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RESEARCH ARTICLE

Effectiveness 0f E-Learning in Teaching Students With Hearing Disabilities in Sultanate of Oman From Their Teachers' Viewpoint

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ABSTRACT

International and local charters emphasize the importance of educating students with special needs, integrating them into society, and fostering their cognitive, social, emotional, and professional abilities. Therefore, the study explored the effectiveness of e-learning in educating students with hearing disabilities in the Sultanate of Oman from the perspective of their teachers. Methodology and research methods. The study's objectives were achieved using a descriptive-analytical approach. The sample included 81 teachers working in the auditory integration program within the general directorates of education in Oman. A structured questionnaire was designed to assess e-learning effectiveness, focusing on teachers' utilization of e-learning, the availability of e-learning means and tools, and the importance of e-learning. Results and scientific novelty. The findings indicated that, according to teachers, the overall effectiveness of e-learning for students with hearing disabilities was moderate. Additionally, no statistically significant differences were observed based on gender. However, significant differences emerged based on years of teaching experience. The study emphasized the importance of integrating e-learning into instruction for students with hearing disabilities. Practical significance. This study hoped to aid special needs teachers in teaching students with hearing disabilities in Oman focusing on e-learning strategies and increasing attention to these students.

INTRODUCTION

The educational process has been influenced in various aspects by the scientific and technological advancements of the present era. This necessitates that curriculum developers and teachers explore modern electronic teaching strategies that align with this significant scientific progress. These strategies should emphasize active and effective learning, where the student plays an active and dynamic role rather than merely receiving information. One such strategy is e-learning.

E-learning is learning through computers and various software, as well as learning via the Internet. It is a core component of the educational process and an integral part of the comprehensive education system. Today, most educational institutions have adopted e-learning to achieve their goals. This shift helps them address modern challenges, including the rapid advancements in information technology [1]. Providing an educational environment based on the Internet and computers as teaching tools in the classroom contributes to improving and enhancing educational outcomes [2]. Additionally, employing e-learning shifts the educational process away from rote learning and traditional teaching methods toward active and effective learning centered around the learner. E-learning achieves multiple objectives, including promoting the concept of continuous learning and developing students' skills in information technology. It also prepares a generation capable of addressing modern challenges and keeping pace with scientific and technological advancements [3]. Furthermore, e-learning contributes to providing a multi-source learning environment that supports

various aspects of the educational process. It enhances interaction and dialogue between students and their teachers, as well as among students themselves within the classroom. Focusing on the education of students with special needs is a fundamental requirement supported by both international and local charters. These charters also call for the care of students with special needs in various social, educational, and health fields. They emphasize the importance of integrating these students into society and discovering their cognitive, social, emotional, and professional abilities.

The hearing disability category is one of the groups of individuals with special needs. Hearing disabilities are defined as the impact on an individual's sense of hearing, which affects their ability to hear different sounds. Hearing disabilities range from mild to moderate hearing loss to severe deafness. They can impact various ear functions, including speech comprehension, language acquisition, and verbal communication [4]. Employing e-learning in teaching students with hearing disabilities can bring many benefits. These include making the educational process more engaging and appealing to students. It also allows students with hearing disabilities to play an active role in the learning process as they interact with various materials, methods, and technologies presented to them [6]. This can lead to the development of their thinking, acquisition of various skills, and improvement of their attitudes toward learning. Based on the above, there arose a need to explore modern e-learning strategies that align with the cognitive and technological advancements of our current era. One such strategy is e-learning. Therefore, the current work was conducted to examine the impact of e-learning on teaching students with hearing disabilities in Oman.

