

Investigating Teachers' Attitudes toward Using Assistive Technology in Teaching Students with Hearing Impairments

Salma Masoud^{1*}.

¹Ministry of Education, Amman, Jordan.

ARTICLE INFO

Article history:

Received 14 Feb 2024

Accepted 28 Mar 2024

Published 01 Apr 2025

*Corresponding author:

Ministry of Education, Amman, Jordan.

Email: Salma.masoud200@gmail.com.

Abstract

This study aims to investigate Jordanian teachers' attitudes towards using assistive technology to teach students with impaired hearing. The research was conducted during the academic year 2022-2023, utilizing one data collection tool: an online questionnaire distributed to 347 special education teachers from Al-Amal Schools for the Deaf in Jordan. The data was analyzed using SPSS, with mean, standard deviation, and percentage calculations. The results indicate that teachers have positive attitudes toward the use of assistive technology for students with impaired hearing.

Keywords: Attitudes, Assistive Technology, Impaired Hearing.

1. Introduction

There is no denying the reality that every child has a fundamental right to an education on a global scale. Therefore, people agree that every child should receive a quality education regardless of whether they have a disability. In this way, education can be roughly divided into special needs education and regular education. The effectiveness of special education can be greatly enhanced by using assistive technologies to assist learners with special needs to become more independent.

Around the world, many educators and professionals have given their definitions of assistive technology (AT). It refers to any tool, machine, or equipment that enables older citizens and those with disabilities to maintain or improve their independence and functionality. In terms of education, work, recreation, and daily living activities (The Assistive Technology Act of 2004). According to (Farooq & Iftikhar, 2015) assistive technology refers to the goods or tools used to improve the functioning abilities of people with disabilities. The International Classification of Functioning, Disability, and Health (ICF) defines assistive items and technologies as any item, device, piece of equipment, or technological advancement that has been modified or specifically created to enhance the functioning of disabled person (Viner et.al 2020)

According to the researcher of this study, assistive technology devices are tools designed to support people with disabilities in a different of ways, depending on the type of condition they

have. For the blind, AT may include tape recorders to record lectures and speeches, while for the deaf, assistive technology may be employed to enhance hearing capabilities.

Thus, given the variety of benefits associated with assistive technology used in special needs education, the effectiveness of integrating assistive technology in any educational system depends on the quality and diversity of teachers serving as the primary curriculum implementers (Adegunju et al., 2017). In this regard, teacher perspectives on the use of technology are crucial. Therefore, there's a better chance that teachers will go above and beyond to successfully include assistive technology in the teaching-learning process when they have a positive attitude toward it. On the other hand, educators who have concerns about assistive technology in general tend to be reluctant to incorporate it into the process of teaching and learning. As a result, this can potentially have a detrimental impact on their proficiency with the technology.

1.1 Literature Review

Types of Assistive Technologies

Over the past three decades, the field of assistive technology (AT) has advanced dramatically from overhead projectors, slides, and filmstrips to modern 21st-century technologies like 3D simulations and virtual reality (VR) (Viner et.al 2020). There are several different types of assistive technologies, including no -tech, low-tech, and high-tech. No-tech AT refers to the use of learning practices like index cards, longer time, chunking materials, and colored folders in place of technology. Simple speakers, pencil grips modified scissors, Buzzers, paper communication boards, and calculators are examples of low-tech AT. High-tech assistive technology refers to the use of computers or computer components, including computer applications and cutting-edge hardware. (Clauson,2018). Zayyad (2019) provides more specific descriptions of these types:

Low-tech assistive technology: Technology generally lessens the impact of the disability on people with disabilities, not making it go away. However, there are several straightforward technologies that are thought to be crucial for people with impairments. Low-tech AT refers to tools or equipment that doesn't need a lot of training, may cost less, and doesn't have intricate mechanical features. These technologies include grab bars, specialized pen or pencil grips, highlighters, squishy balls or sensory input, page protectors or colored transparency, manipulative, switches, switch-operated toys, communication boards, car door openers, roll-in showers, handheld magnifiers, large print text, canes and walkers, and much more.

