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Using Assistive Technology with Blind Students in Jordanian Public Schools

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Abstract

This paper explores the application of assistive technology (AT) to blind students in the Jordanian public schools. A mixed-methods design was adopted, which incorporated semi-structured interviews with teachers and administrators and questionnaires that were sent to blind students and their families. The questionnaire contained 20 questions which were measured on a five-point Likert scale and interviews on perceptions, challenges and recommendations were conducted. Pilot testing and expert review enhanced the validity, whereas reliability was checked with the help of Cronbach alpha. Examination indicates that screen readers, Braille devices and audio books are extensively utilized with barriers to complete inclusion being limited to funding, teacher training and gaps in policies. Suggestions are also made to enhance practices of inclusive education.

Keywords: Inclusive Education, Assistive Technology (AT), Blind Students, Teacher Training, Jordan Public Schools

Introduction

Inclusive education is becoming a significant aspect of equitable education. globally. According to UNESCO (2020), inclusive education is not a suggestion to incorporate. students who are disabled to the regular classrooms but to ensure that they are able to maximize their benefits. learning opportunities. Assistive technology (AT) is a catalytic participative facilitator. autonomy, and student academic achievement in visual impairment (WHO, 2018). The policies adopted by Jordan ministry of education are consistent with international policies. This has not been done consistently in frameworks.

Due to the international trends of inclusive education, there are special challenges to the implementation of assistive technology in teaching blind students in the state schools in Jordan. These issues precondition the necessity to organize a scientific study that will help to assess the existing state of affairs and suggest effective solutions that will play a role in enhancing the process of educational integration and guaranteeing equal opportunities (Alananbeh, & Asha, 2023).

Al-Dababneh and Al-Zboon (2024) recorded the initial attempts in special education and pointed at the systemic issues related to resource shortage and the lack of teacher

preparation. Other more recent investigations attest to the idea that teachers are positive in their attitudes towards inclusion, but they do not receive the training to effectively apply AT (Al-Mawadieh et al., 2024). The transformational power of AT has been highlighted on the global scale. With these gains, the public schools in Jordan have been continuously challenged. Alananbeh and Asha (2023) have indicated that students with visual disabilities face challenges when using AT because of economic factors, management, and technical inefficiencies. These issues point to the fact that there is an urgent necessity to find empirical research to study the availability and efficacy of AT in mainstream schools in Jordan. The gap is addressed in this paper by applying mixed techniques that will analyze the case of the use of AT, problems experienced and the perceptions of students, families, teachers, and administrators. Combining quantitative and qualitative data, the study will provide an insight into the AT integration in the Jordanian. public schools in a holistic manner.

Literature Review

Assistive technology (AT) has been discovered to transform the learning world over. accommodation of students with visual impairments. Recent studies reveal that the It can be empowered by applying artificial intelligence, wearables, and multisensory devices. visually impaired learners. Trying to illustrate the problem, Elshaer et al. (2024) experimented with the question of sustainability; AI solutions to assist Saudi Arabian visually impaired students, found out that AT was important in improving academic performance and classroom attendance. Similarly, recent research indicates the fact that new technologies in the field. Computer vision and wearable technology are opening up the opportunities of blind students to acquire mainstream education (Aduri et al., 2024).

Al Salahat and Ahmad (2022) pointed out that the use of technology and supportive techniques is one of the most important tools for transferring teaching goals and improving communication during the learning process, and that it is extremely central and is required in all teaching settings. These results highlight the need to integrate AT as a support tool but as a key component of the inclusive education systems.

Inclusion education has begun to take off in Jordan with national policies and foreign relations. In cooperation with the Higher Council of Rights of Persons with Disabilities, the Ministry of Education introduced a ten-year plan (2020-2030) to reinforce inclusive education in schools (GIZ, 2024). Male and female equal rights in education are also reported in the compendium on Jordan that UNESCO published in 2023, with issues in implementing them on the classroom level. Although these advances in policies have occurred, there are still practical obstacles. The level of teacher training in AT is also inadequate, and it reduces its application in the classroom (Zickafoose et al., 2024). Family involvement is another critical point: the studies reveal that family involvement in technology partnerships facilitates more AT adoption and sustainability. We may synthesize this and learn that there exists a gap between the policy structures and classroom practices that requires an empirical study that can research the application of AT in Jordanian state schools and generate some solutions that can be implemented.