The researcher's role as a special education supervisor at the Directorate General of Education in Oman involved field visits to schools that cater to students with hearing disabilities. During these visits, he observed that some teachers used traditional methods to teach this group of students. This was also noted by a group of teachers working with hearing disabilities in the auditory integration program at the Directorate General of Education in Oman. That may lead to a deficiency in achieving learning outcomes. These methods, most of the time, are not supported by other tools or strategies and do not focus on the active role of the learner in the educational process. This may be due to the work pressures faced by teachers of students with hearing disabilities. They are required to handle more tasks, duties, and responsibilities than regular education teachers. This may also be due to the limited training courses and workshops available for teachers of students with hearing disabilities. These programs are essential for equipping them with e-learning strategies that align with technological advancements and the knowledge explosion. Such strategies contribute to improving the education level of students with hearing disabilities. This highlights the need to explore modern educational strategies, such as e-learning. Previous educational literature and studies [6-9] have demonstrated the effectiveness of using e-learning in teaching students. This prompted the researcher to experiment with it, teaching students with hearing disabilities. Therefore, this work seeks to assess the effectiveness of e-learning in educating students with hearing disabilities in Oman from the viewpoint of their teachers. It seeks to answer the main research question:"What is the effectiveness of e-learning in teaching students with hearing disabilities in Oman from their teachers' perspective?" From this question, the next sub-questions are derived:

1. To what extent are e-learning tools available in schools for students with hearing disabilities in Oman from their teachers' viewpoint?

2. Is there a statistically significant difference at the level of significance ($\alpha = 0.05$) between the mean of the study sample members' responses to the e-learning questionnaire attributed to the gender variable?

3. Is there a statistically significant difference at the level of significance ($\alpha = 0.05$) between the mean of the study sample members' responses to the e-learning questionnaire attributed to the experience years variable?

The current study is expected to contribute the following: the theoretical significance lies in establishing a theoretical and educational framework for e-learning as an effective teaching strategy for students with hearing disabilities. This study will provide a questionnaire to measure the effectiveness of the e-learning strategy, which can be utilized in similar studies. The practical significance of the current work is hoped to assist special needs teachers in teaching students with hearing disabilities. Additionally, this work aims to increase the focus on e-learning strategies among Oman's teachers of students with hearing disabilities. Also, the educational supervisors may benefit

from this study in supervising the teaching of students with hearing disabilities using the e-learning strategy.

This study aimed to identify the level of effectiveness of e-learning in teaching students with hearing disabilities in Oman from the teachers' perspective and to measure the impact of certain variables (gender and experience) on the level of effectiveness of e-learning in teaching students with hearing disabilities in Oman from the teachers' perspective. Also, it aims to identify the role of teachers' experience in e-learning for students with hearing disabilities. This work was conducted in the General Directorates of Education in the Sultanate of Oman during the second semester of the 2020/2021 academic year. It was restricted to all teachers working in the auditory integration program, totaling (8) teachers.

E-learning is defined as a form of learning that utilizes computers, various software, and diverse media in the educational process. It also incorporates the Internet and digital tools such as projectors, smart phones, and smart boards to support knowledge acquisition [3]. Procedural definition refers to presenting educational content within the classroom using computer applications, its various software, and specialized programs designed for students with hearing disabilities in the Sultanate of Oman. Teachers of Students with Hearing Disabilities are the educators who provide educational and instructional services to students with hearing disabilities. In the context of this study, they refer to the teachers working in the auditory integration program in the general directorates of education in the Sultanate of Oman. They represent the study sample, and their responses on the study's questionnaire are used for measurement. Students with Hearing Disabilities are students with hearing problems ranging from mild to severe, leading to a partial or complete inability to use their sense of hearing. As a result, they face challenges in hearing sounds and acquiring language. They are divided into two categories: those with hearing impairments and those who are deaf [10].