Med- level Assistive technology: The middle of the spectrum AT items or equipment may have some complicated features, be electrical or battery-operated, need some training to use, and cost more than the low-tech alternatives. Manual wheelchairs, electronic organizers, Closed Caption Televisions (CCTV), amplifiers, E-Readers, environmental control units (ECU), alternative computer mice or keyboards, braille translation software, switch-adapted games or toys, adapted switches, adapted seating, adapted keyboard, calculator, electronic speller or dictionary, word prediction software are a few examples.

High tech Assistive technology: it is known as the most advanced software or hardware that has digital or electronic components, may be computerized, and will probably need training and work to understand how to use it before using. This type of technology is the most advanced

and pricey. Power wheelchairs and scooters, digital hearing aids, computers with specialized software like voice recognition, electronic daily living aids, voice-activated telephones, voice-activated communication devices, digi drive technology, portable word processors, text-to-speech and speech-to-text conversion, and alerting devices are some examples of high-tech AT.

Low-tech strategies use basic equipment, whereas high-tech strategies use more advanced, typically programmable, types of technology. No- tech techniques employ no equipment at all. Devices varying in technology from low to high are routinely employed to help kids who face a variety of learning obstacles (Viner et.al 2020). Low and mid-technologies cannot fully support student-centered learning, according to findings of past research conducted within the special education environment. As a result, advanced technology must be used in classroom instruction and learning. (Nsofor ,2015) cited Chukwuemeka et al. (2020).

studies related to teachers' attitudes and pedagogical competence

Williamson-Henriques (2013) investigated the views of secondary general education instructors on the usage of AT for students with impairments. Four secondary schools in all took part in this investigation. 110 general education instructors from these schools responded to surveys. Utilization of AT, attitudes and views on AT, and supports and challenges related to AT were all subscales included in the study. According to the research, teachers felt unprepared to use devices effectively due to the absence of resources, limited preparation time, inadequate technical assistance, fragmented career development, confusion about how to use AT within their subject area, and low productivity.

Garcia & Seevers (2005) investigated general educators' attitudes toward the use of assistive technology by students with learning disabilities in the classroom. A total of 29 teachers from a suburban school in the southwest area of Texas' Gulf Coast participated in the study, which involved four schools. Twenty questions regarding the usage of assistive technology were included in a questionnaire survey that was created by a teacher-researcher and utilized as an assessment tool. The study findings demonstrate that general education instructors have a positive attitude to integrate assistive technology into their lessons for students who have learning difficulties.

In their 2016 study, Flanagan et al. looked at middle school special education instructors' perspectives on the use of AT when teaching literacy to students with high-incidence impairments. A survey investigated the use, efficacy, and variables influencing the use or use of assistive technology for teaching and learning literacy. The findings showed that although teachers used assistive technology sparingly, they believed it to be a useful tool for literacy. Teachers said that when assistive technology was employed, it provided good literacy help. Teachers also mentioned the expense, usability, and lack of knowledge/experience as impediments to implementing assistive technology in literacy. However, elements like prior positive experiences with assistive technology and how such technology supports students' learning encouraged the usage of such technology.

In special education schools in North-West Nigeria, Chukwuemeka, et al. (2020) conducted a study to investigate how teachers perceived and what barriers prevented them from using high-tech assistive technologies. The study employed a survey and questionnaire to gather information from 120 participants who were selected using a multi-stage sampling procedure from

local special education schools. Utilizing percentage, mean, and standard deviation, the data were evaluated. According to research, teachers rarely use cutting-edge assistive technology to teach kids who have physical limitations. The use of these materials, in contrast, was viewed by teachers as having important benefits. It was suggested, among other things, that given the dynamic nature of special education technology, the government should regularly offer workshops, seminars, and training for teachers as a method to stay up with developments in technology.

In a master's dissertation, Almethen (2017) evaluated the views of Saudi Arabian special education instructors regarding their levels of proficiency and areas in need of professional development about assistive technology. To assess special education teachers' perceived understanding of assistive technology and investigate their needs for professional development, the researcher created an online, self-administrated survey consisting of 27 questions. 110 special education teachers received an email with the link to the survey webpage, and 37 of them took part in the study. The study's overall conclusions show that Saudi Arabian special education teachers lacked the necessary training to select and use assistive technology in a classroom full of pupils with impairments.

