

Digital empowerment of undergraduate students with vision disability

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ABSTRACT

Introduction: The digital transformation of higher education institutions (HEIs) globally has positively impacted their competitiveness. Many HEIs are integrating emerging information technology (IT) into their educational systems. This study aims to investigate how HEIs are digitally empowering students with vision impairment, and how this empowerment impacts their transition to higher education.

Methods: To answer the research question, a semi-structured interview was conducted with (18) participants from two universities, and thematic analysis was used to analyze the data.

Digital empowerment for visual disability

Results: findings revealed various strategies used by universities to digitally empower students with vision disabilities. The study also highlighted the importance of social support and professional development in enhancing students' digital competencies.

Implications for practitioners: findings showed that the university portals do not adequately support students with vision disabilities thus further research is recommended to compare legislation regarding digital empowerment of students with vision disabilities.

Keywords: Digital empowering, undergraduate students, visual disability, Palestine.

Introduction

E-learning resources in the digital age provide learners with access to essential information and content. Technological advancements have made a wide range of e-learning resources accessible from various locations, allowing students, particularly those with visual impairments, to study, learn, and obtain information more efficiently (Sabry et al., 2019). According to the World Report on Disability, over one billion people globally (15% of the world's population) face significant barriers, including difficulties in accessing information and education (UNESCO Global Report, 2013). Digital communication technologies are now widely utilized in both formal and informal educational settings, serving not only general students but also those with visual impairments (Ghoneim et al., 2024; Pacheco et al., 2017). Many visually impaired students, including those who are completely blind, frequently rely on interactive technologies, computers, and smartphones to enhance their learning experiences (Faria Oliveira et al., 2023; Khasawneh & Khasawneh, 2023; Quainoo et al., 2023).

Smartphones equipped with screen readers, which can be downloaded from platforms like Google Play or activated through device settings, are commonly used by visually impaired individuals. Computers are also made accessible through software such as JAWS, a screen reader available for Microsoft Windows, which allows users to read on-screen content using text-to-speech output or a refreshable Braille display (Griffin-Shirley et al., 2017; Sulthan & Istiyanto, 2019). These digital communication technologies enable visually impaired individuals to engage in human interaction by adhering to universally accepted communication norms, thereby facilitating effective information exchange (Bhatti et al., 2024; Radanliev et al., 2024).

Given the challenges faced by individuals with visual impairments, it is crucial to adopt appropriate technologies that empower them to apply their knowledge to real-world situations and problem-solving. This requires providing modern technologies that meet specific standards and educational needs, allowing users to store, retrieve, and apply information effectively (Mardiana et al., 2019). Technology has become a vital part of daily life, growing and evolving rapidly over recent years. This study explores whether visually impaired students in Palestinian universities possess the necessary digital skills to mitigate negative impacts and maximize the benefits of technology. The researchers define digital empowerment as the process of training and guiding visually impaired students in using technology to improve their digital competencies and literacy, thereby reducing social inequalities and enhancing academic performance.

Higher education institutions have long utilized technology to advance sustainability goals, particularly in promoting equity and quality in education (Abad-Segura & González-Zamar, 2021). Many students with disabilities, including those with visual impairments, pursue higher education and require support in both academic and social dimensions (Mutanga, 2018). However, there is a scarcity of research on how higher education institutions digitally empower students with visual impairments, as well as on the legal policies and procedures that guide the academic system in this regard. This study aims to explore the perspectives and experiences of students with visual impairments regarding digital empowerment by higher education institutions, and how this empowerment impacts their transition into higher education. The study is expected to enhance our understanding of how to facilitate the transition of students with visual impairments to higher education and the role of technology in different contexts. Higher education institutions should creatively and collaboratively employ information and communication technology (ICT), while decision-makers should

design and implement strategic plans to digitally empower students across various academic areas.

Literature review

According to Mohammed (2021), the integration of technology into education has enhanced learning experiences for students with disabilities (SWD). Allan (2016) outlined principles for incorporating assistive technology into the teaching and learning processes of SWD, emphasizing that it can enhance basic skills rather than replace them and should be regarded as a fundamental tool, much like a pencil and paper for non-disabled students. The use of assistive technology has gained widespread attention due to its potential to improve the lives of students with learning disabilities (Isiaku et al., 2021). Additionally, Ramirez-Montoya et al. (2021) underscore the importance of taking location-specific factors into account when implementing technology in special education environments. Lersilp (2016) introduced assistive technology as a means of help students with disabilities achieve their individual goals and maximize their potential.