LITERATURE REVIEW

Electronic Learning: Technological advancements in information technology have led to the emergence of various electronic learning strategies and models. Applying these strategies to the educational process has become an urgent necessity to develop and elevate it in line with the technological and cognitive progress of the modern era. One of these strategies is electronic learning. It is a term that encompasses a wide range of electronic applications. These include digital collaboration, virtual classrooms, computer-based learning, and the delivery of educational content through computers and the Internet [11]. E-learning is a mode of learning that allows teachers to deliver educational content and convey concepts to students. This is achieved through communication, information technologies, and various media. This allows students to actively interact with the electronic content presented to them within the classroom [12]. Another author defines e-learning as education delivered through computers and electronic applications. This approach creates an ideal learning environment using computers and various digital media. E-learning shifts the learning process from rote memorization to more active and effective learning [1]. E-learning supports the learning process by creating an electronic environment within the classroom, using purposeful and organized electronic systems [13]. Also, e-learning within the classroom has many features, including helping the teacher optimize class time and use it effectively. It also allows the teacher to correct students' mistakes during the learning process and answer various student inquiries. E-learning encourages both the teacher and the learner to make better use of modern technologies in the field of education [14]. The use of e-learning in the classroom creates a learning environment for students through technological devices and electronic learning media. E-learning in the classroom helps attract and engage students by incorporating various colors, shapes, and static and animated images in lesson recordings. These elements enhance the educational content and contribute to the development of the learning process [15]. E-learning has advantages and positive aspects that make it an effective tool for developing education and increasing its efficiency. These advantages can be summarized as follows [16]: utilizing various visual and auditory instructional aids and making education an active, engaging process that distances learning from boredom and rote memorization. Keeping pace with scientific and technological advancements that have influenced various fields of knowledge. Also, it improves and develops students' skills in research, exploration, and the use of technological skills. Moreover, e-learning achieves several goals, including [17] increasing the effectiveness of education and enhancing the efficiency of the

educational system. Achieving high-quality learning for all parties involved in the educational process, according to the methodology of the educational system centered around the learner. Developing all elements of the educational process and system and striving for excellence in its programs and their diversification. Showcasing the creative abilities of teachers and learners through the use of information technology. Strengthening bonds of familiarity and affection and breaking psychological barriers between the teacher and students. And developing skills related to the curriculum. Employing e-learning in the classroom requires several requirements, including the availability of a flexible learning environment. E-learning requires a flexible learning environment, as teachers must continuously adapt the learning space to suit the educational situation. This includes considering individual differences in students' levels, needs, preferences, and interests [2]. The use of e-learning in the classroom also requires the availability of devices and software that enable the teacher to present educational content within the classroom. The teacher needs devices such as a computer or smart board. It is also possible to use a smartphone on which presentation software can be installed to display content to the students.

Students with Hearing Disabilities: Hearing disability is defined as a person's hearing deficiency, which varies in levels, ranging from mild to severe. A deaf person is someone who has experienced hearing loss exceeding 70 decibels. This degree of hearing loss prevents them from using their sense of hearing to perceive sounds or acquire language [7].The hearing loss may stem from congenital causes that begin at birth or shortly thereafter. Hearing disabilities may arise due to genetic or hereditary factors, non-genetic causes, or complications occurring during pregnancy and childbirth. These complications can include maternal infections such as rubella, syphilis, or other infections during pregnancy [18].The acquired causes can lead to hearing disabilities at any age. These include meningitis, mumps, measles, chronic ear infections, fluid accumulation in the ear, and the misuse of certain medications. Prolonged exposure to loud noises may also result in hearing impairment, in addition to age-related conditions, particularly those caused by the degeneration of sensory cells [19]. The students with hearing disabilities exhibit several characteristics, which include the following [20]:

Social Characteristics: Hearing disabilities can pose challenges in adapting to oneself, school, and society. People with hearing disabilities may experience negative effects like isolation due to shyness or positive effects like increased social activity driven by a desire to overcome their disability.

Linguistic Characteristics: Individuals with hearing disabilities often have a limited vocabulary due to their reduced exposure to spoken words. Since hearing loss directly impacts speech development, acquiring new vocabulary becomes challenging without the ability to listen to words, letter sounds, and proper pronunciation.

Cognitive Characteristics: Research shows that individuals with hearing disabilities do not affect their cognitive characteristics. They can still learn using various methods and strategies as long as they do not rely on their hearing sense. The World Health Organization's medical reports confirm this. They can still think logically, analyze their surroundings, and learn effectively.

Emotional characteristics: Many studies have confirmed that individuals with hearing disabilities may suffer from low self-esteem and a lack of emotional stability. Additionally, they are at higher risk of depression, aggression, and lack of trust in others.