Adams, et al. (2017) conducted a second quantitative study in which they looked at the attitudes of teachers and their level of proficiency when it came to using assistive technologies in special needs schools. This study investigated the attitudes and proficiency of teachers in Osun State, Nigeria's special needs schools when it came to using assistive technology. A descriptive survey method was employed in the study, and a purposive sample strategy was used to choose 100 instructors from special needs schools in Osun State, Nigeria. Twenty teachers were chosen, and the instrument was given to them using the test-and-retest approach outside the sample area. The statistical tools used to evaluate the data for this study included the t-test, ANOVA, mean and rank order, and percentages. The results showed that educators have a positive opinion of using assistive technology.

To review research on teachers' attitudes and pedagogical ability about the use of assistive technology for children with hearing impairments, this systematic literature review was conducted. The results of this assessment of the literature showed that assistive technology is a valuable educational tool for children who have hearing loss. The variables in most sample studies were aspects of the teacher's attitude and pedagogical competence, and data were gathered using survey instruments and a quantitative research approach.

Obstacles to the Use of Assistive Technology

Some of the barriers that could make it difficult for people to use assistive technology are discussed in the literature listed below.

According to Judge (2000), access to financing for assistive technology (AT) equipment and services has been a significant impediment. He argued that although several governmental and private sources provide funds to help people with disabilities buy the assistive technology they require, families may still find it challenging to afford it. He added that some special education teachers' training programs do not always include the assistive technology course, which prevents teachers from receiving the necessary training in this area.

Similarly, there isn't much evidence, according to Edyburn (2004), that teachers are adequately trained in the use of assistive technology to enable them to evaluate the need for it and even take it into consideration. The same is true for teachers who are currently working. The researcher discovered that the bulk of the IEP team members had minimal to no training in assistive technology.

Copley and Ziviani (2004) conducted a study of the literature to pinpoint the principal challenges facing the evaluation and application of assistive technology for children with various disabilities. The authors highlighted several obstacles, such as a lack of proper teacher training and support, unfavorable staff attitudes, inadequate assessment, and planning procedures, a lack of funding, difficulties acquiring and maintaining equipment, and time restraints. The authors claimed that various shortfall areas, including handwriting, motor abilities, reading, and math skills, might be addressed with the use of AT.

For students to access and utilize various assistive technology products and services, significant effort may be needed. Finances, training, teachers' bad attitude and inadequate assessment are just a few of the obstacles to obtaining assistive technology.

The importance and benefits of assistive technology for impaired hearing students.

Students who have difficulty hearing have different experiences from other students who can hear, which increases the possibility that they will interpret speech differently from those who are not hard of hearing. Therefore, there is a chance that students with hearing impairments will find it challenging to pay attention in lectures that need a high level of language understanding. Furthermore, there is a chance that poor language learning will contribute to the drop in academic performance. An Android-based assistive device was created by Santoso et al. (2020) to help students with hearing impairment access information that is explained by lecturers. Two programmers, three validators, two lecturers, and three hearing-impaired students participated in this study. The outcomes of validation and testing indicate that lecturers may readily employ this assistive technology, which also makes the topic easier for students to understand.

According to Meinen-Derr et al. (2017), children who are deaf or hard of hearing can benefit from augmentative and alternative communication technologies by using them to improve their language development. Five kids with permanent bilateral hearing loss, ages 5 to 10, who also showed signs of linguistic underperformance, took part in a customized, structured 24-week program utilizing the iPad software TouchChat WordPower. According to the results, the application appears to benefit elementary school-age deaf or hard-of-hearing children with language underperformance in their rapid language progress.

Hearing aid users exhibit extroversion, locus of control, self-confidence, and self-esteem as psychological traits (Lockey, Jennings, & Shaw, 2010; Helvik et al., 2006).

