

Use of Assistive Technologies for Inclusive Education in Visva-Bharati Library Network

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ABSTRACT

Developing countries are facing various problems in the process of implementing inclusive education. Assistive technology is any device, software, or equipment that helps people work around their challenges. Assistive technologies (AT) can help to achieve inclusive education for people having disabilities in academic institutions (Ministry of Human Resource Development, Government of India, 2020). This paper will provide brief ideas about the different types of Assistive technologies (AT) assisting persons to having different kinds of impairments for their Inclusive Education. This is a case study of the Visva-Bharati Library Network to know how Assistive technologies (AT) are being effectively used for inclusive education in Visva-Bharati. The present paper is an extension of literature, initially submitted as a project in Two Week Online National Faculty Development Program / Refresher Course jointly organized by Maitreyi College, University of Delhi, and Guru Angad Dev Teaching Learning Centre, SGTB Khalsa College, the University of Delhi under the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNTT) of Ministry of Education during 20th March to 3rd April 2021.

KEYWORDS: Assistive Technologies, Inclusive Education, Visva-Bharati, Visva-Bharati Library Network, Braille.

INTRODUCTION:

Inclusive Education (IE) refers to the ambition and goal that all children, regardless of ability or disability, should be educated in mainstream classes in their district schools, receiving education and support as required

by their needs (Grönlund et al., 2010). The idea of inclusive education is important because the United Nations define it as a human right in The Convention on the Rights of Persons with Disabilities (United Nations, 2015).



Assistive Technology (AT) is hereby used on a broader sense for indicating any device or technology-based service that allows human beings of all age groups with activity restrictions in their day-to-day life, improvement, work, or relaxation. Assistive technology helps students with disabilities learn more effectively, helping them be more successful in and out of the classroom (Ahmad, 2015). Various assistive technologies, gadgets, and apparatus will be explored, including:

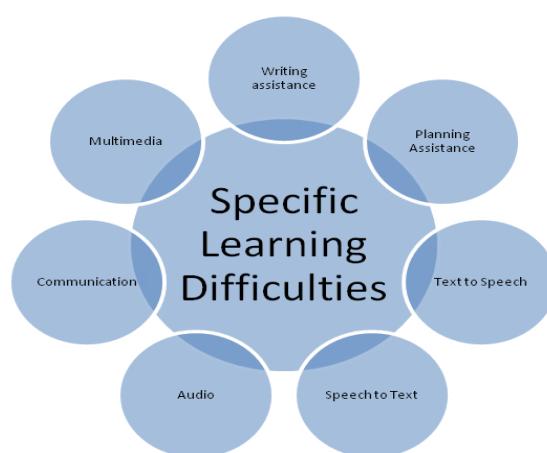
- **Screen Magnification:** Screen magnification apps are used by individuals with low vision. These apps take a computer or mobile device's visual output and enlarge it to allow for easier and more detailed viewing.
- **Text to Speech:** Text-to-speech (TTS) is assistive technology. Briefly, assistive technology (AT) is considered any device, piece of equipment, or system that helps a person with a disability work around his or her challenges so he or she can learn, communicate and function more efficiently. TTS is software that reads digital text aloud (Spalding University, n.d.).
- **Speech to Text:** software is a type of assistive technology program that converts words spoken aloud to electronic, written text to support the increased demonstration of learning and independence.
- **Writing Assistance:** There is a wide range of assistive technology (AT) tools available to help students who struggle with writing. Some of these tools help students circumvent the physical task of writing, while others facilitate proper spelling, punctuation, grammar, word usage, and organization. AT tools that assist with writing fall into several categories, likewise Abbreviation expanders, Alternative keyboards, Graphic organizers & outlining, Paper-based computer pens, Portable word processors, Proofreading software, Speech recognition software, Speech Synthesizers/Screen Readers, Talking spell-checkers, etc (Stanberry, 2011).
- **Planning Assistance**
- **Alternative Input/Interface Tools:** For persons with mobility impairments and sufferers of chronic pain conditions, the main barrier to computer interaction is data entry. The most common input devices in use with computers are the keyboard and mouse. Devices to overcome difficulties include alternative keyboards, rate enhancement applications, and voice recognition tools. Almost all output is communicated via the monitor, and the quality and quantity of the information are enormous. The monitor has improved over the years from text-based monochrome screens to high-resolution color displays, and graphical user interfaces utilize the color and visual capabilities to perform complex tasks in a user-friendly way. These solutions include magnification software, screen-reading programs, and Braille translation devices (Hoogerwerf et al., 2021).
- **Communication:** AAC, which stands for augmentative and alternative communication, is a way for people to

communicate when they do not have the physical ability to use verbal speech or writing. AAC systems are designed to help people express their thoughts, needs, and ideas. It is used by those with a wide range of speech and language impairments due to conditions such as cerebral palsy, autism, spinal muscular atrophy, and head injuries. It can range from a simple set of picture symbols on a communication board to a computer system that is programmed to speak with words or messages