Andraous's 2018 study at Yarmouk University measured the effectiveness of using educational technology tools for students with special needs. The study involved 125 undergraduate students with visual, hearing, and motor disabilities. The data was collected through a questionnaire with 20 items. The results showed high arithmetic mean estimates. Educational technology tools help establish sound thinking and accurate perception and help students with special needs build correct concepts through teacher presentations of images and shapes [21]. Tolba's 2019 study examined the effectiveness of an electronic learning program in developing life communication skills among female students with hearing disabilities in merge schools in Taif Governorate. The study involved ten students in the first secondary grade, integrated with regular students. The quasi-experimental method was used, with a survey to identify targeted English communication needs and a list of communication skills based on the target group. The study concluded that the electronic learning program was effective in improving life communication skills among the target group [6]. A study by Al-Sulaili (2019) explored the use of technological tools in teaching students with hearing disabilities

in Kuwait. The research involved 25 teachers from Al-Amal School for Boys and used semi-structured interviews to gather data. The study found that the use of educational technology was effective in teaching these students, highlighting the importance of technological tools in the education of these students [7]. A study by Cagiltay (2019) found that special education teachers in Ankara, including 27 teachers from six schools, lack significant experience and perceptions about using educational technologies. The study used a qualitative approach and semi-structured personal interviews. The findings revealed a significant shortcoming in the use of technology by special education teachers [9]. A study by Zain Al-Din (2020) examined the attitudes of 120 Alexandria primary school special education teachers towards using technology in teaching students with special needs during the COVID-19 pandemic. The descriptive-analytical method was used to measure these teachers' attitudes. The study found that they had high attitudes towards technology in this regard. This suggests that technology can be effectively used to support students with special needs [8].

The author found that this study aligns with the majority of previous studies on the effectiveness of e-learning in the educational process [6; 7; 8]. However, this study differs from previous studies in that it sought to explore the effectiveness of e-learning in teaching students with hearing disabilities in the Sultanate of Oman from the perspective of teachers in schools for the deaf. Therefore, the current study benefited from previous studies in writing the theoretical framework and determining the appropriate methodology to achieve its objectives. This study will adopt the descriptive-analytical method and identify the main dimensions of the study.

METHODOLOGY, MATERIALS AND METHODS

Study Method: The purpose of this study was to evaluate the effectiveness of e-learning in educating students with hearing disabilities in Oman, as perceived by their teachers. Given the study's objectives, a descriptive-analytical approach was utilized. This method is designed to examine a phenomenon, providing a detailed and accurate description through both qualitative and **quantitative analysis.** By employing numerical data, it helps determine the extent or significance of the phenomenon. The study applied this approach to assess the level of e-learning effectiveness in teaching students with hearing disabilities from the teachers' perspective.

The population and sample of this study: The population involved all special education teachers working in the auditory integration program in the directorates of education in Oman, totaling 266 teachers. However, the sample was selected from special education teachers working in the auditory integration program in the directorates of education in Oman, totaling 81 teachers. The study population of special education teachers was distributed according to gender and years of experience.

Study Tool: The researcher developed a questionnaire grounded in contemporary educational literature and prior studies relevant to the study's problem and objectives. This tool was utilized to gather data on teachers' perspectives regarding the effectiveness of e-learning in educating students with hearing disabilities in Oman. The researcher prepared a questionnaire for special education teachers based on reviewing various literature and previous studies. The personal data of the study participants (gender, years of experience) were represented. The questionnaire was divided according to the study questions into three dimensions. The response scale was designed based on a five-point Likert scale: (very high (5), high (4), moderate (3), low (2), and very low (1)). The following scale was adopted for the purposes of analyzing the results: from 1.00 to 1.80 is very low, from 1.81 to 2.60 is low, from 2.61 to 3.40 is moderate, from 3.41 to 4.20 is high and from 4.21 to 5.00 is very high.

Tool Validity: To study the instrument's validity, the researcher presented the initial version of the scale to a group of experts and specialists from Omani and Jordanian universities. This was done to evaluate its linguistic phrasing, ensure the relevance of its components and domains, and verify the absence of typographical, grammatical, or linguistic errors. The experts' proposed amendments were implemented, which included adding two items, removing one item, and finalizing the scale in its final form.

