

When Technology Meets Reality: User Perspectives on Assistive Technology Access among Adults with Visual Impairments

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ABSTRACT

For the enhancement of independence, inclusion and participation for individual with visual impairments, assistive technologies play an inevitable role. Even though availability of assistive devices and digital tools have increased subsequently, many people with visual impairments continue to encounter challenges in accessing and using these devices effectively in their everyday lives. This study aims to examine barriers faced by people with visual impairments and explores their expectations and suggestions for enhancing assistive technology usability and accessibility.

The study employed a qualitative descriptive research design and the data were gathered from seventy-five adults with visual impairments selected through non- probability purposive sampling method from organizations like Netrodaya and National Association for Blind. The study included individuals aged between 18 to 60 years who had been using assistive devices over 6 months and were wither studying or employed, Primary data were collected using a structured interview schedule and gathered data were analysed with Statistical Package for Social Sciences (SPSS) version 20.

The results indicated several barriers related to affordability, durability, accessibility to training and technical support and usability of assistive technologies. Participants also highlighted the need for enhanced training opportunities, increased awareness, and stronger institutional and government support to improve the assistive technology usage effectiveness.

Keywords: *Inclusion, visual impairments, assistive devices, accessibility, usability*

INTRODUCTION

People with disabilities represent a greater portion of the global population, with an estimated 1.3 billion people experiencing some form of disability (World Health Organization, 2023). Disability is not merely a medical condition, but the result of interaction between individual and barriers present in their social environments. Among persons with disabilities, individuals with visual impairments often face certain barriers in accessing education, employment, information, etc. in recent years, assistive devices like screen readers, braille displays and other navigation aids have been developed as major technologies to support independence and inclusion in everyday life. By enabling individuals with visual impairments to access digital information, perform everyday activities, and engage in social and professional settings, assistive tools play a crucial role in enhancing autonomy and inclusion.

Despite the technology advancement, their access and effective usage are still limited in many aspects of development due to factors like high cost, lack of training, or technical support, limited awareness and inaccessible environments. While many earlier studies have highlighted the possible advantages of assistive technologies for individuals with visual impairments, there is still limited understanding of the challenges users face in accessing these technologies and whether they meet their expectations in real-life settings. In the Indian context, topics focusing on the lived experiences, challenges, expectations, and suggestions of adult users are still relatively understudied. Understanding these perspectives is crucial for enhancing accessibility, improving support systems, and securing that assistive devices are designed and implemented in ways that comfortable to the actual requirements of the users. Therefore, this study explores the barriers faced by adults with visual impairments in accessing and using assistive technologies, while also analysing their expectations and suggestions for improving assistive technology access and support.

LITERATURE REVIEW

The study underscores the broad variety of assistive technologies accessible to assist the persons with visual impairment in doing their day-to-day activities and collecting information. Pundlik et al (2023) studied around 290 mobile applications which are created as assistive tools for people with visual impairments and sort them into navigation, magnification, digital accessibility, computer vision and remote assistance services. The study clearly shows that popularity of smartphone application has increased among the users because of its easy access, recognition, navigation and readability to digital content. In addition to that Mnyanyi (2023) evaluated the ICT based assistive technologies mainly screen readers, wearable devices, mobile applications, and navigation aids which improves the mobility, learning and social interaction among the visually challenged people. The study shows that there is an enhancement in accessibility, independence and participation in social and educational areas by individuals with visual impairment.

Despite of the assistive technologies' advantages, their effective usage mainly depends upon the availability of technical and training support. Peter and Tumwesigye (2025) identified that assistive tools like screen readers, audiobooks, braille displays, and smart applications enhanced academic engagement in learners with visual impairments in Uganda, but inadequate maintenance of devices and poor teacher training restrict their proper usage. Similarly, Philemon and Amos (2024) discovered that visually impaired lecturers in Tanzania experienced barriers in usage because of limited professional training opportunities, limited institution support and lack of technological infrastructure. Also, another study by Muñoz and Abalorio (2025) found that while assistive devices improved independence and emotional well-being among visually impaired adolescents, users faced anxiety and frustration due to difficult user interface of the devices. Or when needed technical support is not available. These results indicate the significance of training, institutional support, and technical support for improving the benefits of assistive technologies.

