of all students equally, overlooking the necessity of considering the needs of students with impairments. In this study, we present the problems raised by students with disabilities and how the e-learning affects students' outcomes in the e-learning experience. We also make recommendations based on the students' realistic special-needs experience at Al-Zaytoonah University in Jordan during the COVID-19 pandemic to inspire decision-makers in educational institutions and those interested in this field.

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1. INTRODUCTION

People with disabilities have been able to do things that were previously impossible or difficult, such as allowing the blind to read using text-to-speech technology and deaf people to use voice-to-text programs, thanks to the broad advancement of information technology in various sectors and successive developments in technology and software. People with limited arm mobility, on the other hand, use dictation systems to write and communicate [1]. E-learning is currently being employed in many educational institutions, allowing instructors in universities, colleges, schools, and other similar institutions to employ diverse information technologies in education through engaging with students via web-based interactive ways. Whether the PowerPoint presentations are in the class or training courses that are provided entirely via the internet, it has become evident that these technologies have become the center of attention as well as an

essential area in which many would like to work on developing and researching following the COVID-19 pandemic [2]. In terms of addressing the goals and demands of students with various disabilities, how effective is the information and communication technology that professors employ in teaching courses via e-learning? How well do students with disabilities interact with programs, software, and other forms of electronic learning? These are crucial questions since students with impairments are one of the most important groups who require special care in order to learn in regular circumstances. The experience of distant learning or e-learning, of course, adds to the burdens and obstacles that this group faces [3].

Furthermore, in our search focusing on e-learning experience for students with special needs, we discovered that there are few in Jordan that address this topic. Why do not we consider e-learning to be a significant tool for integrating students with various disabilities and for researching and presenting the findings of this phenomenon? [4] People who are unable to attend classroom classes due to health, climate, transportation, or physical accessibility can take advantage of online classes. Similarly, in traditional lectures, students with problems, including typing limitations, can access course notes and handouts online without assistance if they are prepared in an accessible manner [5].

Although e-learning has many benefits for learners with impairments, it also has several drawbacks that limit its effectiveness. Provides a quick overview of how students with various disabilities use information and communication technologies (ICT) [6]. One of the primary issues is that, despite their strong desire and eagerness to profit from the integration of teaching and technology, faculty members and others responsible for e-learning within educational institutions do not prioritize accessibility for students with various disabilities [7]. Those in charge of supporting and spreading e-learning, for example, rarely check whether freshly purchased academic applications are compatible with adaptive software that reads what is on screen for those who are blind or visually impaired. If PowerPoint presentations in the classroom are not released online in advance, students with visual and other disabilities who require adaptive software to follow the presentation may have issues [8], [9].

There are three major categories involved and having an interest in the success of e-learning in educational institutions: students, professors who use and implement e-learning in their courses, and e-campus learning professionals who provide leadership, choose e-learning for campus-wide use, and provide e-learning assistance and information technology [10]. Because these groups have various goals and desires in e-learning, they are likely to have diverse perspectives that pose questions and hence issues and research topics [11]. Several studies have looked at the relationship between ICT in education and the challenges that students with disabilities confront in this field, particularly in e-learning, where the participants were disability service providers on campus [12]–[14], postgraduate alumni, assistive technologists, and professors [15], [16]. These studies were distinct in terms of their objectives, questions they addressed, and the samples they used to conduct their research. Furthermore, the questionnaire they adopted, which dealt especially with the issues they encountered during their e-learning experience, as well as suggestions to reduce or even stop them, perhaps most crucially, none of these studies took into account the most crucial group: existing students with impairments who are enrolled in distant learning because of the corona pandemic [17].

For a proper e-learning system, there are a variety of possible structures as well as readily available techniques and frameworks. Nonetheless, the focus of this study is on a disabled learner's happiness with the already available options, and Porczyska-Ciszewska discussed the issue of using e-learning education as a modern information and communication technology in the process of educating people with mild intellectual disabilities [18], and analyzed the relationship between using those civilization achievements and people with mild intellectual disabilities' mental well-being. However, the recently published study by Strelkova *et al.* [19] is devoted to higher distance education for students with disabilities, offering a multifaceted picture of global distance learning systems. Its goal is to provide a complete overview of higher distance education methodologies, organization, and adaptation in Germany, Russia, and other countries. The study's main approach was a comparative analysis of pedagogical and legal literature on how disabled students can take advantage of new learning opportunities and improve their learning and behavioral achievements. As a result, a deeper understanding of higher distance education for students with disabilities is provided, and evaluation of current conflicts and future prospects.