Assistive technology (AT) can empower individuals with disabilities to lead more independent lives (Brown et al., 2020). Senjam and Manna (2024) reported that AT encompasses various devices including emerging technologies such as Artificial Intelligence and services that assist people with disabilities and special education needs in performing daily activities and improving their quality of life. The World Intellectual Property Organization (2021) defines AT as a broad term covering a range of technologies and products, from simple devices like walking sticks and reading glasses to more advanced systems such as assistive robots and gesture or emotion recognition software. Layton et al.

(2020) describe AT as products and services that help individuals, particularly those with disabilities or long-term conditions, to compensate for functional limitations or declines.

Empowering Students with Disabilities through Digital Technology

The historical marginalization of individuals with disabilities underscores the critical need to empower students with disabilities, particularly by leveraging digital technology as a tool for inclusion and learning. Empowerment in this context goes beyond simply providing technical skills; it also involves implementing supportive educational policies and promoting equity in access to resources and opportunities (Mohammad & Aldakhil, 2024). This broader approach ensures that students with disabilities are not merely passive recipients of technology but are actively engaged in their learning journeys.

Digital tools, including mobile technologies, educational games, artificial intelligence (AI), and internet-based platforms, have the potential to transform learning environments into more learner-centered and collaborative spaces (Khlaif et al., 2025). These technologies can adapt to the diverse needs of students with disabilities, fostering an inclusive atmosphere that encourages participation and personalized learning (Chalkiadakis et al., 2024; Jung et al., 2024). Despite these opportunities, significant challenges remain. Morina et al. (2024) highlight persistent gaps in the technological infrastructure of educational systems, that hinder the accessibility and effectiveness of these tools for students with disabilities. These shortcomings indicate the need for systemic reforms that prioritize accessibility, ensuring that digital innovations truly serve all learners equitably. By addressing these barriers, educational

systems can fully realize the potential of technology to empower students with disabilities and promote an inclusive learning environment.

Studies on Students with Visual Impairment

In recent years, a growing body of research has explored the challenges faced by students with visual impairments across various countries, shedding light on their unique experiences and needs in educational settings. For instance, a quantitative study by Bacalla et al. (2024) investigated the challenges and opportunities encountered by visually impaired undergraduate students at a state university. This study identified five major challenges these students face in higher education: accessibility, instruction, educational compliance, socialization, and assistive technology. Interestingly, while opportunities were identified in accessibility, socialization, and assistive technologies, gaps in instruction and compliance were also highlighted, emphasizing areas that require further attention and improvement. Gill et al. (2017) explored how e-learning platforms empower visually impaired students in higher education institutions in Delhi, focusing on how technology can facilitate inclusive learning environments. Similarly, Arslantas and Gul (2022) examined the digital literacy levels of students with visual impairments, identifying the factors that influence their ability to effectively use digital tools. These studies underline the importance of equipping students with the skills and resources needed to navigate the digital landscape successfully.

The role of Universal Design for Learning (UDL) has also been a focal point in recent research. Firdaus et al. (2024) highlighted the critical role of assistive technology in supporting UDL, emphasizing that its integration enhances the framework's effectiveness in addressing the diverse needs of learners. Their findings suggest that the combination of UDL principles and assistive technology can significantly improve educational outcomes for all students, including those with visual impairments. Similarly, Seymour's (2024) research

demonstrated the benefits of UDL in fostering student engagement in online learning modules. Key elements identified included accessible online resources, clearly structured weekly schedules, opportunities for peer collaboration, and effective lecturer communication. Furthermore, UDL was shown to enhance cognitive, teaching, and social presence, creating a more supportive and engaging learning environment.

Collectively, these studies highlight the pressing need for accessible digital technologies and comprehensive support systems to improve the learning experiences and academic success of visually impaired students. Educators must ensure not only the availability of assistive tools but also the provision of tailored support that meets the individual needs of these students, enabling them to thrive in diverse educational contexts. By addressing these challenges, institutions can create inclusive environments that empower all learners to achieve their full potential.