Several literatures discuss about various barriers that limit access to assistive devices for individuals with visual impairments. Senjam et al. (2021) studied about the availability of assistive tools in schools for the blind in Delhi and the results were unavailability of devices, financial challenges, and lack of trainers were key barriers to their usage. Similarly, Khasawneh and Khasawneh (2023) described that lack of awareness

and insufficient institutional support limited the use of voice-recognition devices in visually impaired university students in Saudi Arabia. Senjam and Mannan (2023) highlighted that in many several low- and middle-income countries, including India, but still assistive technology accessibility are limited because of the high costs, low awareness, and weak policy implementation. These challenges underline the demand for enhanced accessibility, affordability, and law enforcements to ensure equitable access to assistive devices.

Earlier researches have studied the expectations and preferences of assistive device users. G (2022) explored the priorities and expectations of users of assistive technologies across the southern states in India and discovered that tools such as braille displays, screen readers and other navigation aids were widely observed useful for education, employment and daily functioning. But participants highlighted the scope for improved technical support, multilingual support, and more durability in devices. Likewise, Soltani et al. (2025) examined user perspectives on navigation aids and revealed that most respondents were willing to take upon new assistive technologies if they were affordable and durable. Despite smartphone advancement, only a few proportions of participants had experience with complex navigation devices. These researches suggest that including user feedbacks, enhancing device affordability and developing specific solution to situations are essential for improving the effectiveness and usage of assistive technologies.

METHODOLOGY

- To explore the challenges faced by adults with visual impairments in accessing and using assistive devices
- To understand the expectations and suggestions of adults with visual impairments for improving the assistive technology accessibility and usability.

The study employed a quantitative descriptive research design to examine the challenges, expectation and suggestion of adults with visual impairments in accessing and using assistive devices. A non-probability purposive sampling method was adopted to select respondents who are between 18 and 60 years and had been using assistive devices over six months and where either studying or employed. Data were gathered using structured interview schedule from 75 adults with visual impairments, who are beneficiaries of organizations like Netrodaya or NAB (National Association for the Blind). Secondary data were obtained from books, research articles and relevant reviews. The collected data were analysed using Statistical Package for Social Sciences (SPSS) Version 20, employing descriptive statistics such as frequencies and percentages to interpret the responses.

RESULTS AND DISCUSSION

Here, we discuss about the results of the study based on the data gathered from 75 adults with visual impairments. The findings are presented in tables using frequencies and percentages to illustrate the types of assistive devices used, the primary challenges faced by them and user expectations regarding improvement in future.

Table No: 1 Socio-Demographic Profile

S. no	Variables	Factors	Frequency	Percentage (%)
1	Age	18 to 29	48	73.8
		30 to 60	17	26.2
2	Gender	Male	43	66.2
		Female	22	33.2
3	Level of education	Primary Class	2	3.1
		Secondary Class	13	20
		Under-graduation	36	55.4
		Post-graduation & Above	10	15.4
		Professional Courses	4	6.2
4	Marital Status	Single	63	96.9
		Married	2	3.1
5	Monthly Household Income	Below Rs.10,000	7	10.8
		Rs.10,000 - Rs.30,000	41	63.1
		Rs.30,001 - Rs.60,000	8	12.3
		Rs.60,001 - Rs.90,000	1	1.5
		Not Applicable	8	12.3
6	Type of Visual Impairment	Low Vision	45	69.2
		Blindness	20	30.8
7	Ownership of Unique Disability Identity Cards	Yes	57	87.7
		No	8	12.3
	Availability of Disability Pension	Yes	36	55.4
		No	29	44.6
8	Duration of Assistive Technology Usage	6 months - 1 year	9	13.8
		1 - 2 years	18	27.7
		2 - 3 years	15	23.1
		3 - 4 years	5	7.7
		4 - 5 years	10	15.4
		More than 5 years	8	12.3

