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Enhancing Library Accessibility for Blind and Visually Impaired Users: A Case Study of Braille Library, University of Delhi

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Abstract:
Library services for blind and visually impaired users in academic libraries are essential for ensuring inclusivity and accessibility. Libraries serve as the backbone of knowledge dissemination and must offer equitable access to information, regardless of users' abilities. This study explores the accessibility services provided at the Braille Library, University of Delhi, highlighting assistive technologies, specialized services, and infrastructural support. The findings underscore the importance of continued improvements in accessibility and inclusivity to empower BVI users with independent access to knowledge resources. This research paper aims to explore the strategies and services implemented by academic library focused in braille library, Delhi University to support blind and visually impaired users in accessing library resources effectively in order to promote equity in education by ensuring that all users have equal access to information and resources.

Keywords: Blind and Visually Impaired (BVI), Library Services, Braille, Digital Accessible Information System (DAISY), Assistive Technology (AT), University of Delhi (D.U.)

Introduction

Access to information is a fundamental right, and academic libraries play a pivotal role in ensuring that blind and visually impaired individuals receive equitable access (Shukla, R.K. & Kamboj, Yogesh B., 2005). Various initiatives, such as India's Sugamya Pustakalaya (Sutar, 2017), have been instrumental in bridging accessibility gaps by offering digital and audio resources (Nagarkar et al., 2022). Electronic information and resources are significantly contributing for the betterment of people with disabilities (Kumar & Sanaman, 2013). This research work investigates the specialized services, adaptive technologies, and infrastructural enhancements implemented at the Braille Library, University of Delhi, to support BVI users.

Overview of Braille Library, Delhi University

Braille Library of Delhi University was established in 1976. It started with one room having limited resources in the form of tape recorders and cassettes. Gradually with technological advancements, CDs came into existence. At present, the resources available are in the form of digital audio, braille printouts, e-texts including 2500-3000 e-publications and 500-600 braille documents, recorders, CDs, talking books, audio books, braille printers, scanners, and earbuds for BVI users (Rani & Khan, 2022) (Vyas & Patani,

2021). The library has subscribed to bookshare.org to assist BVI students by providing relevant collections in various forms, such as Daisy, MP3, and E-text (Kumar & Sanaman, 2015).
Based on observations and feedback gathered from the librarians, the study deals with the following services:

Services and Assistive Technologies for BVI Users

1. **Specialized Library Materials:**

- **Braille Books:** Raised-dot texts that enable tactile reading.
- **Talking Books:** Audio recordings of printed materials available in CD, MP3, and digital formats (Horsfall & Opara, 2023).
- **Large Print Materials:** Enlarged fonts for users with partial visual impairment (Akbar et al., 2024).

2. **Digital and ICT Services:**

- **Screen Readers:** NVDA and JAWS software facilitate textual content reading (Ershanty et al., 2020).
- **Voice Recognition Software:** Converts spoken words into digital text.
- **Kibo XS Scanner:** Converts printed content into accessible digital formats (Nagarkar et al., 2022).
- **Duxbury Braille Translator & Printer:** Converts digital text into Braille printouts (Adigun et al., 2019).

3. **Infrastructure Enhancements:**

Ramps, tactile pathways, ergonomic reading spaces, and accessible washrooms to support mobility and independent navigation (Horsfall & Opara, 2023).

Below are the details of major devices used by the BVI users:

Kibo XS Scanner

The Kibo access device helps to perform following operations (Nagarkar et al., 2022):

- Audio Conversion: Reads any printed or handwritten document aloud in audio format.
- Multilingual Translation: Supports translation of documents into more than 100 languages.
- Editable Document Downloads: Allows users to download translated or original documents in Unicode formats such as .doc, .docx, .txt, and .zip.

Portability: Weighing less than 400g, the device is lightweight and easy to carry, enabling accessibility anytime, anywhere. Image of Kibo XS scanner highlighted in Figure 1.1.