Tomaino *et al.* [20] looked at the social validity of distance education programs for students with severe developmental disabilities and high behavioral requirements. For students aged 5–22 years who attended a nonpublic school (NPS) in Southern California, questionnaires from parents, teachers, and paraeducators were evaluated to establish impressions of feasibility and efficacy. Moreover, the impact that transitioning to a distance learning program had on the academic progress of students with severe developmental disabilities and high behavioral needs was also investigated by the authors. In particular, the data from students' individualized education plan (IEP) goals pre-and post-transition to the distance learning program were analyzed.

Kant, Prasad, and Anjali [21] investigated the learning management system (LMS) strategic selection criteria using feedback from a variety of sources, including academic learners and mentors in open and distance learning (ODL). The relevance of an adequate LMS in ODL to attain self-reliance and competitiveness was the focus of data collection and analysis. The researchers used a qualitative research design to focus on the benefits and characteristics of many common learning management systems, as well as comparisons between them. Learners' and academic advisers' comments were also gathered using quantitative design (questionnaire-based online reaction) with the goal of identifying their requirements and issues in e-learning. While, Naumova *et al*. [22] explored how educational e-learning approaches for students with special educational needs were applied and adopted in the educational process through a study at Udmort State University, The training methods were developed corresponding to the characteristics of students with disabilities by focusing on the attention span, the personality, and the distinctive characteristics of logical thinking and adaptive behavior on the basis of psychology and educational features. Through educational experience, it has been established that incorporating active training methods into the educational process has a positive impact on the adaptation process in modern society.

The majority of distance learning research has centered on the general education sector. The impact of distant learning on students with special needs has been studied in fewer studies. These are the students who are most influenced by e-learning and who require the most attention and care. Although some studies indicate that distance learning programs are uniquely positioned to meet the needs of students with disabilities [23], research in this area is scarce and results are mixed [24]. With additional support, college students with learning difficulties can succeed in online learning programs, according to Markova, Glazkova, and Zaborova [25]. The conclusions, however, cannot be applied to all students with impairments because this group does not reflect the full educational community. In order to assist others, we at Al-Zaytoonah University wanted to offer our personal experience and recommendations based on the findings. To provide support and help to students in this category so that they can have a brighter future in e-learning.

2. RESEARCH METHOD

We examine the viewpoint of the main component of stakeholders on access to e-learning in this study, which is part of the studies that chose to research in e-learning: they are students at Al-Zaytoonah University of Jordan who suffer from various disabilities (physical, hearing, and visual) in e-learning during the distance learning period due to the corona pandemic [26]. Figure 1 shows the e-learning portal at Al-Zaytoonah University of Jordan. We focus on the issues they confront, as well as evaluating the benefits of e-learning from the perspective of students, and most importantly, we make suggestions and recommendations based on the findings to resolve the challenges of e-learning in education for this category. It is vital to remember that this is a descriptive and exploratory study. Its main goals are to raise awareness about e-learning for students with impairments and to provide recommendations for future research based on the findings of this study.
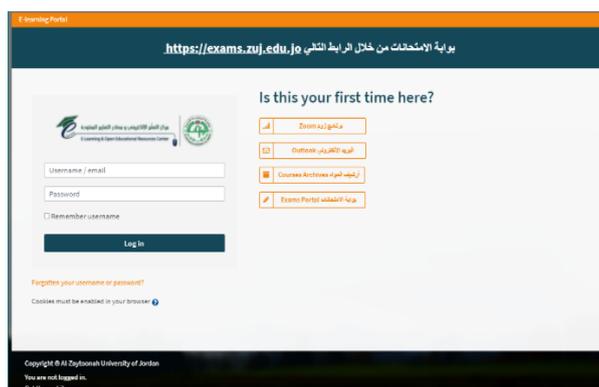
Figure 1. Al-Zaytoonah University of Jordan e-learning portal

Due to the corona pandemic, Al-Zaytoonah University of Jordan has received 56 students with various disabilities (43 males and 13 females) from various disciplines at Al-Zaytoonah University of Jordan; engineering, nursing, pharmacy, literature, and business administration. These students have received their education entirely through the university's e-learning system via distance learning in the last three semesters.

