

## Provision of Assistive Technology for Students with Visual Impairment in University Libraries in India

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### ABSTRACT

The use of advanced IT applications has enabled the university libraries to provide innovative library services to their patrons. While the general students are getting all required services from the libraries, the students with visual impairment have continued to face challenges in accessing the library collection. The technology to help overcome these challenges is available today in the form of assistive technology (AT). Unfortunately, a majority of the university libraries in the country do not have this technology in their libraries due to which a huge amount of information stored in the books and journals subscribed by them has become out of reach of the students with visual impairment. The present study was conducted to ascertain the status of AT to support students with visual impairment in university libraries. The study which has covered around 185 universities, provides the first systematic exploration of the status of AT in university libraries in India. The major findings of the study in context of university libraries in India are: 12.97 per cent having Braille Books in their collection; 22.70 per cent have made provision for AT for students with visual impairment; 22.70 per cent have accessible library websites; 21.08 per cent have designated staff members to serve the students with disabilities; 22.70 per cent have 'written disability policy or 'documented minutes' related to the 'library services for the students with disabilities'.

**Keywords:** Assistive technology in libraries; Library services to visually impaired; Library services to blind; Inclusive libraries.

### 1. INTRODUCTION

As per the Census of India 2011, India has 5.03 million people suffering from visual impairment<sup>4</sup>. Although it is very discouraging, with better education and more access to jobs, the people with visual impairment can become integral part of the society thereby help the country achieve higher higher economic growth. In India, the Government has been providing number of facilities and services to people with disabilities. These services and facilities are ensured by the introduction of 'Persons with Disabilities Act, 1995'. The Government has also introduced various welfare schemes to motivate the people with visual impairment for higher education.

The Indian higher education system is one of the largest higher education systems in the world. There are around 700 universities and 35000 affiliated colleges in the country which have collectively enrolled more than 20 million students<sup>5</sup>. The institutional framework of India's Higher Education System consists of Central Universities, State Universities, Deemed Universities, Private Universities, Institutes of National Importance, Institutions established by State Legislative Act and

Colleges affiliated to the Universities<sup>1</sup>. Though the country has one of the largest education systems in the world, the number of students with visual impairment studying in higher education institutes is very low. According to a report published in The Hindu<sup>8</sup> only 1.2 per cent of the 3.6 lakhs youth who are disabled, had access to higher education. A study conducted by the International Council for Education of People with Visual Impairment (ICEVI) there were only 1200 student with visual impairment pursuing higher education at different universities in India<sup>9</sup>. The reason could be due to non availability of basic facilities for the people with visual impairment in higher education system especially the assistive technology devices which are very critical for the people with visual impairment to read and understand the reading resources.

A recent study conducted by Bharadwaj<sup>2</sup> on visually impaired undergraduate students of the Delhi University with an aim to understand their perceptions about the digital environmnet in the higher education campuses has revealed that the students with visual impairment have been facing a number of constraints in accessing library resources including the lack of assistive technology facilities.

## 2. LITERATURE REVIEW

Pillai<sup>7</sup> in her study, examined the institutions providing library and information services to visually impaired people in India. The study also examined the Disability Acts and Copyright Laws for the people with visual impairment in USA, UK and India. The study further looked at the needs and expectations of the visually impaired library users and suggested ways and means to improve the library facilities. The study which was limited in scope, gave a general understanding of the situation of library services to the people with visual impairment in India.

Tripathi and Shukla<sup>10</sup> studied the use of assistive technology in academic libraries in India, United Kingdom, United States and Canada. The study recommended the academic libraries to have a computer lab with necessary assistive technology facilities for people with visual impairment. The study also highlighted the provisions and amendments made in and to the Copyright Acts with regard to reproduction and sharing of information from the copyrighted books for the benefit of people with vision impairments.

Koganuramath and Choukimath<sup>6</sup> argue that the establishment of a learning resource centre for the people with visual impairment with assistive technology is essential for the universities to foster the inclusive education.

Bharadwaj<sup>3</sup> in his study reported that the university libraries in Delhi were not having the infrastructure suited for the people with visual impairment. The study also reported that the libraries were not able to provide the effective library services to the people with visual impairment due to lack of funds and trained staff members. The study was limited in scope and highlighted the situation of the university libraries functioning in Delhi city only.

## 3. OBJECTIVES OF THE STUDY

University libraries possess a huge amount of information both in print and digital forms. Most of information stored in the books and other materials can be obtained via the visual and auditory senses. Therefore, unless such information is available in an alternate format, it is not possible for the people with sensory impairments to get access to it. Today, with the help of Assistive Technology (AT) the people with vision impairment can access the non-braille documents and other electronic resources stored in the libraries like their sighted counterparts do. Unfortunately, such facility is not made available in most of the university libraries in India which in fact has become a major obstacle stopping the visually challenged in accessing the valuable library resources. In order to understand the reality of the situation the present study was undertaken by the researchers with following objectives:

- To know the availability of assistive technology for students with visual impairment in university libraries in India

- To understand the challenges faced by University Libraries in providing assistive technology for students with visual impairment.