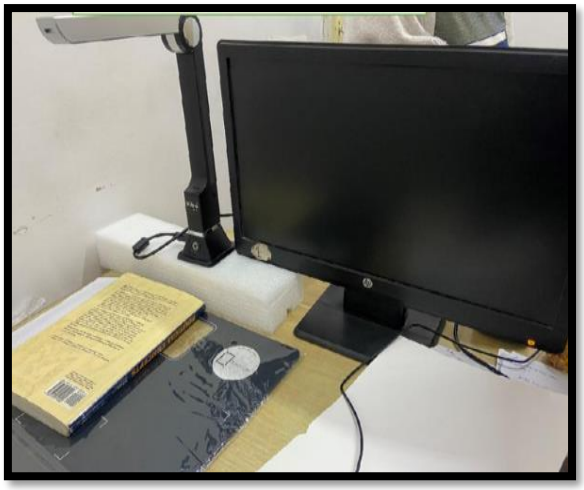

Figure 1.1: Kibo XS Scanner image from DU Braille Library

Duxbury Printer

JAWS is integrated with the Index Braille Basic D V4 Printer. Text entered in Microsoft Word can be converted to Braille by installing the Duxbury Braille Translating Software (Adigun et al., 2019). The Index Braille Basic D V4 Printer can then be used to take Braille prints. Picture of Duxbury printer shown in Figure 1.2.

Figure 1.2: Duxbury Printer image from DU library

These devices improve accessibility and independence of BVI users.

Literature Review

(Onsinyo, Charity Nyaboke, 2018) reviewed the challenges faced by persons with disabilities (PWDs) in accessing library and information services in university libraries in Meru County, Kenya. This study examined four libraries to assess the facilities available for PWD students. The findings indicates that these libraries lacked braille facilities for visually impaired users, comprised unskilled staff and lacked formulated policy frameworks. Consequently, the article suggests recommendations to improve library accessibility and services for PWD users.

(Kwafoa & Imoro, 2020) conducted research on library services for visually impaired students (VIS) in three public libraries in Ghana. The study observed that these libraries did not provide adequate special service to the Visually Impaired Students (VIS). Since access to information is a fundamental right, there is a need to enhance assistive technologies to facilitate equal access to services in public spaces. The author has also emphasized on the need of investment in assistive technologies, staff training, and policy enforcement to create inclusive library environments. In the research paper, author has recommended, standard orientation program for VIS to enhance accessibility, extended availability of resource centre, investment in training for resource staff.

The author in this research paper explored the critical role of libraries in providing equitable access to information for visually impaired users (Rayini, 2017). The main focus of the study to discuss various assistive technologies such as Braille books, talking books, screen readers, voice recognition software, and screen magnifiers, which enable visually impaired users to access information effectively. Additionally, it highlights the importance of inclusive library services, including large-print materials, digital resources, and specialized software's such as JAWS, NVDA, and VoiceOver, which provides reading and navigation (Khot et al., 2022). Despite advancements, challenges such as lack of funding,

societal biases, and limited infrastructure continue to hinder full accessibility. The paper concludes by advocating for increased investment in assistive technologies, librarian training, and policy enforcement to ensure that visually impaired individuals can access library services (Thakur, 2021) .

(Horsfall & Opara, 2023) conducted a study on availability of information resources for visually impaired (VI) students in 20 University libraries in Nigeria. The findings of the study revealed that majority of the university libraries lacked adequate information resources for VI students. The study recommended betterment in optical aids, Braille writing materials, computer applications, funding, library resources, personnel availability and architecture of libraries to increase accessibility and support for VI students.

(Akbar et al., 2024) investigated the challenges faced by visually impaired students (VIS) in accessing and utilizing digital information resources in Pakistan. The study found that while these students use a variety of digital resources, they face significant barriers, including format barriers, navigational barriers, technical barriers, ICT illiteracy, and financial barriers. The article also highlights the crucial role that libraries can play in overcoming these challenges by providing accessible formats, training, and support services to impaired students.

(Nazim, 2021) conducted a study of accessibility of library services for disabled users at Jawaharlal Nehru University (JNU), India. It was highlighted that the importance of barrier-free infrastructure, assistive technologies, and inclusive policies to ensure equitable access to knowledge. While JNU has made significant efforts to provide Braille books, large-print materials, audio resources, and digital assistive technologies (JAWS, NVDA, DAISY books), challenges still remain due to funding limitations, inadequate signage, and accessibility issues in library infrastructure etc. The study also highlighted global and Indian policies advocating for disability-friendly libraries, emphasizing the need for increased investment, staff training, and better policy implementation.