Conclusion from these studies indicates that using AT can help students develop students understanding of the materials and benefit students with language underperformance in their rapid language progress. Using AT can also affect psychological traits positively like exhibiting extroversion, self-confidence, and self-esteem.

2. The Problem Statement and Study Questions

Assistive technology devices are crucial for the education of hearing-impaired individuals. Students who have hearing impairments in perceiving or receiving information through their hearing organs may need them. Teachers' attitudes can have a big impact on whether they want to accept and use assistive technology. The pace of students with hearing impairments in the classroom may be slowed down or hampered by the negative attitude of the teachers regarding the use of the assistive technology they use during the teaching and learning process. To put it another way, educators who have a positive attitude towards using assistive technology will be more adept at integrating it into their lessons. There are currently few empirical studies about teachers' perceptions regarding the use of assistive technology in Jordan. Al-Zboon (2020), for example, examines how Jordanian teachers of pupils with visual impairments—blindness or low vision—perceive assistive technologies. Methods: Twenty teachers participated in the study. Semi-structured interviews were used to gather data, and the constant-comparative approach was used for analysis. Findings: The findings shed light on the difficulties instructors see when implementing assistive technology with their students, especially when it comes to computer use, a child's willingness to use a specific device, the absence of these technologies in homes and schools, and inadequate training in the home. The findings draw attention to perceived external obstacles, such as those pertaining to money, education, social perceptions, and family support, that stand in the way of the efficient application of assistive technology.

On the other hand, Al-Zboon (2019) provided evidence-based data about prospective special education teachers' opinions of their preparedness to utilize assistive technology (AT) and the state of the field about AT use. The data from eight-person focus groups and fifteen semi-structured interviews were analyzed using content analysis. The findings show that, overall, the participants weren't happy with their training courses or the situation in the field when it came to using AT. The participants also mentioned obstacles and moral dilemmas related to using AT.

Nevertheless, none of these studies investigated the attitude regarding the use of assistive technology with impaired hearing students. Thus, this constitutes a gap in literature that could be filled by this study. It will therefore be needed to investigate how teachers feel about using these AT tools with impaired hearing students. Therefore, the present study aims to investigate Jordanian teachers' attitudes toward using Assistive Technology to teach impaired hearing students. To accomplish the stated aim, the following questions were addressed: What are the attitudes of the teachers toward the use of AT on students with impaired hearing?

3. Objectives of the study

The present study aims to:

1. Investigate Jordanian teachers' attitudes toward using Assistive Technology to teach impaired hearing students.

4. Significance of the Study

This study identifies teachers' degree of the use of AT with impaired hearing students in the classroom and their perception regarding the effect of AT on students with impaired hearing.

The results of this study may aid policy and decision-makers in the Jordanian Ministry of Education in developing a plan of action for the use of assistive technology and may be of significant help to decision-makers and stakeholders in Jordanian education in determining the extent to which changes can be made in the existing assistive technology framework. The results of this study may also give schools important information about how to incorporate different types of assistive technology into their learning programs to enhance impaired hearing student learning and better train future teachers. This study may support the development of more practical aspects in the field of special education, especially for researchers and teachers.

5. Limitation of the study

This study was conducted in Jordan at Al-Amal schools for the deaf during the academic year 2022-2023.

6. Definitions

6.1 Theoretical definition

Attitude: According to Bruvold (1973) attitude is a reaction to something or a concept, positive or negative.

6.2 Operational definition

Attitude: The way a person perceives and assesses something. The study looked at how teachers felt and thought about using Assistive Technology to teach impaired hearing students.

7. Method

7.1 Research Design

The researcher employed the descriptive survey method to investigate Jordanian teachers' attitudes towards using Assistive Technology to teach impaired hearing students.

7.2 Population

This study was conducted in Jordan at the impaired hearing special education public schools. This study population consists of every special education teacher in Jordan. The researcher conducted the research during the academic year 2022-2023.

7.3 Participants

The participants of this study consist of 347 special education teachers from Al-Amal schools for the deaf in Jordan. The researcher sent the questioner to the schools' principles and 347 teachers responded to it. Some ethical issues were considered to make sure the study was conducted correctly. The participants were given a brief explanation of the study's objectives at the start of the questionnaire, and they had the option to stop at any point. The demographic information of the study participants is displayed in Table (1).