Construct Validity: The instrument's validity was assessed by determining the correlation coefficients (CCs) using Pearson’s correlation method. A pilot study was conducted with 30 special

education teachers who were not included in the main study. The correlation coefficient values for the questionnaire items ranged from 0.56 to 0.89. Table (1).

Table (1): CCs between the scale items, the total score, and their respective dimensions

No.	CCs	No.	CCs
1	**0.87****	14	**0.80****
2	0.81**	15	0.78**
3	0.82**	16	0.76**
4	0.56*	17	0.83**
5	0.80**	18	0.87**
6	0.78**	19	0.81**
7	0.76**	20	0.82**
8	0.83**	21	0.89**
9	0.86**	22	0.80**
10	0.87**	23	0.78**
11	0.81**	24	0.89**
12	0.82**	25	0.88**
13	0.86**	-	-

*&** indicated the statistical significance at the levels (0.05) & (0.01), respectively.

It is observed from the previous construct validity indicators that all items had a correlation coefficient with their respective dimensions higher than (0.56). These values are considered acceptable for retaining the items within the scale. Consequently, all the items were retained, and the final version of the scale comprised (25) items distributed across three dimensions. Therefore, none of the items were excluded.

The test-retest method was employed to assess the instrument's reliability. The questionnaire was administered twice, with a two-week interval, to a separate group of 30 teachers working in auditory integration in Oman who were not part of the main study. The Pearson correlation coefficient between the two sets of scores was calculated, yielding a value of 0.83. Additionally, internal consistency was measured using Cronbach's alpha, which resulted in a value of 0.82. These reliability values were deemed appropriate for the study's objectives.

The variables of the current work are independent, including gender and experience (less than 5 years, between 5 and 10 years, and 10 or more than 10 years). The dependent variables arethe estimates of auditory integration teachers regarding the effectiveness of e-learning in teaching students with hearing disabilities in the Sultanate of Oman.

Statistical Processing: Data analysis was conducted using SPSS, utilizing frequencies and percentages to describe the study population. The Pearson correlation coefficient was applied to assess the internal consistency and validity of the research instrument. Additionally, Cronbach's alpha was used to measure the reliability of the tool, while the Spearman-Brown correlation coefficient for equal split-half was calculated to determine the questionnaire's reliability coefficient. The Independent Samples t-test was employed to determine the statistical significance of differences in participants' responses based on gender (male and female). Additionally, a one-way ANOVA was performed to examine variations in the mean responses of male and female teachers across different sections of the questionnaire. These differences were analyzed in relation to the variable of years of experience.

RESULTS AND DISCUSSION

To answer the 1st question, the AM (means) and SD (standard deviations) were calculated for the degree of acquisition of e-learning skills by teachers of hearing disabilities across the three dimensions: importance of e-learning, availability of e-learning tools, and use of e-learning. Table (2) displays these results.

Table (2): AM and SD for the level of the dimensions

No.	Rank	Degree of Acquisition by Teachers of Students with Hearing Disabilities	AM	SD	Level

1	3	Importance of E-learning	3.03	0.56	moderate
2	2	Availability of E-learning Tools	3.34	0.56	moderate
3	1	Use of E-learning	3.15	0.61	moderate
Overall scale			3.08	0.54	moderate

Table (2) displays that the degree of acquisition of e-learning skills by teachers of hearing disabilities and its dimensions was moderate. The overall mean was (3.08), and for each dimension, the means were (3.03) for the importance of e-learning, (3.09) for the availability of e-learning tools, and (3.15) for the utilization of e-learning.

Table (3): AM and SD for the degree of acquisition of e-learning skills by teachers of hearing disabilities according to the dimension of importance of e-learning