Legal and Procedural Empowerment

Palestine has demonstrated its commitment to advancing the rights of people with disabilities through various legislative and legal policies aimed at minimizing barriers and improving access to education and higher education opportunities for persons with disabilities (PWDs) (Burton et al., 2013). For example, Article (9) of the amended Palestinian Basic Law of 2003 (Bir Zeit Institute of Law, 2008) guarantees equal rights for all Palestinians before the law, regardless of disability. Article (22) mandates the regulation of disability and retirement insurance, requiring the Palestinian Authority to provide education, healthcare, and social insurance for PWDs, as well as educational support for their families (Hattab & Mahamid, 2024). Additionally, Article (10) of the Palestinian Disability Law No. 4 of 1999 (DREDF, 1999) outlines the educational rights of PWDs, ensuring access to education at all levels according to their needs. The law requires authorities to provide equal opportunities for

enrollment in educational institutions, along with appropriate curricula, resources, and facilities (DREDF, 1999). In 2004, a Presidential Decree was issued to enforce the 1999 law and other disability-related legal provisions (Giacaman, 2021), and a 2017 legislative decision confirmed the right to education for all children, including those with disabilities (MQAM, 2017).

Despite increased services for students with disabilities in Palestine (Nasir-Tucktuck et al., 2016), challenges persist in providing suitable equipment, creating accessible lab environments, and delivering effective instructional practices for visually impaired students (Snounu et al., 2019; Nasir-Tucktuck et al., 2016). In its 2019 report to the United Nations under Article 35 of the UN Convention, the Palestinian Authority acknowledged difficulties in implementing inclusive education for students with disabilities, particularly for visually impaired students (United Nations, 2023). These challenges include a lack of resource rooms at all educational levels, limited Braille literacy among teaching staff and students, a shortage of specialized teachers, and insufficient coordination between Palestinian universities and relevant ministries (United Nations, 2023; Snounu, 2019).

Nonetheless, several NGOs, such as the Bethlehem Arab Society for Rehabilitation (BASR), work with the Ministry of Education and Higher Education to establish resource centers for students with visual disabilities (BASR, 2022). Many Palestinian universities also provide support for students with disabilities, including accessible restrooms, elevators, playgrounds, sports activities, and technological equipment (Snounu et al., 2019; Hassouna et al., 2017).

For instance, An-Najah National University, the largest university in Palestine, has implemented numerous policies to reduce inequality and ensure that all members -employees, students, clients, and visitors- are treated fairly and with respect (An-Najah University,

2023a). These include an quality policy for non-discriminatory student admission and an Anti-discrimination and Harassment policy (An-Najah University, 2023a).

The university also established the "Students with Disabilities Care Office," which focuses on the right to higher education for students with disabilities (An-Najah University, 2023b). The office provides comprehensive support, including preferential treatment for loans, grants, scholarships, and financial assistance. It offers counseling services, encourages students with disabilities to participate in cultural exchanges, and supports their involvement in musical, theatrical, and sports activities (An-Najah University, 2023b).

For visually impaired students, the university has created a computer lab with Braille books and volunteers to assist with mobility education and material transcription. The university also offers free training for visually impaired community members and provides free accommodation and mobility assistance for students with visual impairments. It conducts training programs on sign language, guiding techniques, and the Braille Transcribing System for teachers and students. Braille books and specialized library services for students with visual and hearing impairments are also available (An-Najah University, 2023b). Most other Palestinian universities have implemented similar measures to support visually impaired students (Hassouna et al., 2017).

Therefore, this study is guided by the following research questions:

1. How have undergraduate students with vision disabilities been digitally empowered by their institutions?
2. What are the challenges of digital empowerment for undergraduate students with vision disabilities?

3. What legal regulations and policies support students with vision disabilities in their academic transition?
4. How does the digital empowerment of undergraduate students help them in their transition to higher education?