Their opinions were collected in this experiment at the end of the first semester of 2021 to ensure the maturity of their distance learning experience, as well as the clarity of the difficulties they faced in various classes and the benefits they received from their point of view (it should be noted that the total sample size is 56 students) of students with different disabilities at the university in that semester. Table 1 shows that hearing impairment: hard of hearing was the most common impairment mentioned by students (46.4%), followed by visual impairment: poor vision (37.5%). There were 8 (14.3%) of the 56 students had trouble utilizing their hands and/or arms, and one student had a physical disability (lack of limbs). As previously stated, students were enrolled in a range of disciplines. Students with disabilities received the necessary psychological support from various sources at the university, which included the deanship of the student affairs/ psychological support department, the university presidency, the students' deanship of the faculty, the students' head of the department, and even the students' academic and administrative faculty staff. They also received technical support from the e-learning center and the computer center at the university, who did their duty towards students in general and students with disabilities in particular, but the learning process was not free from difficulties that could not be avoided.

Table 1. Percentage of students indicating various disabilities/impairments

Disability/Impairment	Number of students	Percentage of students
Visual impairment: low vision	21	37.5%
Hearing impairment: hard of hearing	26	46.4%
Difficulty using hands and/or arms	8	14.3%
Physical disability (lack of limbs)	1	1.8%

The students received the questionnaire by email. The students were contacted directly by email after receiving the questionnaire. On the questionnaire questions, the research team worked with a group of students with special needs. To ensure that the questions were correct, they were tested first. It has also undergone technical testing to ensure that students with diverse disabilities can use it. After that, we did the test dependability test and retested it for three weeks in a row. Questions about demographics: we inquired about each participant's gender, major, academic level, and number of semesters spent in e-learning. It's worth noting that in the questionnaires, e-learning" was defined as a set of information and communication technologies that professors employ while delivering their classroom courses totally online, including but not limited to course web pages and lectures delivered directly over the Internet. Accessibility is defined as the ability of students, regardless of their disability, to use e-learning easily and independently.

3. RESULTS AND DISCUSSION

Students (57%) said they require adaptive technology, such as customized devices and/or specific programs, to make e-learning more effective (examples include customized keyboards and apps that increase writing quality, screen readers, and dictation for students). Visually impaired students, special headphones, sound amplification programs for hearing impaired students, and others. There were 25 students acknowledged using adaptation techniques, and their proportion 44.64% of the overall sample was recorded. Table 2 reveals that screen readers are the most commonly used technology, followed by writing aiding software. This table also reveals that students, despite mixed replies, need to employ adaptive approaches to improve e-learning efficiency.

Table 2. Adaptive computer technologies used by students

Adaptive computer technology	Number of students	Percentage of students	Mean	Std. deviation
Writing assistance software	15	60%	4.12	1.36
Screen readers and/or software that magnifies what is on the screen	16	64%	4.01	1.06
Optical character recognition scanner	9	36%	4.78	1.75
Voice dictation program	8	32%	4.56	1.56
Large computer screen	12	48%	4.31	1.02
Adaptive mouse	4	16%	4.25	2.11
Special keyboard (feature to increase characters clarity)	6	24%	4.03	1.47
Else	1	4%	4.00	2.74

There were 32 students reported using at least one adaptive computer technology; several indicated using more than one.
Five-point scale, with higher scores indicating being able to use the technology more effectively.

3.1. Perceived benefits of e-learning

All students with disabilities (56) at Jordan's Al-Zaytoonah University took part in a discussion about the advantages of e-learning. Table 3 indicates the percentage of students who believe that using e-learning to produce and improve course content is beneficial. The most common benefit, as seen by 73.2% of students, is that e-learning aids in the delivery of course information.

Table 3. Benefit of e-learning (course content)

Benefit category	Number of students	Percentage of students	Mean	Std. deviation
E-learning helps provide course content	41	73.2%	4.02	1.08
E-learning helps facilitate access to course content	36	64.3%	4.03	1.03
E-learning helps in the success of the course	39	69.6%	4.14	1.11
E-learning helps to understand the course	29	51.7%	4.29	1.02
E-learning helps in developing the course content	30	53.6%	4.17	1.21

There were 56 students reported perceived benefits of E-learning on the course content; Five-point scale used.