Table (1): Demographical Data of the Teachers

Variables	Category	f	%
Gender	Female	255	73.5
	Male	92	26.5
	Total	347	100
Experience	Less than 5 years	101	29.1
	From 5-10 years	129	37.2
	From 10-20 years	71	20.5
	more than 20 years	46	13.3
	Total	347	100
The Qualification	Diploma	93	26.8
	Bachelor	132	38.0
	Master	56	16.1
	PhD	66	19.0
	Total	347	100

From Table (1), we notice that most of the respondents are females (73.5%). We also find that most of the respondents hold a bachelor's degree (38.0%) and have from 5-10 years of experience (37.2%).

7.4 Data Collection and Instruments

The researcher used a quantitative research method for this study. A questionnaire was utilized as the only data-gathering tool for the current study. The questionnaire for this study was adapted from (NJIKEM,2022). Although the questionnaire was adopted, it was reviewed by two experts in method and instruction to give it final form. The researcher used Google Forms to create and distribute the questionnaire. The questionnaire consists of three dimensions demographic information, teacher attitude, and teacher competence. The electronic questionnaire was given to the headmasters of the schools, who distributed it to the teachers at the school. After completion, the survey was instantly forwarded to the researcher.

In measuring the stability of the research tool, the researcher relies on the Cronbach's Alpha coefficient to measure reliability, and coefficient of self-honesty toward measure the validity, which is the square root of the reliability coefficient. A survey sample of 24 respondents was taken.

Table (2): Validity and reliability of the instrument

variables	Number of items	Cronbach Alpha	coefficient of self-validity
Teachers Attitudes towards Using Assistive Technology	20	0.98	0.99

The Cronbach alpha value for the questionnaire, it was (98%) with a coefficient of self-validity (99%) and all were above the minimum acceptable (60%) in social and educational studies.

7.5 Data Analysis

After collecting the data, and the necessary information about the variables of the study it was coded and entered into the computer to extract the statistical results Where the software for the statistical packages for social sciences (Spss) Was used to process the data obtained through the field study from the members of the study sample, and specifically the researcher He used the following statistical methods to answer the study questions and test its hypotheses:

- Cronbach's alpha coefficient to measure reliability and coefficient of self-honesty to measure the validity.
- Descriptive statistics: to describe the characteristics of the study sample and to indicate the extent to which it represents the characteristics of the community from which it was drawn.

8. Results

Result related to the research question (What is the attitude of the teachers toward the use of AT on students with impaired hearing?

Table (3): shows Teachers' Attitudes towards Using Assistive Technology

N	item	Mean	SD	Evaluation
1	Using Assistive technology can improve the performance of students with hearing impairments in class.	4.33	0.720	high
2	Using assistive technology can enhance classroom instruction.	4.36	0.833	high
3	Feeling confident in using assistive technology with student with hearing impairments.	4.34	0.825	high
4	Feeling satisfied, when utilizing assistive technology in the classroom.	4.29	0.818	high
5	Employing assistive technology will make it easier for me to modify the curriculum to meet the unique needs of the impaired hearing students.	4.29	0.826	high
6	Using assistive technology enhances academic engagement in the classroom.	4.32	0.849	high
7	Using assistive technology further students understanding of the subjects	4.26	0.824	high
8	Using assistive technology is really challenging and complicated.	4.28	0.819	high
9	Using assistive technology with impaired hearing students irritates me and consumes too much of my free time.	4.31	0.827	high
10	Assistive technology is essential to the education of students who have hearing impairments.	4.35	0.849	high
11	Providing high-tech assistive technology for impaired hearing students should be a priority for decision makers.	4.30	0.817	high
12	Knowing the ideas and terminology of assistive technology for students who have hearing impairments.	4.31	0.830	high