## 4. RESEARCH METHODOLOGY

The study was quantitative in nature. Hence, a standard Survey Method was adopted to conduct the study so that baseline information gathered could be easily verified and the results obtained could be compared effectively.

The stratified sampling technique was adopted in order to avoid the sampling error. After identifying the relevant stratum and their representation in the population, a random sampling technique was used to select the population.

A zone-wise list of the universities was prepared first and after that the random sampling technique was adopted to select the universities for the study.

Based on the objectives set for the study, a structured questionnaires was designed to collect the research data from the university libraries.

## 5. DATA ANALYSIS AND DISCUSSION

The data collected from the target group was analysed using a spreadsheet application called MS-Excel developed by the Microsoft. The results found are presented in a tabular form for easy understanding and interpretation.

### 5.1 Category-wise Distribution of Responses

Out of the 250 questionnaires distributed, 185 were received in return. Of the total responses received, 70.81 per cent were from State Universities followed by 16.21 per cent from Central Universities and 12.97 per cent from Deemed Universities. Since there are more number of State Universities in the country, the rate of distribution of responses was well predicted as shown in Table 1.

Table 1. Distribution of responses

Type of University	Number of Libraries
Central	30 (16.21)
Deemed	24 (12.97)
State	131 (70.81)
Grand Total	185 (100)

### 5.2 Special Collection in University Libraries

'Braille' is a system of raised dots that can be read with the the help of fingers by the people with visual impairment. Only 22.70 per cent of the libraries have Braille books in their collection. On enquiring further, it is found that the number of braille books that the universities claimed having in their collection is very small and does not cover even the basic subject fields. A majority of the libraries (78.30 %) Do not have the braille books in their collection. Audio book or talking book is nothing but a recording of text being read. It

**Table 2. Special collection**

Collection type	Number of Universities		Central University		State University		Deemed University	
	Available	Not available	Available	Not available	Available	Not available	Available	Not Available
Braille books	42 (22.70)	143 (78.30)	13 (43.33)	17 (56.67)	27 (20.61)	104 (79.39)	2 (8.33)	22 (91.67)
Audio books	15 (2.70)	180 (93.30)	3 (10.00)	27 (90.00)	2 (1.53)	129 (98.47)	0 (0.00)	24 (100.00)

is very discouraging to know that only 2.70 per cent of the libraries have audio books/ talking books in their collection as shown in Table 2.

### 5.3 Basic I.T. Facilities in University Libraries

Table 3 depicts that all the libraries (100 %) under the study have basic ict facilities in their premises. since every university library has basic ict facility, it will not take much investment in implementing assistive technology for the benefit of the students with visual impairment. The universities can utilise various schemes of the UGC like HEPSN to create suitable reading environment for the people with visual impairment.

**Table 3. Basic IT facilities were available in all the libraries**

IT infrastructure	Number of universities	Central university	State university	Deemed university
Computers	185 (100)	30 (100)	131 (100)	24 (100)
Internet	185 (100)	30 (100)	131 (100)	24 (100)
Printer	185 (100)	30 (100)	131 (100)	24 (100)
Photocopier	185 (100)	30 (100)	131 (100)	24 (100)
Photo Scanner	185 (100)	30 (100)	131 (100)	24 (100)

### 5.4 Availability of Assistive Technology

A screen magnifier is software that interfaces with a computer's graphical output to present enlarged screen content. Only 22.70 per cent of the libraries have made provision for screen magnification software. A majority of the libraries (77.30 %) are yet to provide such facility for the benefit of people with low vision problems. Screen Readers are the software programs that allow people with visual impairment to read the text that is displayed on the computer screen with a speech synthesiser. Only 22.70 per cent of the libraries have made provision for such softwares as shown in Table 4.

Scanning and reading appliance (SARA) scans the text, converts the image into text by means of optical character recognition and uses a speech synthesiser to read out what it has found. It is very sad to notice that a majority of the libraries (77.30 %) do not have this important machine in their libraries.

Digital accessible information system (DAISY), is a substitute for print materials and is designed for the use

by people with visual impairment. Unfortunately, only 3.24 per cent of the libraries have daisy book readers. Optical Character Recognition (OCR) Scanner converts the printed characters into digital text. Only 22.70 per cent of the libraries have such important OCR scanners in their procession.

A braille embosser is an impact printer that helps the people with visual impairment to convert the text into Braille. Unfortunately, only 19.45 per cent of the libraries have the Braille Embossers in their possession,

A digital voice recorder helps the people with visual impairment in recording class lectures and readings done by volunteers for them. Only 11.89 per cent of the libraries have these devices with them. Large printer keyboards are very helpful for the people with low vision problems in using computers. Only 12.43 per cent of the libraries have made provision of large print keyboards which are essential for the people with low vision problems.

### 5.5 Accessible (Disabled friendly) Library Website

Library websites provide vital information about the books, journals, library services and facilities and it is essential that they should be accessible by the people with visual impairment. Unfortunately, only 25.94 per cent of the university libraries have Accessible Websites which is hindering the people with visual impairment to access the useful information. The results validated the outcome of the previous study conducted by Bharadwaj on visually impaired undergraduate students of the University of Delhi as shown in Table 5.