Table 4 shows other benefits experienced by students with disabilities that reflect on personal aspects. The table also shows that the most prevalent benefit, as reported by 85.7% of students, is that e-learning facilitates comfortable communication with colleagues and professors, followed by 83.9% that e-learning allows students to remain anonymous, which aids in social anxiety reduction. Table 5 indicates the advantages gained by students with disabilities in terms of saving time, effort, mobility, or even the ease with which they can complete activities in the educational process, in addition to the speed with which they can do so. The data also demonstrates that the most prevalent benefit of e-learning, as reported by 92.9% of students, is that it reduces mobility. This is followed by 87.5% through e-learning there is an opportunity to be able to provide information anywhere and at any time.

Table 4. Benefit of e-learning (personal benefits)

Benefit Category (personal benefits)	Number of students	Percentage of students	Mean	Std. deviation
E-learning makes the classroom enjoyable and stimulating	38	67.8%	4.21	1.08
E-learning helps to learn more about technology	43	76.8%	3.98	1.09
E-learning provides an opportunity to exploit technology/adaptive software	41	73.2%	4.17	1.12
E-learning helps in comfortable communication with colleagues and professors	48	85.7%	4.02	1.22
The ability to be anonymous in e-learning reduces social anxiety	47	83.9%	4.17	1.08
E-learning enhances a sense of independence/confidence /less stress	43	76.8%	4.15	1.13

56 students reported perceived personal benefits of e-learning; Five-point scale used.

Table 5. Benefit of e-learning (saving time and effort)

Benefit category	Number of students	Percentage of students	Mean	Std. deviation
E-learning helps increase the ability to complete tasks quickly	36	64.3%	4.01	1.06
E-learning helps in managing time	39	69.6%	4.14	1.14
E-learning helps to provide information anywhere, anytime	49	87.5%	4.17	1.06
E-learning helps save time	43	76.8%	4.9	1.10
E-learning helps save effort	47	83.9%	4.03	1.13
E-learning helps reduce mobility	52	92.9%	4.18	1.04

56 students reported perceived benefits of e-learning on saving time and effort; Five-point scale used.

The opinions of students with special needs differed when it came to educational practices, so the opinions of all (56) students were taken into account, and the following figure represents the best educational practices from the perspective of students with hearing, vision, and physical disabilities, which resulted in benefit and knowledge for them. It's worth noting that the majority of instructional approaches employed in online contexts were beneficial, but they differed and were influenced by the type of impairment that the student had [27]. More details are shown in Figure 2.
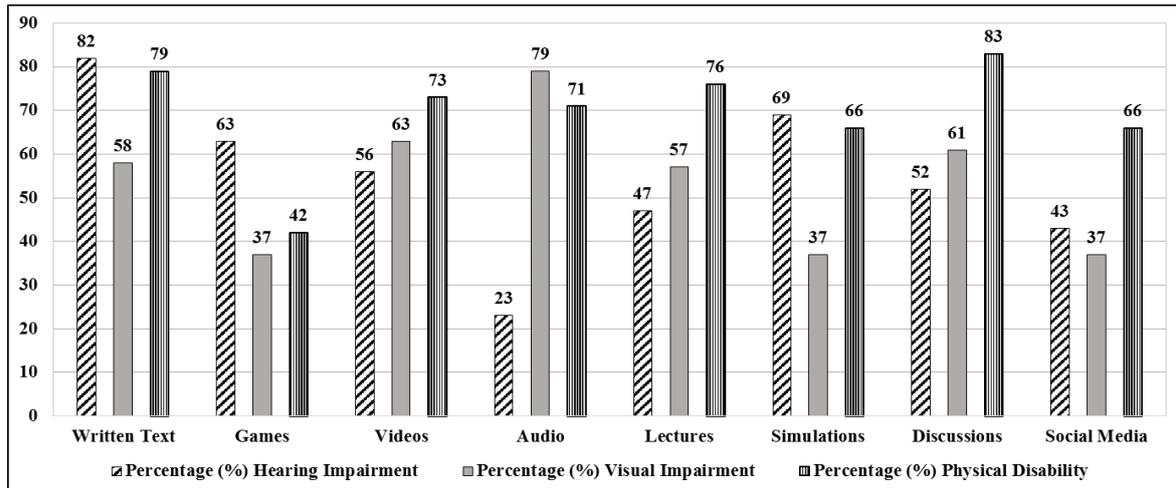
Figure 2. Usefulness of different online instructional methods