The above table indicates that a higher percentage (73.8%) of the respondents are in the age of 18 to 29 years, Majority (66.2 %) of the participants are Male, most of the respondents (55.4%) are under graduates, (96.9%) of the respondents are single, majority of the respondents (63.1%) are from lower to middle, larger portion of the respondents (69.2%) are low vision, A higher percentage of the respondents (87.7%) have UDID cards, however 44.6% of the respondents doesn't receive disability pension. Most (27.7%) of the respondents are using assistive technology for 1- 2 years, indicating a relatively recent adoption of these devices. This shows that individuals with visual impairments are slowly gaining access to education as they are using assistive devices to assist them facilitate their learning. Nevertheless, the low coverage of disability pensions shows that the welfare schemes are not extensive despite the disability identification.

These results show that young adults with visual impairments are increasingly getting access to education and are applying assistive technologies to facilitate it as well as other activities. This fact is consistent with the results of Pundlik et al. (2023) who emphasized the increasing popularity of mobile-based assistive applications and their use by people with visual impairments because they are accessible and easy to use. On the same note, Mnyanyi (2023) highlighted that assistive technologies based on ICT can be very helpful to enhance learning opportunities, mobility, and social engagement among individuals with visual impairments. The low coverage of disability pensions in the current study however presents a gap between disability identification and actual welfare benefit provision.

Table no. 2 Assistive Devices used by the Respondents

S. No	Assistive Devices	YES	NO
1	Screen Readers	43 (57.3%)	32 (42.7%)
2	Braille Technologies	29 (38.7%)	46 (61.3%)
3	White Cane	42 (56%)	33 (44%)
4	Smart Cane	4 (5.3%)	71 (94.7%)
5	OrCam	0 (0%)	75 (100%)
6	Smart Vision Glasses	5 (6.7%)	70 (93.3%)
7	Magnifiers	31 (41.3%)	44 (58.7%)
8	Text to speech facility	39 (52%)	36 (48%)

The findings shows that some of the common assistive devices used by the respondents are Screen readers (57.3%), white cane (56%), Text-to-speech facility (52%), magnifiers (41.3%) and braille technologies (38.7%), while the use of advanced technologies like smart canes (5.3%), smart vision glasses (6.7%), and OrCam tools (0%) were found to be very low. This indicates that while basic and popular devices are relatively common among users while advances ones remain limited.

These findings align with some of the studies that shows the growing role of digital and smart phone based assistive technologies in supporting individuals with visual impairments. for example, Pundlik et al. (2023) studied that smartphone-based apps have become widely popular due to their accessibility, availability, navigation support and ease of use features. Likewise, Mnyanyi (2023) observed that technologies such as mobile apps, screen readers, and navigating appliances particularly improve independence, mobility, and engagement of people with visual impairments. The limited use of more complex and advanced tools in the current study may indicate the challenges related to affordability, awareness and accessibility to those.

Table no. 3 Primary Challenges faced in using Assistive Devices

S. No	Challenges	YES	NO
1	High cost	58 (77.3%)	17 (22.7%)
2	Lack of training	13 (17.3%)	62 (82.7%)
3	Poor user interface design	19 (25.3%)	56 (74.7%)
4	Difficulty in learning to use the device	62 (82.7%)	13 (17.3%)
5	Limited availability of technologies in local markets	18 (24%)	57 (76%)
6	Incompatibility with other technologies or systems	36 (48%)	39 (52%)
7	Lack of technical assistance	21 (28%)	54 (72%)

The findings highlighted that major challenges faced by adults with visual impairments in assistive device usage are difficulty in learning to use the device (82.7%), high cost (77.3%), incompatibility with other technologies (48%). Some other barriers include lack of technical assistance (28%), poor user interface (25.3%), limited availability in local markets (24%) and lack of training (17.3%). These results show that although assistive technologies are available, some barriers are still limiting their effective usage.