(Moirangthem & Phuritsabam, 2022) explored in his research paper published in ‘Library Philosophy and Practice (e-journal)’ that how accessible academic libraries for users with disabilities in central institutes of India's North Eastern Region. In the research paper, case study-based approach was employed using structured questionnaires and interviews with library administrators. To gather various dimensions of accessibility, including physical infrastructure, library materials, assistive technologies, and administrative policies. The findings revealed that while some progress has been made, significant barriers remain, such as inadequate policies, limited funding, insufficient assistive devices, and a lack of specialized training for staff. Ultimately, the study calls for a stronger institutional commitment and adherence to international standards to create truly inclusive library environments that support the educational needs of persons with special needs.

(DebashiPhukan & Saikia, 2022) conducted research study on visually impaired users in two central university (Tezpur and Dibrugarh) of Assam. This study highlights that the critical need for continuous assistance to visually impaired (VI) users in libraries. It also emphasizes that library staff should be well-trained and cooperative to enhance accessibility and usability of electronic information services. The research work underscores that efficiency of library operations largely depends on the competency of its staff. Additionally, libraries should organize internet training sessions or workshops tailored to blind and low-vision users, covering topics from basic web navigation to advanced online research and email usage. The research also shows that marginalization of visually impaired individuals, particularly in developing countries like India, due to the lack of accessible resources.

Methodology and Data Collection

To carry out this research, a descriptive research approach was adopted. A comprehensive review of scholarly articles related to "Library Services for Blind and Visually Impaired Users in Braille Libraries" was conducted to incorporate studies from various authors worldwide. After building a thorough understanding about this topic, we collected data from the library staff of Braille Library, University of Delhi.

Field Survey: For the field survey, we visited "Braille Library", University of Delhi, North Campus, to understand more about the services and resources available for BVI users.

According to the data provided by the university, the library has shown significant commitment for access over recent years. The number of BVI users has consistently increased, as shown in Figure 1.3, which presents year-wise growth in BVI user count from 2020 to 2024.

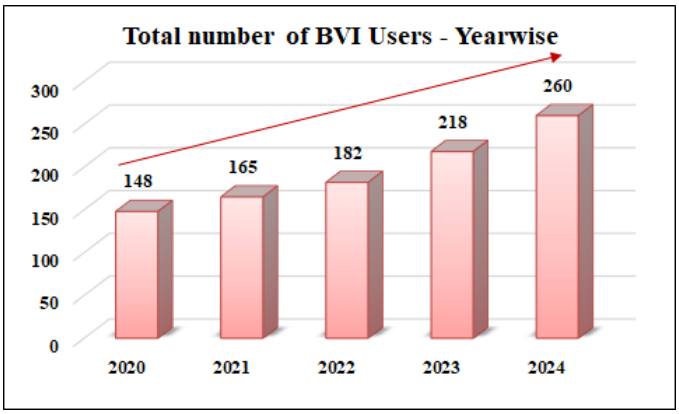

Figure 1.3: Number of BVI users yearwise (2020-2024)

Similarly, to assess the availability and distribution of braille facilities available, we observed a detailed investigation into the assistive technologies and infrastructure provided by Delhi university. The Figure 1.4 depicts the availability of various Braille facilities at Delhi University, highlighting the types and quantities of assistive resources provided for BVI users. The data indicates that CD plyers are the most frequently available resource.

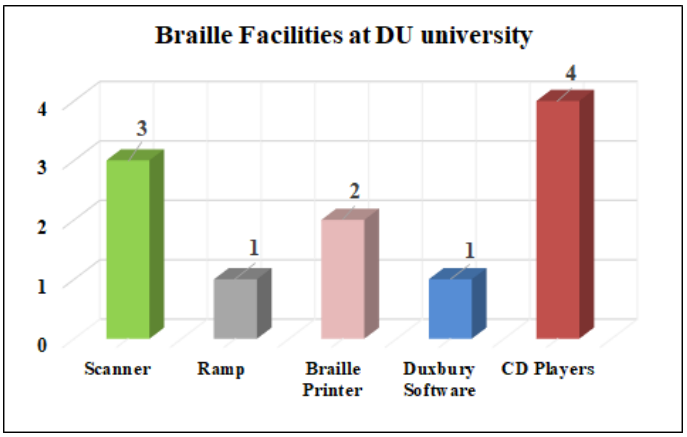

Figure 1.4: Details of Braille facilities available

The Figure 1.5 represents the collection of digital and audiobook resources available in the library. The collection is categorized into three types: E-Publications, E-Textbooks, and Audiobook DAISY TOC. The E-Textbooks category has the highest count, with 1,967 resources, followed by Audiobook DAISY TOC, which has 1,863 resources (DULC, Annual Report, 2023).