The research is based on three theoretical perspectives that are highly interconnected and allow it to focus on its subject: Inclusive Education Theory underlines the right of everyone to quality education despite disability. According to UNESCO (2020), inclusion is such a process

of accommodating and responding to the diversity of needs of all learners by enhancing participation and minimizing exclusion. Inclusion, as applied to blind students, should entail not only physical attendance in the mainstream classes but also participation in the classroom where the blind students should have access to teaching materials and techniques. Assistive Technology Assistive technology (AT) is a device, software, and tools that help to improve the functional abilities of people with disabilities (WHO, 2018). AT also involves screen readers, Braille displays, audio books and tactile graphics to the students with visual impairments. They help the students to get access to the content of the curriculum, to be involved in the classroom discussions, and to become independent.

The studies indicate that AT can be used to a great advantage to enhance academic outcomes and motivation when the principle is introduced properly into the teaching process (Fernandez-Batanero et al., 2022). Teacher Competence and Training Models AT implementation depends on the teacher competence and institutional support. Research indicates that teachers are usually not trained in the use of AT which lowers their effectiveness (Zhang and Tian, 2025). Continuous technical support and development of professionals is thus a requirement to make sure that AT is not only there, but it is being used in the classrooms successfully. The framework places the study in the context of the inclusive education discussion, which attributes the relevance of AT as a policy-practice interface, the significance of teacher readiness and institutional encouragement.

Although the policies of inclusive education were adopted in Jordan, blind students in the Republican schools still have a range of obstacles to accessing and effectively using assistive technology. This problem is caused by a number of related problems: Poor Access of AT: While there are schools that offer the simplest facilities like screen readers, the more complex technologies, like Braille displays and tactile graphics are not common because they are expensive (Alananbeh & Asha, 2023). Lack of Teacher Training: Teachers are usually found to have positive attitude to inclusion but are not trained enough to incorporate AT in their teaching methods (Arnaiz-Sanchez et al., 2023). This leads to poor use of available tools and lost opportunities of engaging the students. Weak Institutional Support: There are weak administrative efficiency and technical support that makes the steady use of AT inefficient. Schools do not necessarily have special personnel or departments to service and debug equipment (UNICEF, 2022). Gap between Policy Practices: Despite alignment of education policies of Jordan with and according to international policies, the same policy does not find execution at school level. There are no explicit accountability mechanisms, which implies that policies are not always implemented to give rise to effective classroom practices (UNESCO, 2020).

Effects on students: The barriers have direct impact on the academic performance, independence and motivation of blind students. In the absence of proper AT integration, students find it difficult to access the curriculum content, engage in classroom activities, and acquire problem-solving skills (Fernandez-Batanero et al., 2022). The issue points to the fact that empirical research that studies both the availability and effectiveness of AT in Jordanian primary schools, as well as the systemic obstacles and recommendations that can be undertaken are much needed. With the solutions to these problems, the study aims to close the gap that exists between policy of inclusive education and practice in the classrooms.

The importance of this research can be explained by the fact that it would produce both practical and theoretical contributions to the research on inclusive education and assistive technology.

This research provides the empirical evidence related to the usage and availability of assistive technology (AT) in Jordanian state schools, where literature on this subject is still limited and scarce (Alananbeh and Asha, 2023). Recording the existing practices, the study is useful in a better comprehension of the practice of assistive technology in the public-school environment. Moreover, the results also present systemic barriers, such as difficulties concerning funding, professional preparation, and policy implementation, and offer effective solutions to the policymakers and teachers to help assistive technology implementation become more efficient (Navas-Bonilla et al., 2025). In addition, the work introduces the views of various stakeholders, such as students, families, teachers, and administrators, which will make sure that the solutions suggested are based on lived experiences and are not merely a reflection of the realities of inclusive learning settings (ECTA Center, 2025).

Theoretically, the research fits into the body of knowledge on the field of inclusive education in the Middle East as it builds on the previous literature on special education in the Jordanian setting (Al-Dababneh and Al-Zboon, 2024). It also explains the importance of mixed-method research, where quantitative data are combined to offer breadth and qualitative data to offer depth, thereby making the results of the research more comprehensive (Creswell and Plano Clark, 2018). Moreover, the research reinforces the conceptual linkage between the models of inclusive education and the practical use of assistive technology in the classroom, as well as the correspondence between the theoretical frameworks and the instruction practice (UNESCO, 2020; Zhou et al., 2024).