NO.	Rank	Items	AM	SD	Level
1	4	E-learning facilitates communication between students with hearing disabilities and the teacher	3.12	1.187	Moderate
2	5	E-learning helps ease communication between students with hearing disabilities and others	3.11	1.164	Moderate
3	6	E-learning helps students with hearing disabilities gain experience and develop their abilities	3.10	1.138	Moderate
4	13	E-learning helps clarify many situations in which language is used	2.35	1.086	Low
5	1	E-learning helps students with hearing disabilities interact with their surrounding environment	4.26	1.068	Very high
6	8	E-learning contributes to linking linguistic concepts with images and physical objects	2.84	1.164	Moderate
7	9	E-learning fosters self-activity and provides tangible experiences	2.82	1.049	Moderate
8	10	E-learning increases the vocabulary of students with hearing disabilities	2.81	1.181	Moderate
9	11	The use of e-learning in teaching students with hearing disabilities facilitates communication between them and regular students	2.80	1.152	Moderate
10	7	E-learning helps clarify and reinforce abstract meanings	3.06	1.077	Moderate
11	12	E-learning enhances the listening skills of students with hearing disabilities	2.78	1.182	Moderate
12	3	E-learning develops the residual hearing of students with hearing disabilities	3.16	1.207	Moderate
13	2	E-learning stimulates the senses of students with hearing disabilities.	3.18	1.177	Moderate
The Importance of E-learning			3.03	.7920	Moderate

Table (3) displays that the AM ranged from (2.35 to 4.26). Item number (5), "E-learning helps students with hearing disabilities interact with their surrounding environment," ranked first with an AM of (4.26) at a very high degree. Meanwhile, item number (4)"E-learning helps clarify many situations in which language is used," ranked last with an AM of (2.35) at a low degree. The overall AM for the importance of the e-learning dimension was (3.03) at a moderate degree.

Table (4): AM and SD for the degree of acquisition of e-learning skills by teachers of hearing disabilities according to the availability of e-learning tools dimension

NO.	Rank	Items	AM	SD	Level
1	4	Computers are available in schools for students with hearing disabilities	3.03	1.164	Moderate
2	3	Smart boards are available in schools for students with hearing disabilities	4.12	1.086	High
3	2	Virtual laboratories are available in schools for students with hearing disabilities	2.71	1.164	Moderate
4	5	Electronic teaching tools are available in schools for students with hearing disabilities	2.65	1.182	Moderate
5	1	The Internet is available in schools for students with hearing disabilities	4.22	1.077	Very high
Availability of E-learning Tools			3.34	1.182	Moderate

Table (4) displays that the AM ranged from (2.65 to 4.22). Item number (5) "The internet is available in schools for students with hearing disabilities," ranked first with an AM of (4.22) at a very high degree. Meanwhile, item number (4)"Electronic teaching tools are available in schools for students with hearing disabilities," ranked last with an AM of (2.65) at a moderate degree. The overall AM for the availability of e-learning tools dimension was (3.34) at a moderate degree.

Table (5): AM and SD for the degree of acquisition of e-learning skills by teachers of hearing disabilities according to the use of e-learning dimension

NO.	Rank	Items	AM	SD	Level
1	6	I use e-learning activities in teaching students with hearing disabilities	2.82	1.164	Moderate
2	5	I use moving and stationary electronic educational pens in teaching students with hearing disabilities	3.16	1.138	Moderate
3	4	I use electronic models and representations in teaching students with hearing disabilities	3.21	1.086	Moderate
4	7	I use multimedia tools in teaching students with hearing disabilities	2.73	1.181	Moderate
5	1	I use presentation software in teaching students with hearing disabilities	3.46	1.152	high
6	2	I ensure to convert educational content into effective electronic content to teach students with hearing disabilities	3.41	1.077	High
7	3	I use electronic images and drawings in teaching students with hearing disabilities	3.29	1.182	Moderate
Use of E-learning			3.15	1.177	Moderate

Table (5) displays that the AM has ranged from 2.73 to 3.46. Item number (5), "I use presentation software in teaching students with hearing disabilities," has first ranked with an AM of (3.46) at a high degree. Meanwhile, the item number (4), which states, "I use multimedia tools in teaching students with hearing disabilities," has last ranked with an AM (2.73) with a moderate level. The overall mean for the dimension of management was (3.15) at a moderate degree.