Research Design

The researchers concluded that an exploratory qualitative case study design was the most appropriate methodological approach to effectively address the research questions posed in the study. This approach was chosen because of its strength in facilitating a deep and nuanced exploration of complex phenomena within their natural contexts. By employing a qualitative research design, the study was able to prioritize the collection of rich, non-numeric data, which is essential for capturing the subtleties of human experiences and perspectives (Heinrich, 2024). This approach enabled the researchers to engage directly with individuals who possess lived experience relevant to the study's focus, providing an authentic and in-depth understanding of their realities. As Creswell (2009) emphasizes, qualitative research is particularly valuable for examining phenomena in natural settings, allowing for a holistic interpretation of the subject matter that is deeply rooted in the participants' unique contexts and interactions. This alignment between the methodological choice and the research goals ensured that the study could generate meaningful insights and contribute to the broader understanding of the topic under investigation.

Participants

The study participants were undergraduate students with visual disabilities from two large universities in Palestine, pursuing their first degrees in various fields. A purposive sampling was employed to gain an in-depth understanding of the study topic from the participants'

lived experiences (Temane et al., 2024). A total of 18 students (11 females and 7 males) with different levels of visual disabilities and from various locations in Palestine participated in the study. Most participants had attended public schools, while two attended private schools for visually impaired students. All students were from middle-class sociocultural communities.

The recruitment process began with the assistance of the Disability Services units at the two universities, which provided the number of visually impaired undergraduate students for the researchers to contact. The first researcher then scheduled face-to-face individual interviews with the potential participants.

Study Context

The study context involved undergraduate students enrolled in various fields of study and academic levels, hailing from different locations in Palestine. These students have visual disabilities and use technology to communicate with their peers and continue their education.

Ethical Clearance

Participants provided consent to participate in the study, and the Institutional Review Board (IRB) committee at ANNU granted approval for the research.

Data Collection:

Semi-Structured Interviews

To explore the digital empowerment of undergraduate students with vision disabilities, we conducted semi-structured interviews with participants. The interview protocol (Appendix A) was designed to address key aspects of digital accessibility, institutional support, and students' academic experiences. The protocol consisted of various sections, including an

introduction to the study, the study's purpose, and a statement informing participants that their participation was voluntary and they could withdraw at any time. Furthermore, we assured participants that their identities would be kept anonymous. The individual interviews lasted between 25 and 35 minutes and were recorded after obtaining participants' permission. The interviews began with background questions, such as *“Can you share a bit about your educational journey before entering university?”* and *“What were some of the challenges you faced as a student with a vision disability in your previous schooling?”* to establish context. Participants were then asked about their university experiences, including *“What digital tools or technologies are available at your university to support students with vision disabilities?”* and *“How accessible do you find the university’s online platforms, digital resources, and learning management systems?”* to assess digital empowerment. Additionally, questions like *“Are you aware of any laws or policies that protect the rights of visually impaired students in higher education?”* and *“Does your university have clear policies regarding digital accessibility for students with disabilities?”* were included to examine the role of institutional policies. The semi-structured format allowed participants to elaborate on their experiences while ensuring consistency in data collection across interviews.

Data Analysis:

The initial step in data analysis involved transcribing the audio files and converting them into text files. We employed inductive thematic analysis, as suggested by Braun and Clarke (2006). The first and third authors independently read each transcript and divided them into smaller segments based on ideas and concepts. Color-coding and numbering were applied to the lines to differentiate the ideas and concepts. The unit of analysis was the idea or concept. The two researchers then grouped similar ideas/concepts to form themes and assigned names to them. Subsequently, the two authors responsible for data analysis met to discuss the

procedures and findings. Using this method, they developed the themes based on their discussion. Table 1 presents an example from the coding book developed in this study.

Table 1

Shows an example from coding book developed by the researchers in this study

Text segments	Main Idea(s)	Theme	Subthemes
<p>Student 1 Male: In the first day of my classes, the professor asked us to log in Moodle and check the Syllabus of the course. Actually, tried by myself, but my smart phone did not support reading the test...I asked my classmate to help me and taught me to download an application to read the text</p>	Using LMS	Institution policy	ICT-Based curricula
	Transferring materials into digital content Friend assistance	Colleague support	Social support
<p>Student 2 Female: The availability of Internet and the Disability unit are important to get support from them in terms of using technology For example; I used Internet to communicate with my instructor to ask her about how to upload the assignment. Where the disability unit provided me laptop suitable for my case with many applications to facilitate my study in undergraduate study.</p>	Availability of Wi-Fi, Getting support from Instructor	Institution facilities Social support	Wi-Fi Instructor support
	Support with devices and applications	Institution policy	
<p>Student 5 Female: Many sources of supporting us were available such as training to use technology but sometimes it was difficult for us to access these resources because of the time. However, sometimes, they provide us with audio files about the new technology</p>	Availability of different resources of information	Institution policy	Information management
	Students training	Professional development	Audio files