The research is also unique because it focuses on the group of blind students studying in ordinary schools as opposed to special schools, which has rarely been explored in literature considering the Jordanian context. The research has made a meaningful contribution to country. literature by focusing on inclusive educational setting as opposed to the segregated setting. Moreover, it incorporates the input of families, teachers, and school administrators and presents a comprehensive picture of the assistive technology integration and its multifaceted effects on the learning process of students (Bernardes de Morais et al., 2023). The methodological rigor of the study is demonstrated as a validated 20-item Likert scale and semi-structured interviews, which were used in measuring the results quantitatively as well as conducting a qualitative analysis. Lastly, the study will help in addressing the gap between practice and policy in the area of inclusive education in Jordan because it will produce evidence which can be used by the Ministry of Education and other international organizations that strive to improve access, equity, and inclusion to education.

The study is especially significant as it gives logical proof that can assist policy makers and teachers in enhancing the use of assistive technology in public schools in Jordan thereby the gap between policies and practices. It also helps to the growth of equal learning opportunities of blind students and helps national and international activities to attain full integration in education (Al-Zboon, 2022).

The results of this study will be useful to the Ministry of Education in formulation of inclusion plans, teachers in enhancing their practices, families in strengthening their children, researchers in addition to the literature pertaining to the inclusive education in the Middle East. It will also offer feasible recommendations that can be implemented at the school level and teaching directorate level to make sure that the utilization of the assistive technology becomes sustainable.

Methodology

The research was based on a sequential explanatory mixed-methods design: a quantitative step was carried out with the help of a questionnaire, and the qualitative step was conducted with the help of semi-structured interviews to further elaborate the interpretation of quantitative findings. This type of methodology helped in the triangulation of data and maximizing the validity of the conclusions in line with the standards of mixed-method research and the finest practices. related to the structure of the tools of education (Creswell and Plano Clark, 2018).

The purposive sampling technique was used to select a sample that was well structured. inclusion criteria. The students who were blind and with their families were involved in the process. in public mainstream schools in Amman and Irbid, teachers who had one year of experience in teaching blind students, assistive technology (AT), administrators or inclusion. coordinators who will be in charge of inclusion programs provision. This has been selectively focused on ensuring that the participants possessed personal and pertinent experience of inclusive. education and practice of assistive technology. There were 40 blind students as the sample population. and consisted of 21 and 19 males and females respectively and were enrolled. in regular state schools in three education directorates in the Jordanian capital, Amman. Their families were the ones to be included. Questions to provide valuable data on the usage of assistive technology in the questionnaire survey. technology, the problems encountered and the type of assistance required to enhance the learning experiences of students. Additionally, the researcher selected six teachers who had a year's experience in working with blind students or using assistive technology tools in the classroom. These teachers provided experience concerning the teaching method, classroom adjustments and examples of AT in integrated settings.

The study involved four administrators/ inclusion coordinators. They were to monitor the inclusion programs, carrying out educational policy, and giving technical and administrative assistance to the school or directorate level. Their participation brought about an institutional approach to the implementation of policies, distribution of resources, and overall systemic backing of inclusive education. The relevance of the participants and their firsthand experience with AT was the basis of the purposive sampling process in terms of a balanced sample size to serve the descriptive quantitative and qualitative analysis (Ahmad and Wilkins, 2025).

The research employed a purposive sampling technique to make certain that the respondents were pertinent to the research purposes. Only schools in Amman with an inclusion program that is officially implemented on blind students were selected. The schools were identified in collaboration with the Jordanian Ministry of Education and the Higher Council of the Rights of Persons with Disabilities that maintains a list of inclusion classes and

provision of assistive technology (GIZ, 2024; UNESCO, 2023). This research collected data from two instruments. The questionnaire used in the study had 20 items which had a five-point Likert scale, with responses being 1 = Strongly Disagree to 5 = Strongly Agree. The instrument was drafted in a meticulous manner in accordance with the current guidelines of questionnaire development, such as systematic item creation, reviewing of the instrument by experts to guarantee clarity and relevancy, pilot study with a small sample to restrict wording and final modification to improve accuracy and reliability.

Table 1
The questions of the Assistive Technology Questionnaire.