These findings are consistent with previous studies indicating usability and training challenges in assistive devices adoption. Peter and Tumwesigye (2025) discovered that although assistive devices enhanced academic participation in visually impaired students, inadequate maintenance and lack of training have affected their efficient usage. Similarly, Philemon and Amos (2024) found that lecturers with visual impairments encountered challenges because of the limited institutional support and limited professional training opportunities. Also, Muñoz and Abalorio (2025) discussed about complex user interfaces and limited technical support created emotional distress to the users. These results altogether highlight the significance of training, technical support, and user-friendly design in improving the benefits of assistive devices.

Table no. 4 Influencing Factors in Adopting a New Assistive Device

S. No	Influencing Factors	YES	NO
1	Cost	67 (89.3%)	8 (10.7%)
2	Ease of use	73 (97.3%)	2 (2.7%)
3	Brand reputation	49 (65.3%)	26 (34.7%)
4	Availability of training	61 (81.3%)	14 (18.7%)
5	Compatibility with existing technologies	59 (78.7%)	16 (21.3%)
6	Recommendations from peers or professionals	46 (61.3%)	29 (38.7%)

The major findings in terms of influencing factors mentioned by respondents in the adoption of new assistive devices are ease of use (97.3%), cost (89.3%), availability of training (81.3%), compatibility (78.7%), brand reputation (65.3%), recommendation from peers (61.3%). These findings suggest that practical usability and affordability have an important role in identifying whether people are willing to adopt new devices.

These findings are in sync with earlier researches examining the adoption of assistive devices. Senjam et al. (2021) underlined that financial barriers and lack of availability of these tools often limit assistive technology access. Correspondingly, Khasawneh and Khasawneh (2023) discovered that awareness lacking, and less institutional support influenced the voice-recognition technology usage in visually impaired university students. Senjam and Mannan (2023) also highlighted that in many developing countries, limited awareness and high cost are still a major concern to adopt a assistive device. These researches reinforce the current findings by showing that financial, institutional and technological factors can strongly influence the assistive device adoption.

Table no. 5 Expected Improvements and Preferred Features in Future Assistive Technologies

S. No	Expectations/ Preferred Features	YES	NO
1	Affordable pricing	75 (100%)	0 (0%)
2	Better training support	63 (84%)	12 (16%)
3	Better durability	71 (94.7%)	4 (5.3%)
4	More intuitive user interfaces	63 (84%)	12 (16%)
5	Greater compatibility	64 (85.3%)	11 (14.7%)
6	Enhanced technical support	60 (80%)	15 (20%)
7	Voice control	71 (94.7%)	4 (5.3%)
8	Multi-functionality	60 (80%)	15 (20%)
9	Customizable settings	62 (84%)	12 (16%)
10	Smart devices	59 (78.7%)	16 (21.3%)

The respondents expressed several expectations regarding future device preferences. Many emphasized on factors like affordable pricing (100%), better durability (94.7%), voice control (94.7%), greater compatibility (85.3%), more intuitive user interfaces (84%), better training support (84%), customizable settings (84%), enhanced technical support (80%), multifunctionality (80%) and smart devices (78.7%). These suggest the users' wish to make assistive devices more practical, durable and easily operable.

These results are supported by some of the previous studies on user perspectives on assistive devices. G (2022) described that users in southern India identified braille displays, navigation tools and screen readers as valuable devices, but they also mentioned about the necessity for enhanced technical support, multilingual facilities and more durability. Similarly, Soltani et al. (2025) found that assistive technology users were fonder of the devices those are durable and affordable. These researches underscore the significance of including user feedback in the designing and developments assistive devices to ensure that the user needs are properly met.