13	Having faith in the ability to recognize and use software and programs that cater to the learning requirements of students with hearing impairments.	4.28	0.889	high
14	Having the knowledge and the skills to evaluate hearing-impaired students to decide the best assistive technology to use when instructing them.	4.30	0.832	high
15	Having the awareness of how to assess whether assistive technology is useful in helping my students who have hearing impairments.	4.25	0.815	high
16	Having the awareness that there are both low-tech and high-tech A.T alternatives available for pupils who have hearing difficulties.	4.32	0.807	high
17	Having the confidence in the ability to recognize a variety of assistive technology (A.T.) devices to educate and support students with hearing impairments.	4.31	0.818	high
18	Having the confidence in using a range of AT tools (low tech, mid tech, and high tech) to assist impaired hearing students.	4.30	0.810	high
19	Having the knowledge about how to set up a classroom to ensure using assistive technology is easier.	4.31	0.808	high
20	Lack of training or professional development regarding the use of assistive technologies.	4.31	0.843	high
General mean		4.31		high

(3.67-and above: high), (2.34-3.66: medium), (2.33-and below: low)

The results suggest that, overall, the study participants hold positive attitudes towards using assistive technology in the context of teaching students with hearing impairments.

The mean scores for all the items are consistently high, ranging from 4.25 to 4.36, with a general mean of 4.31. This indicates that, on average, respondents strongly agree or agree with the statements related to the positive impact of using assistive technology. The standard deviations (SD) are relatively low (ranging from 0.717 to 0.889), suggesting that there is a relatively low degree of variability in responses for each item. This indicates a degree of agreement among the study participants.

The evaluations provided (e.g., "high") further reinforce the positive attitudes of the respondents towards using assistive technology. Respondents express confidence, satisfaction, and belief in the importance of assistive technology in improving the educational experience for students with hearing impairments.

There is no item where respondents express negative attitudes or significant challenges regarding the use of assistive technology. Even the item related to the perceived challenge and complexity of using assistive technology (Item 8) received a high mean score, suggesting that teachers do not find it overwhelmingly challenging.

The last item (Item 11) emphasizes the importance of providing high-tech assistive technology as a priority for decision-makers. The high mean score suggests that respondents

believe in the necessity of prioritizing resources for high-tech assistive technology in the education of students with hearing impairments.

In summary, the results indicate a strong positive orientation among the study samples towards incorporating assistive technology into their teaching practices for students with hearing impairments.

Respondents also express confidence in their knowledge and skills related to various aspects of assistive technology, including terminology, software usage, evaluation, awareness of low-tech and high-tech alternatives, and recognizing a variety of AT devices.

Teachers feel confident not only in recognizing various AT devices but also in using a range of tools, including low-tech, mid-tech, and high-tech options, to assist students with hearing impairments.

Teachers also report having knowledge about how to set up a classroom to make the use of assistive technology easier, indicating a holistic approach to integrating technology into the learning environment.

Despite the overall positive responses, there is a notable concern expressed in Item 20 about a perceived lack of training or professional development regarding the use of assistive technologies. This highlights an area that may need attention or improvement.

Overall, the study suggests that teachers generally feel competent in using assistive technology for students with hearing impairments. Addressing concerns related to training and professional development could further enhance their capabilities and confidence in leveraging assistive technology effectively in the classroom.

8.1 Discussion

The focus of this research was to investigate Jordanian teachers' attitudes and the level of pedagogical competence toward using Assistive Technology to teach impaired hearing students. All 11 items in the second component of the study instrument were answered by participants, and their answers were ordered in terms of percentages and averages. The first research question revealed that all the participants have positive attitudes towards using assistive technology in the context of teaching students with hearing impairments. The study's participants' positive attitudes may have resulted from their access to most of the assistive technology (AT) devices used to teach students with hearing impairments, as well as their moderate levels of pedagogical competency in using these devices in their classrooms. This finding is like Adams, et al. (2017) and Garcia & Seever (2005) who conducted quantitative studies in which they looked at the attitudes of teachers and their level of proficiency when it came to using assistive technologies. The findings show that educators have a positive opinion of using assistive technology.