No	Paragraph
1	I usually apply assistive technology in learning.
2	Screen readers (e.g. JAWS/NVDA) can be used to aid my studies.
3	In my school, there are Braille machines, and they are made accessible.
4	Audio books assist me in deciphering learning contents.
5	Tactile graphics are well employed during lessons.
6	In my school, teachers are trained in the use of AT.
7	Technical support on AT maintenance/operations is provided adequately.
8	(AT) has helped me to enhance my academic work.
9	I am more self-reliant with AT.
10	My school promotes policies that favor the use of AT.
11	There is adequate financial resource to offer AT.
12	(AT) is disseminated in all subjects.
13	(AT) eases barriers to learning.
14	I am content with the AT/quality/availability.
15	(AT) aids me in being engaged in classroom discussions.
16	My family does not object to my use of AT.
17	(AT) tools are user friendly.
18	I face challenges in using AT.
19	(AT) is made available to all students in need.
20	I suggest spending more money on AT at school and ministry levels.

Semi-Structured Interviews**:** the interviews were carried out with teachers and administrators as a supplement to the questionnaire findings. Six questions were aimed at the accessibility of assistive technology, the effects of this technology on learning by blind students, implementation challenges, technical support, policy activities and the proposed solutions. This open-ended format provided uniformity among the participants but also provided better understanding of practical experiences with AT.

Table 2
Semi-Structured Interviews Items

No	Items
1	What are the assistive technologies currently present in your school and the way they are delivered?
2	What would be the practical changes or enhancements that you would recommend enhancing AT integration?
3	What is your assessment of AT effects on learning and participation of blind students?
4	What are the primary challenges (financial, training, technical, administrative) to the implementation of AT?
5	What is the practices of technical support, maintenance and updates?
6	How does the policy in school/ministry support or inhibit the use of AT?

The Instrument's Validity and Reliability has extracted for these instruments; Validity is a concept that indicates how well an instrument can measure what it is supposed to (Takona, 2024). The content validity in the present study was defined by means of expert review: three experts in the field of the special education and educational technology reviewed the questionnaire concerning its clarity, relevance, and correspondence with the goals of the research, and the results were over 80 percent close. A pilot study involving five respondents was also done to perfect wording and also to make sure that it was suitable in the school setting. Reliability deals with measurement consistency (Mohajan, 2017). Cronbach alpha was also used to analyze internal consistency, and values [?] 0.80 are acceptable (Surucu and Maslakci, 2020). The pilot test indicated consistent results within items that the questionnaire would be able to measure the dimensions of availability, use, support, impact and policy.

Table 3
Reliability values of Assistive Technology questionnaire

Dimensions	Items Number	Cronbach's Alpha
Availability	4	0.86
Use	4	0.88
Technical Support	4	0.84
Academic/Social Impact	4	0.89
Policies and Funding	4	0.87

Table 4
Semi Structured Interview Trustworthiness Indicators.

Indicator	Procedure Applied
Content validity	Interview question review by experts.
Credibility	Member checking with participants.
Reliability	Peer review Coding Dependability Coding and theme peer review.
Triangulation	Questionnaire comparison.

The process of data collection took place for four weeks. Questionnaires were given out during this period in formats that were readily available such as audio and Braille versions so that the meaningful participation of the blind students and their families could be achieved. After giving out the questionnaires, semi-structured interviews with teachers and administrators were carried out. The ethics issues were also taken into consideration during the study, such as making sure that participants were informed about the importance of the

study and the study was voluntary, as well as that a person with visual impairments would have the proper support in taking part in the study.

The preparation phase entailed the formulation of ethical processes of data collection, schedule of activities of data collection and training data collectors on ethical and inclusive ways of interacting with blind students. Informed consent, respectful communication and accessibility requirements were given special considerations in all levels of data collection. The quantitative data were gathered in terms of questionnaires in both the paper and online format, and an audio and a Braille version were provided where necessary. Anonymity was assured of the participants who were allowed to participate on a voluntary basis. This is because these measures were made to enhance accuracy of the responses and ethical standards of research.

Qualitative data was obtained through semi structured interviews with teachers and administrators. All the interviews were taped and transcribed verbatim to analyze the interviews with the consent of the research participants. This approach was a chance to conduct a profound study of the experience and impressions of the respondents with respect to the practice of assistive technology and inclusive education. Other response formats like audio response and Braille were made available and supplementary help provided where needed in order to make it accessible. These features were in line with the objectives of inclusive education as they erased the obstacles to participation and provided equal participation to all participants.