CONCLUSION

The results of the study highlight that most common used assistive devices by adults with visual impairments are screen readers, text-to-speech facilities, white cane and magnifiers, while the usage of more advanced devices like smart cane, and smart glasses were very limited. The key barriers identified were the high cost, learning difficulty to use, and issues based on compatibility with other technologies as well. The adoption influencing factors of assistive technologies included affordability, durability, ease of use and availability of training and technical support. Participants also suggested the need for more affordable devices, improved durability and user -friendly devices.

From a social work perspective, these findings highlight the scope for increased advocacy, awareness and capacity building initiatives to enhance assistive devices accessibility for individuals with visual impairments. Social workers have a crucial role in connecting people with available resources, facilitating training programs and supporting inclusive practices within the communities and institutions. Government should enforce policies that ensure affordability and wider distribution of assistive technologies, while educational institutions and organizations should focus on providing training and technical support. Addressing these things can improve the effective assistive technology usage and can go a long way in terms of independence, participation and social inclusion of individual with visual impairments

REFERENCES

- Ackley-Holbrook, E., Kang, M., & Morgan, D. W. (2016, March 1). *Development and evaluation of the walk for health program: A physical activity intervention for adults with visual impairments*. The Free Library. <https://www.thefreelibrary.com/Development-and-evaluation-of-the-walk-for-health-program-a0452290555>
- Jarbi, Y. A. (2024). *Influence of Assistive Technologies on Visually Impaired Students' Experiences of Social Inclusion in Higher Education in Qatar*.
- Khasawneh, Dr. Y. J. A., & Khasawneh, Dr. M. A. S. (2023). Availability of Voice-Recognition Devices to Support Visually Impaired Students in Saudi Arabian Universities. *Journal of Wireless Mobile Networks, Ubiquitous Computing, and Dependable Applications*, 14(3), 186–193. <https://doi.org/10.58346/JOWUA.2023.I3.014>
- Mnyanyi, C. (2023). ICT-Based Assistive Technology for Empowering Persons with Visual Impairment. *JOURNAL OF ISSUES AND PRACTICE IN EDUCATION*, 14(2). <https://doi.org/10.61538/jipe.v14i2.1214>

- Muñoz, N., & Abalorio, B. (2025). Explaining the Emotional and Psychological Impact of Assistive Technologies on Adolescents with Visual Impairments. *The Psychological Research in Individuals with Exceptional Needs*, 3(2), 17–25. <https://doi.org/10.61838/kman.prien.3.2.3>
- Peter, T., & Tumwesigye, K. (2025). The Impact of Assistive Technology on Learners with Visual Impairment in Uganda. *Asian Journal of Education and Social Studies*, 51(5), 531–542. <https://doi.org/10.9734/ajess/2025/v51i51938>
- Philemon, S., & Amos, O. (2024). Exploring Strategies Related to Usability of Assistive Technologies in Implementing Inclusive Education among Visually Impaired Lecturers in Tanzania. *British Journal of Education*, 12(7), 43–67. <https://doi.org/10.37745/bje.2013/vol12n74367>
- Pundlik, S., Shivshanker, P., & Luo, G. (2023). Impact of Apps as Assistive Devices for Visually Impaired Persons. *Annual Review of Vision Science*, 9(1), 111–130. <https://doi.org/10.1146/annurev-vision-111022-123837>
- Senjam, S. S., Foster, A., & Bascaran, C. (2021). Barriers to using assistive technology among students with visual disability in schools for the blind in Delhi, India. *Disability and Rehabilitation: Assistive Technology*, 16(7), 802–806. <https://doi.org/10.1080/17483107.2020.1738566>
- Senjam, S. S., & Mannan, H. (2023). Assistive technology: The current perspective in India. *Indian Journal of Ophthalmology*, 71(5), 1804–1809. https://doi.org/10.4103/IJO.IJO_2652_22
- World Health Organization, (2023)