Table 3

Final themes and subthemes with examples reported by the participants this study

Theme	Subtheme	Example
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**Professional
development**

Short audio recorded files	I got audio files to instruct how to enroll online and to follow up the announcement from the university (Student 5)
Desktop assistant	Honestly, when I face any technical issues in terms of using the services on the university portal, I asked the desktop help who provides me with clear instruction and sometimes download application to use for academic purposes (Student 12)
Technical support	The university provided me with technical support in different ways that enables me to use technology fluently to mitigate the difficulties that I have because of vision disability (Student 17)

**Social
support**

Colleagues support	Disability support unit at the university always encourages us to collaborate with colleagues to share our skills and knowledge to help each other in using technology (Student 11)
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	Instructor support	A lot of communication channels are available for us to get support to use technology or to ask questions about the suitable application for our study at the university from the instructors of the courses (Student 15) The Disability unit provides me with important information about suitable technology [Application] and tools that can help me to finish my assignments (Student 3)
	Social media platforms	Sometimes the university Facebook provides tips to use technology on campus specifically accessing Wi-Fi (Student 5)

Institution facilities	Availability of technological devices	The university provided LCD projectors with audio amplifiers and audio system to the classrooms and distributed laptop to some students who have economic difficulties
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Wi-Fi	The important issue for me to be able to use technology on campus is the availability of strong Wi-Fi and easy to access (student 1)
Technological desk assistant	Yeah, availability of desktop assistant to answer questions related to technology that assist my case [vision disability] encourages promotes my technological skills (student 19)
Institution policy	Facilitating communication
	Creating weekly groups for students with vision disability and students without vision disability increased the communication between us and others where I can ask for skills about using technology (Student 11)
Accessing information	I believe accessing information and content about using technology is important for digital empowerment (Student 3)
Information management	I believe strongly that the availability of different resources of information about technology especially assistive technology and how the university manage these sources will increase my technological skills (Student 16)

**ICT-Based
curricular**

If you go to the description of how to use the university portal you will find a text video without audio, this cannot enhance my skills, it frustrated me...you want to improve our digital competencies, you should design audio content and guidelines to be used by blind students (Student 10)

It is a good idea to have digital content with audio recorded or option so it will be for both students with disability in vision and students without disability (Student 16)

Trustworthiness

After finishing the transcription recorded audio files, another researcher listens to the recorded files and compares it with the audio files. After erification by the team member, the researchers send the text files to all the participants for member checking, asking to verify the content accuracy by listening to the document through using Real Aloud features in Office 2019 where all of them have the applications. Moreover, the participants were asked to add new information to the transcripts rewrite sections if necessary, write notes, and return them within one week of receiving them. t. No one of the participants' changes or add any information. After finishing data analysis and identifying the main and subthemes, two

professors in educational technology and inclusive education were asked to analyze 10% of the data using the coding book to check its accuracy. The inter-coder agreement between the internal coders (the researchers) and external coders was 89%.

Findings

The following section reports on the data collected from interviews and document analysis regarding higher education institutions' policies toward students with disabilities, particularly those with vision impairments, and how they are digitally empowered. All of the participants in this study confirmed the importance of technology for them to mitigate **the difficulties they face due to their visual impairments**. The participants reported different ways that they can use technology in their daily life specifically in their academic life to make their assignments, communicate with their peers and faculty member. In addition, they use some applications to convert the text messages into audio.

The findings of this study revealed different procedures and clear policy towards integrating students with disabilities in the university life and digitally empowering them through the services provided by the university. The researchers organized the findings into five main themes including institutional policy, institution facilities, professional development, and social support.

Institution Policy

The researchers categorized the findings relate to the institution policy into three subthemes including facilitating communication, accessing information, and information management.