### 5.6 E-resources in Accessible Format

In order to provide universal access to the digital documents stored on the library webistes, the libraries should ensure that these documents are in accessible formats. Table 6 depicts that only 22.70 per cent of the libraries under the study have their electronic resources in accessible formats which is very disheartening.

### 5.7 Private Study Rooms in Library for the People with Visual Impairment

Sometimes, the people with visual impairment take the assistance of volunteers, their friends and classmates in reading books and journal articles for them. Such reading sessions can be conducted in private study rooms

**Table 4. Availability of assistive technology**

A.T. Devices	Number of Universities		Central University		State Universities		Deemed Universities	
	Available	Not Available	Available	Not Available	Available	Not Available	Available	Not Available
Screen magnification software	42 (22.70)	143 (77.30)	13 (43.33)	17 (56.67)	27 (20.61)	104 (79.39)	2 (8.33)	22 (91.67)
Screen reading software	42 (22.70)	143 (77.30)	13 (43.33)	17 (56.67)	27 (20.61)	104 (79.39)	2 (8.33)	22 (91.67)
SARA	42 (22.70)	143 (77.30)	13 (43.33)	17 (56.67)	27 (20.61)	104 (79.39)	2 (8.33)	22 (91.67)
Daisy Book Reader	6 (3.24)	179 (96.75)	4 (13.33)	26 (86.66)	02 (1.52)	129 (98.47)	0 (0.00)	24 (100)
OCR Scanner	42 (22.70)	143 (77.30)	14 (46.67)	16 (53.33)	27 (20.61)	104 (79.39)	2 (8.33)	22 (91.67)
Braille embosser	36 (19.45)	149 (80.54)	07 (23.33)	23 (76.66)	27 (20.61)	104 (79.39)	2 (8.33)	22 (91.67)
Digital voice recorder	22 (11.89)	163 (88.10)	8 (26.66)	22 (73.33)	12 (9.16)	119 (90.83)	2 (8.33)	22 (91.67)
Large print keyboard	23 (12.43)	162 (87.56)	10 (33.33)	20 (66.66)	16 (12.21)	115 (87.78)	1 (4.16)	23 (95.83)

**Table 5. Accessible website**

Library Website	Number of Universities	Central Universities	State Universities	Deemed Universities
Accessible	48 (25.94)	17 (56.67)	24 (18.32)	7 (29.16)
Not accessible	137 (74.06)	13 (43.33)	107 (81.68)	17 (70.84)

**Table 6. Accessible E-resources**

E-resources accessibility	Number of universities	Central universities	State universities	Deemed universities
Accessible	42 (22.70)	13 (43.33)	27 (20.61)	2 (8.33)
Partially Accessible	4 (2.16)	4 (13.33)	0 (0.00)	0 (0.00)
Not accessible	139 (75.13)	23 (76.66)	104 (79.38)	22 (91.66)

**Table 7. Study rooms for the PWDs**

Separate Section	Number of Universities	Central Universities	State Universities	Deemed Universities
Available	41 (22.16)	12 (40.00)	27 (20.61)	2 (8.33)
Not available	144 (77.83)	18 (60.00)	104 (79.38)	22 (91.66)

inside the library. Table 7 indicates that only 22.16 per cent of university libraries under the study have made provision for such private study rooms.

### 5.8 Tactile Pathways in Library

The university libraries should make provision for tactile pathways to guide and help the people with visual impairment to move independently in library building. The provision will help the people with visual impairment to overcome any design obstructions in the library building such as walls, pillars, tables, chairs etc. Only 01 library (0.54 %) under the study has made provision for tactile pathway. Other libraries should consider creating Tactile Pathways for the benefit of people with visual impairment. In addition to the above, the study has also revealed that only 21.8 per cent of the university libraries have Written Disability Policy and only 21.7 per cent of the libraries have designated staff to help the people with disabilities as shown in Table 8.

## 6. CONCLUSIONS

Library and information services are considered to be very important services in the university campuses. University libraries have both moral and constitutional obligations to ensure that people with disabilities get equitable access to their resources and services. The study has revealed that only 22.70 per cent of the university libraries in the country have made provision of assistive technology in their libraries to enable the students with visual impairment to have instant access to library resources. The others should also follow suit as early as possible.

The University Grants Commission (UGC) has been providing necessary guidance and financial support to help the universities achieve the national goal of making



**Table 8: Tactile pathways**

Tactile Pathways	Number of Universities	Central Universities	State Universities	Deemed Universities
Available	1 (0.54)	1 (3.33)	0 (0.00)	0 (0.00)
Not available	184 (99.45)	29 (96.66)	131 (100.00)	24 (100.00)

university education inclusive. Hence, the universities of all types and kinds should understand the educational needs of the students with visual impairment and should create an inclusive environment on the campus which in turn would encourage more and more number of students with visual impairment to undertake higher education. The library is regarded as the heart the University. All teaching and learning activities in the universities revolve around their libraries. If the libraries understand the importance of assistive technology and implement the same along with other recommendations, they would truly become Inclusive Libraries.

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