The e-learning skills and their three dimensions were found to be at a moderate level. This could be attributed to the fact that e-learning, as an electronic educational strategy for teaching students with hearing disabilities, offers several advantages. One of these is encouraging teachers to integrate modern technologies into the educational process. Multimedia in e-learning also attracts students with hearing disabilities and enhances their interest in the learning process through the use of colors, images, and various videos. This was highlighted in some studies such as [2; 3; 6]. Integrating e-learning into teaching students with hearing disabilities could provide an appealing educational

environment for them through the use of technological tools and electronic learning media. E-learning can also attract and engage students with the electronic educational content presented. It utilizes various colors, shapes, illustrations, and both animated and static images to enhance lesson delivery. This could result in numerous positive impacts of e-learning on educating students with hearing disabilities. This finding is consistent with Al-Aridhi's study [2]. This may be attributed to training students with hearing disabilities to use educational electronic tools such as computers and iPads. This training has led to numerous positive outcomes for them in educational, psychological, and social aspects. Many studies have shown that these tools play a significant role in reducing stress and anxiety levels among students with disabilities. Additionally, many electronic tools provide entertaining programs and educational games that bring joy and happiness to students with hearing disabilities and increase their motivation to learn. This finding aligns with Al-Sulaili's study [7]. This may also be due to the fact that some teachers of students with hearing disabilities have numerous work-related responsibilities and operate under pressure. As a result, they have limited time to integrate electronic learning tools into their teaching. Additionally, some schools and centers specialized in educating students with hearing disabilities lack the technological tools necessary for implementing electronic learning.

To answer the 2nd question, the AM, SD, and T-test were used to calculate the responses of the study sample on the e-learning scale for hearing disabilities students. This result is based on the gender variable (male or female). Tables (6) and (7) show the results:

Table (6) AM and SD of special education teachers'

Gender		No.	AM	SD	t- value	DF	SIG.
Overall	Males	45	3.49	0.352	2.178	154	0.178
	Females	36	3.48	0.313			

Table (6) indicates that no statistically significant differences were found at the significance level (α = 0.05) between male and female teachers regarding the use of e-learning for students with hearing disabilities. The calculated T-value was 2.178, with a significance level of 0.178.

Table (7) AM and SD of the e-learning scale dimensions for students with hearing disabilities related to the gender variable (male, female)

Gender		No.	AM	SD	T value	DF	SIG.
Teachers' Use of E-Learning	Males	45	3.57	.309	1.234	154	.1620
	Females	36	3.55	.358			
Availability of E-Learning Tools and Means	Males	45	3.36	.376	2.145	154	.0540
	Females	36	3.37	.411			
The Importance of E-Learning	Males	45	3.52	.373	2.222	154	.0880
	Females	36	3.51	.435			

Table 7 reveals that the study participants' responses to the various dimensions of the e-learning scale for students with hearing disabilities, as perceived by special education teachers, were consistent across all dimensions. Furthermore, the results of the Independent Samples t-test indicated no statistically significant differences at the significance level (α = 0.05) across any of the scale's dimensions.

The findings showed no statistically significant differences (α = 0.05) between male and female teachers in their use of e-learning for students with hearing disabilities based on the gender variable. Additionally, the responses of the study participants regarding the dimensions of the e-learning scale for students with hearing disabilities, as viewed by special education teachers, were consistent across all dimensions. This may be because teachers of students with hearing disabilities, regardless of their gender, are keen on addressing individual differences among their students. They achieve this by diversifying the teaching methods and strategies they use, including electronic learning [8]. It may also be because teachers of students with hearing disabilities, regardless of their gender, focus on

developing their students' skills in various cognitive, social, linguistic, sensory, and motor aspects. They aim to reduce the effects of hearing disabilities, improve their learning opportunities, and enhance their creativity. This can only be achieved by employing learning environments that are appealing to the students, such as the electronic learning environment. This could also be due to the common commitment among teachers of students with hearing disabilities to addressing the challenges they encounter in the teaching process and identifying effective solutions. One such approach is integrating e-learning to support the education of students with hearing disabilities.

To answer 3rd question, the AM and SD of the study sample's responses to the e-learning questionnaire were calculated related to the years of teaching experience variable. Table (8) displays this.

Table (8) AM and SD for the effectiveness of e-learning in teaching students with hearing disabilities.