Facilitating communication

Many participants in this study confirmed the importance of communication with other students and staff at the universities to improve the digital skills and staying updated on

available technologies suitable for students with vision impairments, thereby enhancing their engagement on campus. For example, a female student said “university has to establish various communication channels for students to communicate with each other...It communication with other students is important for me to learn more about technology” (Student 5). Another male student confirmed that communicating with his instructor allowed him to acquire new skills for converting PDF files.

A follow up question was asked to the students about the ways to facilitate communication especially between student with vision impairment and students without disabilities. Most of the answers of the students were about creating communication groups related to improving technological skills of the blind students.

However, few participants disagreed with their peers about the importance of communication with classmates or instructor. Their justification was that other students and instructors are busy, and even if they are willing to help, they may not be able to do so immediately. **Accessing information**

In the context of this study, accessing information refers to the process of seeking and obtaining new knowledge about technologies that can benefit students with vision disabilities. The majority of the participants expressed the importance of making the information on campus accessible and available at any time and from anywhere to use it to improve their technological skills and knowledge. A male student said, “making information related to the assistive technology for students with vision disability available and easy to access encourages me to learn more about this technology and enhances my digital competencies” (Student 7).

Some students reported that they could not access the guidelines and instructions on using the Internet on the website of the university because it was not responding. A follow up question

asked to those participants about the reasons of not responding some of them related the reasons to the weak Internet connection and others refer to the server of the university.

Information management

In the context of this study, information management refers to how higher education institutions produce, share, and deliver the knowledge and skills of digital technology to diverse students (students with any type of disability and students without disability). Some participants mentioned that their university has well-organized resources of information targeted the students with disability, particularly those with vision impairments. Where, other students reported that the university did not consider students with vision impairment. For example, one said that “how I use the guideline of using [Moodle] that is text file...this file for student who can use their eyes not blind students” (Student 19).

Institutional facilities Institutional facilities refer to the services of the university that can be useful for enhancing students with vision impairment technological knowledge and skills. Therefore, the researchers organized the institution facilities into three subthemes including Wi-Fi, technological desk assistant, and availability of technological devices.

Wi-Fi

Many students confirmed the importance of having strong Wi-Fi on campus to enhance digital competencies of students with vision disability. the answers of the students were varied based on their experience with technology. For example, some students mentioned that Wi-Fi facilitates communication with their peers and faculty members to receive support. Others highlighted its importance in receiving updates or upgraded versions of the technology they use. In addition, it helps them stay informed about the latest developments in technology for visually impaired individuals. Other students reported that there is Wi-Fi on the campus but

the signal is weak so they cannot download any applications or use Internet in a professional way to improve their digital competencies.

Technological desk assistant

Technological desk assistant is a place, where technological skilled persons can stay and provide assistant for students who request information about a technology or need help to use it. All of the participants in this study confirmed importance of the availability of a desk assistant to improve their digital competencies and acquire new skills in technology. One female student mentioned, “she learned a lot from the technological desk assistant about new technology for vision disability people” (Student 17). Two students reported that they got training from the person who was working in the technological desk to use the “TAPTAPSee” which was downloaded on their smart phones to identify the objects when they are walking.

Availability of technological devices

The availability of technological devices refers to both classroom infrastructure and devices provided to students with vision disabilities. . The majority of the participants reported that all of their classrooms they attended courses were supported with interactive projector and audio system. In addition, they confirmed that some of the courses presentations were recorded and they can use the files after the classes.

Some students who have difficulties to buy laptop were provided with laptop device from their institution as reported by four students from the two universities. The interviewers asked a follow up question about the benefits of receiving a laptop from the university. The responses emphasized the importance of these devices and the policy of the university to provide students with devices on the digital competencies. For example, one said, “I got a laptop from the university when I told them I do not have laptop...It is a new device and suitable for my study...Yes, it is important for enhancing my digital skills (student 18).

Social support

In the context of this study, social support refers to the assistance provided to students with vision disabilities by their colleagues and instructors at the university. Therefore, the researchers categorized the social support themes into three main subthemes including colleagues, instructors, social media platforms created by the institutions, and the official website of the institutions.