3.2. Challenges and solutions

All (56) students with special needs at Jordan's Al-Zaytoonah University who used electronic learning due to the corona pandemic completed a questionnaire in the previous three semesters to learn about the benefits and challenges they faced, and we analyzed and presented the results to readers in the previous section. At least 30% of the students expressed concern about the following: It was not enhancing course content, with the most prominent reason being the difficulty of accessing materials over the Internet, which necessitated students using adaptive computing technologies. On the other hand, at least 25% of students struggled to use technology in e-learning due to disability, resulting in a gap in learning and the added value they received in academic courses, as well as at least 25% feeling self-assured and autonomous.

At least 30% of students had difficulty finishing work on time, and at least 10% of them had trouble obtaining material anywhere and at any time. One of the main reasons they struggled with face-to-face learning was a lack of mobility. Students often recognize the advantages of having access to knowledge at any time and having course materials available online. Students also indicated that e-learning provides them with the opportunity to work at their own pace, and to communicate easily with their peers and professors.

The study also looked at e-learning teaching approaches, determining which are best from the student's perspective and according to the disability he has. Written texts, followed by simulation, and then games, are the greatest teaching modalities for students with hearing problems, according to our findings. As for students with physical disabilities, the study proved that they prefer discussions, followed by written texts, and then lectures and videos.

More than half of the respondents (53%) said they used one or more types of adaptive technology, such as writing aids, screen reading aids, or voice dictation tools to make efficient use of e-learning. Adding these programs to e-learning platforms in universities as a tool available to students at any time and ensuring that they are provided in a way that ensures the ability to work with each other. It is worth noting that at least 50% of the sample used physical equipment in e-learning such as large computer screens, an adaptive mouse or even a keyboard that increases the clarity of vision. We propose that the institution give or at least encourage students with special requirements to use this technology.

We also recommend to professors that, in light of the low levels of satisfaction with course content, the most important reason for which is the difficulty in obtaining online materials, the course content be improved to meet the needs of these students as much as possible and not neglecting this group of students who may be the most in need category care in e-learning, in addition to sharing part of their time to familiarize these students with the way to access the content of the courses and to provide them with a means of quick communication when needed to save their time and effort as possible [28]. Apart from providing appropriate possibilities for these students to participate in debates and lectures, it is also important to foster their sense of independence and self-confidence [29]. We also recognize the importance of teachers in providing appropriate time for these students to finish the assignments assigned to them on time [30].

4.   CONCLUSION

The debate over the use of modern information and communication technology by people with disabilities, as well as the expansion of e-learning methodology by people with disabilities, highlights an important and hot issue in an era dominated by the Internet and new media on the one hand, and exceptional circumstances such as the corona pandemic on the other. E-learning programs used to educate both healthy and disabled people are geared towards faster and more effective learning for students who use them and improve their skills in many areas of performance. However, when creating and executing e-learning education for people with disabilities, it's important to examine the features of these people and how they use modern educational approaches like e-learning. These characteristics include difficulty accessing course content, difficulty interacting positively with professors and colleagues, and difficulty completing tasks on time. When using modern information and communication technologies to educate people with disabilities, we must remember that technological advancements, both in communication and in the development process, create a new source of potential threats, such as the difficulty of online education and its social consequences. While remembering these threats, we must also appreciate the benefits resulting from the use of modern electronic communication tools in the education of people with disabilities, such as providing adapted programs for disabled students, which boost their self-esteem and are a key sign of their ability to learn and participate in society. The authors of this study were motivated by their curiosity to move from theoretical discussion to experimental exploration in order to confirm the relationships between the use of modern electronic means of communication (such as e-learning) in education for people with impairments and their learning results, which undoubtedly aided in the discovery of solutions that we believe will alleviate the burden on these individuals. This is the group that needs ongoing assistance from all aspects of the educational process.

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