The time schedule of the study was five weeks in total. The first four weeks were used to collect the data whereas the fifth week was used to verify the data, conduct quality checks and initial analysis to verify the accuracy and consistency of the data. Statistical analysis was done with descriptive statistics, reliability coefficients, and correlation analyses. The means, standard deviation, were computed to describe the pattern of responses, whereas the alpha coefficients of Cronbach were employed to measure internal reliability of the questionnaire. Correlation matrices were used to investigate the relationship between the study areas and simple group comparisons done where necessary.

The thematic coding was used to analyze the qualitative data. The important themes were availability, training, technical support, policies, funding and impact. The codes were coded by peer review of codes and cross-case comparisons between the schools that participated in the study to increase credibility. Lastly, the triangulation was obtained because the qualitative and quantitative results were integrated and a thorough and approved interpretation of the data was obtained.

Findings

The quantitative results showed that the supply of and utilization of assistive technology differed among instruments. Screen readers and audio books were said to be moderately available in public schools, and the availability of Braille devices and tactile graphics was relatively low, which was limited to a large extent by their high cost. The means of technical support and teacher training were relatively low in terms of support and training. The challenges associated with usage were observed to have negative correlation with

satisfaction and perceived impact, which means that low support minimizes the effectiveness of assistive technology implementation.

Academically, academic performance, independence, and confidence of the students rated high with high positive ratings. Significant positive associations were statistically found between the classroom participation and the presence of assistive technology. Equally, the results of social impacts revealed a potent positive association between the performance and independence of the students on one hand and their confidence on the other. Classroom participation and access to assistive technology were also strongly positively correlated, which indicates the contribution of availability to the development of engagement.

With respect to policies and financing, variations were observed between schools with reference to the level of implementation of assistive technology that crosscut across the subjects. Lack of proper funding was directly linked with reduced access to assistive technologies and reduced levels of satisfaction, which highlights the key role of financial resources in the successful implementation. The quantitative results were supported and amplified by the qualitative results. Most participants said that screen readers were used in most schools, but Braille and tactile materials were not used very often. A number of obstacles were experienced such as the lack of financial means, inconsistent training processes, sluggish administrative process, and lack of technical support.

With regard to policy, the participants did not have much awareness of the national frameworks in a bid to inform inclusive education. Also, there was inconsistency in policy specifications and actual school practices. The findings underscored the need to have good monitoring and accountability practices that can aid in the adequate policy implementation. It was the schools which were said to have undergone good experiences which were the ones who had been given the proper training on the aspects of behavior and those schools that were being provided with the hands-on technical support. The classroom participation and involvement of students were enhanced in this scenario. Family and community support too were crucial to the identification of factors that contributed to the successful assistive technology use.

Conclusion

The implication of the findings is that schools tend to utilize assistive technology devices that are not costly and not available as compared to more advanced technologies due to financial and technical possibilities. The training of teachers was found to be one of the determinants that enable the transformation of access to assistive technology into learning outcomes. Further, it is also found that there is a clear need in the presence of sustainable technical support mechanisms and effective frameworks that are capable of linking national inclusion policies with classroom practices at the level of classroom.

The research makes the conclusion that even the mere availability of assistive technology does not help in effectively supporting the blind students except when it is supplemented with systematic training of teachers, continuing technical assistance, and consistent policy enforcement. Combining quantitative and qualitative results, it is important to address the necessity of specific funding, empowerment on the school level, and effective family and community partnerships in order to facilitate inclusive education.

According to the research results, it is recommended to use continuous professional development programs devoted to the use of assistive technology with the active participation of specialists and specialized centers. There should be the creation of sustainable financing mechanisms to assist acquisition, maintenance and updating of assistive technology on the school and the directorate level. Moreover, it is also necessary to establish special units of assistive technology support on the school or district level to ensure routine maintenance and technical support.

It is also suggested that the educational policies should be translated into clear implementation plans that have a set of outcomes, monitoring procedures and accountability measures. Last but definitely not least, building partnerships with families, model inclusive schools, and community organizations are paramount to sharing knowledge and long-term support. These recommendations are in line with the national and international trends in inclusive education, as well as the realities found out by the field-based research in Jordan. The recommendation will not only enhance the experience of blind students in Jordan, but the recommendations may also be emulated in the Arab region as an example on how to achieve full inclusion in education through the use of assistive technology.

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