Colleagues support

All of the participants in this study reported that they received assistance from their colleagues in the university to use the technology on campus or off campus. For example, a female student said, “I usually get help and guidelines from my classmate; I liked to ask her more than using any other way for assisting to use technology (Student 11). The assistance for students with vision disability is variant based on the type of assistance as reported by most of the participants. To clarify a male student said, “if I need to download an application on my smart phone and learn to use it, my colleague gives me directions to download and install it if he has assignments, but if he is free, he spent time to download, install, and teach me how to use it (Student 9).

Instructor support

Few participants expressed the importance of instructor’s support for their digital empowerment because instructors are busy and do not have enough time. However, some students reported that their instructors supported and trained them to use the learning management system to upload the assignments. A male student said, “the instructor of the course taught me how to use Moodle to upload the assignments and how to record my voice on PowerPoint slides” (Student 9).

Digital empowerment for visual disability

The variation in instructors' assistance with technology depends on their field of study, as reported by some participants. For example, a female student said, “getting help from instructors to use technology depends on their digital competencies and their field. Some of them are willing to help because of his/her skill cannot provide anything (Student 6).

Social platforms and virtual assistant

Creating a page to provide students with help and assistance in using technology, especially for students with vision disabilities, is important and helpful in enhancing digital competencies among students, as reported by many participants in the study. Many participants emphasized the importance of sharing, knowledge, skills, and experience of using technology to develop digital competencies among students with vision impairments.

In addition, some students mentioned that their university offers a virtual help tool that assists students in using technology and suggests applications suitable for students with vision disabilities. A female student said, “it is easy for me to send a recorded question to the online help to request technical assistance or any kind of assistance than going in person” (Student 7).

Professional development

Professional development refers to equipping and training students with suitable skills and knowledge while keeping them updated on how to use technology in ways tailored to their special needs that is related to vision disability. The majority of the participants reported different ways implemented on their campus for training them such as recorded audio files about using technology, creating guidelines printed in Braille. For example, a student said, “it is easy to be trained and skilled on the campus, there are a lot of methods to educate yourself about any specific technology, in each semester there is training from the Disability unit about new technology installed on campus, printed guidelines by Braille, and recorded files (student 17).

Other students highlighted the importance of digital literacy in keeping students with disabilities updated on new technology by organizing small mixed groups (students with vision disability and students without vision disability) to share their digital skills and knowledge. “I think training is not sufficient to be digitally empowered, the importance for me is to have advance digital skills such as ability to use technology to find what you want without any assistance, communicate, and evaluate the resources. This is what I want in order to be digitally empowering...Do not give me fish—please teach me how to fish” (Student 13).

ICT-Based curricular

Integrating ICT-based curriculum and teaching materials is an important way to keep students updated on technology and digitally empowered, as reported by many participants in this study. A follow up question about how ICT-based curricula enhance digital skills of the students with vision disability, the responses of the participants were variant based on their experience with technology. A few participants mentioned that digital curricula with supporting audio files often require students to update their devices to access the latest versions of applications, such as PDF readers or text-to-speech converters. **Discussion**

This study aimed to investigate how higher education institutions in Palestine digitally empower undergraduate students with vision disabilities through a qualitative approach using student interviews. The findings revealed various strategies for empowering these students, including the implementation of institutional policies, access to facilities, provision of social support, and professional development initiatives. These efforts have enabled students with vision disabilities to integrate into the higher education community in Palestine (Snounu, 2019). Some institutions have adopted advanced technologies for teaching, learning, and information delivery, such as Extended Reality (Fragkaki et al., 2020; Khlaif et al., 2024),

established virtual labs (Popovici et al., 2019), and introduced specialized e-learning systems (Khlaif, 2018).

However, despite these advancements, previous studies highlight systemic shortcomings in upholding the educational rights of students with disabilities in Palestine (MacKenzie et al., 2020). This underscores the need to revisit and revise institutional policies to better support the digital empowerment of students with vision disabilities. The study also identified specific efforts by institutions, such as providing assistive technologies for text-to-audio conversion, interactive tools, equipping classrooms with audio systems and projectors, and offering devices like laptops to students in need, to enhance accessibility and support their academic success.