Dimensions	Teaching Experience	No.	AM	SD
Teachers' Use of E-Learning	Less than 5 years	17	3.84	.748
	5 to less than 10 years	24	3.74	.629
	10 years or more	40	4.16	.597
	Total	81	3.90	.674
Availability of E-Learning Tools and Means	Less than 5 years	17	3.61	.725
	5 to less than 10 years	24	3.70	.639
	10 years or more	40	4.14	.674
	Total	81	3.81	.705
The Importance of E-Learning	Less than 5 years	17	3.74	.804
	5 to less than 10 years	24	3.66	.668
	10 years or more	40	4.15	.678
	Total	81	3.83	.738
Overall score	Less than 5 years	17	3.73	.709
	5 to less than 10 years	24	3.71	.586
	10 years or more	40	4.15	.579
	Total	81	3.85	.648

Table (8) illustrates noticeable differences in the AM and SD regarding the effectiveness of e-learning in teaching students with hearing disabilities in Oman, as perceived by their teachers. To assess the statistical significance of these differences, a one-way analysis of variance (ANOVA) was conducted, as presented in Table (9).

Table (9) ANOVA for the effect of teaching experience on the effectiveness of e-learning in teaching students with hearing disabilities.

Dimensions	Source	SS	DF	MS	F value	significant
The extent to which teachers use e-Learning	Between-group	4.186	2	2.093	4.881	.009
	Within group	54.458	79	.429		
	Total	58.643	81			
The extent of availability of e-learning tools and means	Between-group	6.455	2	3.228	7.100	.001
	Within group	57.733	79	.455		
	Total	64.188	81			
The Importance of E-Learning	Between-group	6.022	2	3.011	5.957	.003
	Within group	64.193	79	.505		
	Total	70.214	81			
Overall score	Between-group	5.219	2	2.610	6.778	.002
	Within group	48.897	79	.385		
	Total	54.116	81			

Table (9) displays statistically significant differences at the significance (α = 0.05). This is attributed to the impact of teaching experience in all dimensions and in the overall tool, which favors teachers of students with hearing disabilities with experience of 10 years or more.

The findings revealed a noticeable variation in the mean scores and standard deviations concerning the effectiveness of e-learning in educating students with hearing disabilities in the Sultanate of Oman, as perceived by their teachers. The results indicate statistically significant differences at the significance level (α = 0.05), attributed to the influence of teaching experience across all domains and the overall assessment. These differences favored teachers with 10 or more years of experience.

This may be because experienced teachers of students with hearing disabilities have attended numerous training courses on teaching strategies for these students, including training on the electronic learning strategy. This has positively impacted their performance at work. Years of experience may also help teachers of students with hearing disabilities develop their skills and enhance their competencies. As a result, they can adopt strategies, methods, and teaching approaches that align with modern technological advancements, such as electronic learning strategies.

CONCLUSION

E-learning is a crucial tool in modern education, providing flexible and accessible learning for diverse student populations, including those with hearing disabilities. In Oman, integrating e-learning in special education aims to improve students' experiences. However, its effectiveness depends on factors like digital resource availability, teacher preparedness, and institutional support. This study examines e-learning's effectiveness in teaching hearing-disabled students, identifying challenges and opportunities for improvement. The findings indicate that while e-learning significantly enhances the learning experiences of students with hearing disabilities, its overall effectiveness was rated as moderate. However, teaching experience emerged as a crucial factor, with teachers who had ten or more years of experience demonstrating a greater ability to integrate e-learning strategies effectively. This highlights the importance of professional development and continuous training in digital education methodologies. Given these findings, it is essential to strengthen e-learning initiatives by ensuring access to appropriate technological resources and providing specialized training for teachers. Implementing structured e-learning programs tailored to the needs of students with hearing disabilities can further enhance their educational outcomes. Future research could explore the long-term impact of e-learning on students' academic performance and social development, as well as the challenges faced by educators in adopting digital teaching strategies.

Recommendations

In light of the results obtained, the researcher recommends the following:

1. The necessity of utilizing electronic learning in teaching students with hearing disabilities.

2. Organizing training workshops for teachers of students with hearing disabilities on electronic learning.

3. The Omani Ministry of Education should provide technological tools for teaching students with hearing disabilities.

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