The study also revealed that teachers generally feel competent in using assistive technology for students with hearing impairments. Addressing concerns related to training and professional development could further enhance their capabilities and confidence in leveraging assistive technology effectively in the classroom. This finding contradicts with Almethen (2017) who discovered that Saudi Arabian teachers lacked the necessary competence and training to select and

use assistive technology in a classroom with children with impairments. Hence, these findings are also at variance with that of Williamson-Henriques (2013) who investigated the views of secondary general education instructors on the usage of AT for students with impairments. According to the findings, teachers felt unprepared to use devices effectively due to the limited resources, limited preparation time, inadequate technical assistance, fragmented career development, confusion about how to use AT within their subject area, and low productivity.

9. Conclusions

The purpose of this study was to investigate Jordanian teachers' attitudes toward using Assistive Technology to teach impaired hearing students. The findings indicate that the teachers hold positive attitudes towards using assistive technology in the context of teaching students with hearing impairments.

This study serves as an eye-opener to special education teachers and educational stakeholders in Jordan as it contributes to bringing out quantitative findings concerning teaching impaired hearing students. This study could be further expanded to other disabilities. Therefore, based on the findings of this study some vital recommendations were made:

1. Although the teachers adopted an attitude regarding using assistive technology for students with hearing impairments, there is a continuous high need for in-service training for teachers.
2. It can be recommended to carry out a study in which other disabilities like visual disability are examined.

Acknowledgments

We would like to express our sincere gratitude to the reviewers and the Editor-in-Chief for their valuable comments on an earlier draft of this paper. We also extend our thanks to teachers from Al-Amal schools for the deaf in Jordan, for their support in facilitating data collection. Any remaining errors or inaccuracies are solely our responsibility.

Ethics Declarations

This study was conducted in accordance with the Declaration of Helsinki (1964) guidelines and was approved by the Research and Ethics Committee of the Ministry of Education in Amman, Jordan. The following ethical principles were strictly adhered to throughout the research process:

- Voluntary Consent: Informed consent was obtained from the relevant authorities at Ministry of Education in Amman, Jordan.
- Minimization of Risks: Efforts were made to minimize any potential risks to participants.
- Confidentiality: Participant information was kept confidential.
- Transparency: Participants were informed about the research content and objectives.
- Documentation: All research stages and results were thoroughly documented.

-
- Reliability: The research methodology and instruments used were designed to ensure reliability.
 - Validity: Data processing methods ensured the validity of the research findings.

Data Availability Statement

The datasets collected and analyzed during this study are available upon reasonable request from the corresponding author.

Funding

No funding was received to conduct this research.

Conflicts of Interest

The author declares no conflict of interest.

Author Contributions

- Salma Masoud: Conceptualized and designed the study, collected and analyzed the data, wrote the first draft of the manuscript.
- All authors: Reviewed and edited the manuscript and approved the final version for publication.

Consent for Publication

The author consents to the submission of this paper for publication and, pending the editorial board's decision following the peer-review process, agrees to its publication. The work has not been previously published nor submitted to any other journal for consideration.

References

- Adams, O. O., Onyiyeche, E. O., & Bunmi, J. O. (2017). Teachers' attitude and competence in the use of assistive technologies in special needs schools. *Acta Didactica Napocensia*, 10(4), 21-32.
- Adegunju, K. A., Onivehu, A. O., Odetunde, A. O., & Oyeniran, A. O. (2017). Cognitive and psychosocial predictors of academic achievement among pre-service teachers in University of Ilorin, Nigeria. *Asia Pacific Journal of Multidisciplinary Research*, 5(3), 84-92.
- Al-Dababneh, K. A., Al-Zboon, E. K., & Akour, M. M. (2016). Competencies that teachers need for teaching children who are deaf and hard-of-hearing (DHH) in Jordan. *Deafness & Education International*, 18(4), 172–188. <https://doi.org/10.1080/14643154.2016.1249173>
- Almethen, M. A. (2017). Saudi special education teacher's knowledge, skills, and professional development needs of assistive technology in the classroom (master's thesis, California State University). San Bernardino.