In this study, undergraduate students with vision disabilities face several challenges that impeded their digital empowerment. These challenges include inconsistent internet connectivity and limited accessibility to online resources, aligning with the findings of Morina et al. (2024). Additionally, institutional materials often lack adaptability for visually impaired students, such as guidelines that are not compatible with screen readers. Social and instructor support is also uneven; while some students benefit from assistance provided by peers and faculty, others encounter difficulties due to time constraints or a lack of digital competency among instructors. This is consistent with Bacalla et al. (2024), who identified similar challenges and opportunities in the digital empowerment of students with disabilities. Moreover, some students expressed a strong need for advanced digital literacy training to facilitate independent use and evaluation of resources, highlighting a significant gap in opportunities for skill-building.

According to the findings of this study, Palestinian higher education institutions have begun adopting policies aimed at promoting accessibility and inclusion for students with disabilities.

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These initiatives include establishing effective communication channels, offering assistive technologies, and enhancing information management systems to meet the specific needs of these students. Although this study did not delve into specific legal regulations, the institutional policies highlighted prioritize equitable access to resources, comprehensive training, and technological support for students with disabilities. These efforts align with broader educational mandates designed to promote inclusivity and adherence to frameworks that support students with disabilities (Rahajeng et al., 2024; Vlcek & Somerton, 2024).

Digital empowerment enables students with vision disabilities to navigate academic environments independently, actively participate in academic activities, and feel integrated into the campus community, aligning with the findings of Mohammad and Aldakhil (2024). By providing access to assistive technologies, professional training, and inclusive curricular resources, these students are equipped to complete assignments, communicate effectively, and stay abreast of technological advancements. Such empowerment boosts their confidence, enhances interaction with peers and instructors, and improves their overall learning experience. This support significantly eases their transition into the demands of higher education, as highlighted by Rosli et al. (2024) and Malinovskiy et al. (2024).

Limitations and future research

The current study has several limitations related to the sample of the study because of low number of undergraduate students with vision disability enrolled in higher education institutions. Therefore, data were collected using a qualitative approach from a small sample size. Future research with a larger sample involving all higher education institutions in the country and comparing policies across universities will be helpful to generalize the findings to another context.

Implications for practice

The results of this study regarding the procedures conducted for the digital empowerment of students with vision disabilities are potentially important for educators, researchers, and practitioners. One of the important findings was the role of communication channels in providing technical support, which indicates that fostering a culture of inclusion for students with vision disabilities in higher education could encourage decision-makers to admit more students with disabilities. . In addition, improving the infrastructure is essential to facilitating the digital empowerment of students with disabilities. However, the findings reveal a lack of audio instructions and outdated technology on the university website. It is important to improve the university portal by incorporating instructional materials in multiple formats (audio, video, text files, etc.). The lack of a clear policy to enhance digital competencies for all students with disabilities could challenge the procedures reported by the participants in this study. Therefore, it is recommended that decision-makers develop a clear policy on digital empowerment and improve e-learning at the university to make it more accessible for people with disabilities, particularly students with visual impairments.

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Appendix A

Interview questions

1. Can you share a bit about your educational journey before entering university?
2. What were some of the challenges you faced as a student with a vision disability in your previous schooling?
3. Were there any digital tools or assistive technologies provided to you in your earlier education? If so, how did they support your learning?
4. How would you describe your transition from high school to university as a student with a vision disability?
5. What digital tools or technologies are available at your university to support students with vision disabilities?
6. How accessible do you find the university's online platforms, digital resources, and learning management systems?
7. Can you provide examples of how your university has digitally empowered you in your studies?
8. What challenges have you encountered in using digital tools or assistive technologies at your university?
9. How do these challenges impact your academic performance or participation in university activities?
10. Do you feel that university staff and faculty are adequately trained to support visually impaired students with digital tools? Why or why not?
11. Are you aware of any laws or policies that protect the rights of visually impaired students in higher education? If so, how have they influenced your academic experience?
12. Does your university have clear policies regarding digital accessibility for students with disabilities? Have these policies been effectively implemented?
13. How has access to digital tools and assistive technology influenced your ability to engage with coursework and university life?
14. In what ways has digital empowerment helped you navigate academic and social aspects of university life?
15. What additional digital resources or support do you believe would enhance the academic experience of students with vision disabilities?