The E-Publications collection is comparatively smaller, with 403 resources. This data highlights the library's emphasis on digital learning materials and accessible audiobooks, ensuring better resource availability for all users, including those with visual impairments.

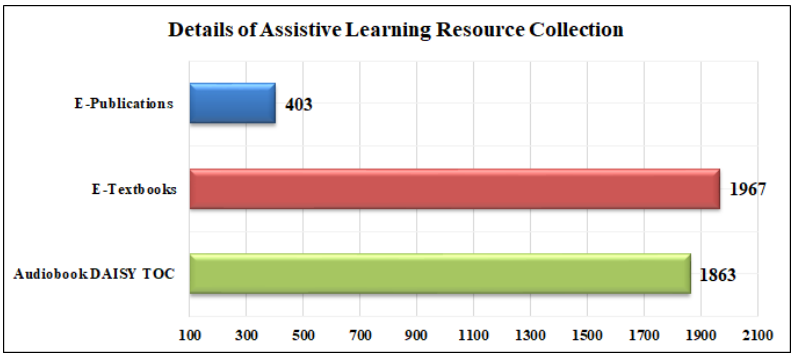

Figure 1.5: Details of Assistive Learning Resources

Findings and Discussion

The findings of this research study indicate that there is a strong reliance on screen-reading software (such as NVDA and JAWS) (Vijayakumar et al., 2023). Additionally, the Equal Opportunity Cell (EOC) has significantly contributed to ensuring accessibility compliance. However, challenges persist in areas such as insufficient volunteers, outdated assistive tools, and financial constraints for library upgrades (Kumar & Sanaman, 2015). Below are the Tables 1.1 and Table 1.2 depicting monthly and yearly resource access trends, respectively.

Resource Access Monthly

Table 1.1: Resource Access Frequency (2024)

Resource Type	Monthly Accesses	Percentage of Total
Audio Books	1,200	43%
Braille E-Text	800	29%
Physical Braille	500	18%
E-Text (non-Braille)	300	11%
Total	**2,500**	100%

Resource Access Yearly

Table 1.2: Resource Access Frequency (2024)

Resource Type	Accesses (Annual)	Percentage
Audio Books	15,000	50%
Braille E-Text	9,000	30%
Physical Braille	4,500	15%
E-Text (non-Braille)	1,500	5%
Total	**30,000**	**100%**

During the field survey activity, we also got a chance to interact with the users and came to know about various challenges faced by BVI users, their reliability on various library services and resources and what changes they would like to see in the future in the library services to improve the accessibility.

Suggestions

Investment in Accessibility Resources: More funds should be allocated for the latest assistive technologies.

Staff Training: Librarians should receive training on operating assistive devices and software.

Expanding Digital Library Collections: Increased availability of DAISY audiobooks, E-texts, and tactile graphics.

Community Engagement: Encouraging student volunteers to assist BVI users in accessing printed resources and collaboration with disability support organizations (Kavanagh, 2005).

Conclusion

After detailed analysis of information and results obtained from the study, the Braille Library at University of Delhi has made significant steps in providing accessible resources for BVI users. However, addressing persistent challenges through technological advancements, policy implementation, and collaborative efforts can further enhance library inclusivity. Ensuring accessibility for BVI users in academic libraries remains a significant challenge, primarily due to the limited availability of resources in accessible formats, financial constraints, and inadequate volunteer support. While the Braille Library at Delhi University has made notable efforts by providing Braille materials, audiobooks, and screen reader software etc. The findings highlight that the need for improving digital accessibility, increasing budget allocations for assistive technologies, and reviving volunteer-led initiatives such as audio recording services. Additionally, reopening recording studios and training BVI users in digital literacy can significantly enhance their independence in accessing information. Addressing these gaps through policy interventions, technological advancements, and community engagement will be crucial in making libraries more inclusive and empowering BVI users with equitable access. Future research should focus on assessing user satisfaction and the impact of evolving technologies on library accessibility for BVI impaired user.

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