- Al-Zboon, E. (2019). Assistive technologies as a curriculum component in Jordan: Future special education teachers' preparation and the field status. *Assistive Technology*, 34(1), 20–25. <https://doi.org/10.1080/10400435.2019.1677804>
- Al-Zboon, E. (2020). Perceptions of assistive technology by teachers of students with visual impairments in Jordan. *Journal of Visual Impairment & Blindness*, 114(6), 488–501. <https://doi.org/10.1177/0145482x20971962>
- Bruvold, H. (1973). Belief and behaviour as determinants of environmental attitudes. *Environment and Behavior*, 5(2), 202–218.
- Chukwuemeka, E., et al. (2020). Teachers' perception and factors limiting the use of high-tech assistive technology in special education schools in North-West Nigeria. *Contemporary Educational Technology*, 11(1), 99-109. <https://doi.org/10.30935/cet.646841>
- Cook, A. M., & Polgar, J. M. (2008). *Cook and Hussey's assistive technologies: Principles and practice* (3rd ed.). Elsevier.
- Copley, J., & Ziviani, J. (2004). Barriers to the use of assistive technology for children with multiple disabilities. *Occupational Therapy International*, 11(4), 229-243.
- Edyburn, D. L. (2004). Rethinking assistive technology. *Special Education Technology Practice*, 5(4), 16-23.
- Farooq, M., et al. (2015). Learning through assistive devices: A case of students with hearing impairment. *Bulletin of Education and Research*, 37(1), 1-17.
- Flanagan, S., Bouck, E. C., & Richardson, J. (2013). Middle school special education teachers' perceptions and use of assistive technology in literacy instruction. *Assistive Technology*, 25(1), 24–30. <https://doi.org/10.1080/10400435.2012.682697>
- Garcia, K. D., & Seevers, R. L. (2005). General education teachers' attitude regarding the use of assistive technology by students with learning disabilities in their classes. *Electronic Journal for Inclusive Education*, 1(9), 29-36.
- Helvik, A. S., Jacobsen, G., & Hallberg, L. R. (2006). Psychological well-being of adults with acquired hearing impairment. *Disability and Rehabilitation*, 28(9), 535-545.
- Judge, S. (2000). Accessing and funding assistive technology for young children with disabilities. *Early Childhood Education Journal*, 28(2), 125-131.
- Lockey, K., Jennings, M. B., & Shaw, L. (2010). Exploring hearing aid use in older women through narratives. *International Journal of Audiology*, 49(8), 542-549.
- Meinzen-Derr, J., Wiley, S., McAuley, R., Smith, L., & Grether, S. (2017). Technology assisted language intervention for children who are deaf or hard-of-hearing: A pilot study of augmentative and alternative communication for enhancing language development. *Disability and Rehabilitation: Assistive Technology*, 12(8), 808-815.

- Santoso, Y. B., Astuti, E. Y., Ratnawulan, T., Khoeriah, N. D., & Hakim, L. L. (2020). Development of assistive technology for students with hearing impairments. *Journal of Physics: Conference Series*, 1539(1), 012042. IOP Publishing.
- The Assistive Technology Act of 2004. (2021). The Research and Training Center on Promoting Interventions for Community Living. <https://rtcil.org/sites/rtcil/files/documents/ATA%20Fact%20Sheet%202.15.2021--Fixed.pdf>
- Viner, M., Singh, A., & Shaughnessy, M. (2020). Assistive technology to help students with disabilities. In *Advances in Assistive Technology* (pp. 220-240). IGI Global. <https://doi.org/10.4018/978-1-7998-1431-3.ch012>
- Yayi, T. O., Onivehu, A. O., Ohawuiro, O. E., & Oyeniran, B. J. (2016). Social studies teachers' competence in the use of information communication technology in Ilorin Metropolis basic schools. Paper presented at the 10th Annual Conference of the Association of Sociologists of Education in Nigeria (ASEN).
- Williamson-Henriques, K. M. (2013). Secondary teachers' perceptions of assistive technology use for students with learning disabilities (Doctoral dissertation, The University of North Carolina).
- Zayyad, M. (2019). Incorporating assistive technology for students with disabilities. In M. Shelley & S. A. Kiray (Eds.), *Education Research Highlights in Mathematics, Science and Technology 2019* (pp. 271-285). ISRES Publishing.