- Multimedia: Multimedia technologies can enable teachers to create meaningful

learning opportunities for students. With the advent of Web 2.0 and Cloud Computing programs, teachers have ready access to many programs that could be used as cognitive assistive technology solutions (Ahmad, 2015).

Specific learning difficulties (SLD) is a broad term used to cover various types of problems which can range in their severity. These are the major-specific learning difficulties as shown in the pictures. It basically affects an individual's motor skills, information processing, and memory.



Visual Impairments: People, who are visually impaired, have problems seeing or are unable to see at all. These assistive technologies may help them.

- Computer equipped with text-to-speech software
- Podcasts
- Braille printouts
- Thick lined paper
- Highlighters
- Colour filters
- Slant board
- Electronic text
- Screen magnification
- Text to Speech

Speech Impairments: People, who are speech impairments, have problems with verbal (talking) communication. In this impairment following assistive technologies need to be included:

- Audio
- Speech to Text
- Alternative Input/Interface

Mobility Impairments: People, who are mobility impairments, have problems walking. In this impairment following assistive technologies need to be included:

- On-screen keyboard
- Text to Speech
- Podcasts
- Chat

Hard of Hearing: People, who are hard of hearing impairments, have problems hearing or listening. In this impairment following assistive technologies need to be included:

- Transcription
- Closed captioning
- Chat
- Sign language interpreters

VISVA-BHARATI LIBRARY NETWORK

The genesis of Visva-Bharati Library is traced back to Rabindranath Tagore starting a college (Visva-Bharati) in Santiniketan in the year 1921 with the proceedings of the Nobel Prize he won in 1913. This Library was developed

and reinforced with great care by Gurudev himself. On Gurudev's death in the year 1941, his personal collection was also added to this library.

Presently, the Library Network incorporates the Central Library, 13 Sectional (Bhavana) Libraries, and 30 Seminar Libraries, which have more than 8.63 Lakhs volumes of books and bound volumes of Journals. All the libraries of the Visva-Bharati Library Network are fully automated and networked even though they are located at various places on the two campuses; they function virtually as a single unit. The library subscribes to around 147 Current Journals. Some of these journals are available online, and more than 7000 e-journals available from the INFLIBNET Centre. The Network holds a cumulative collection that includes e-books (3836), digitized books (29,689), and digitized theses (1,650) spread in the Central Library 13 Sectional Libraries, all of which are downloadable from the campus network. Visva-Bharati has the intuitional membership of DELNET (Developing Library Network). The Central Library has introduced Inter Library Loan (ILL) and Photocopy of journal Article requisition services to its library members through DELNET (Das et al., 2009).

Braille Unit at Visva-Bharati was started in August 2012 at Central Library, and its other unit has also been started at Vinay Bhavana Library (Institute of Education Library) since February 2014. In the beginning, there were only 5 Braille students, but presently, we have about 20 Braille Students in different subjects and in other courses like Undergraduate, Postgraduate, B.Ed., Ph.D., etc. Library has well established Braille unit with the following facilities:

Location of Braille Unit:

- 1) Central Library - Room in front of the Stack (Ground Floor).
- 2) Vinay Bhavana Library was set up in 2014, having all the facilities available as in the Central Library, Visva-Bharati.

Software and Hardware available in the Braille Unit:-

- **Supernova:** It is commercial software and has two functions. One is Desktop Reader. This reader can read out all the actions that take place on the desktop like 'save',

'delete,' 'desktop icon', 'start' etc. Another is Write-Read. Through this, it can read back what you type and also any text file line by line. It also assists in browsing the Internet as it can speak about.

- **NVDA:** It is a software (Open Access Software) having all the features of Supernova. We have five computers with NVDA enabled.
- **Readit Wand:** This unit has a scanner-cum-reading machine. If users put any documents under the scanner and press enter, it will scan the whole page and starts reading. The scanned documents can also be saved into various file formats, likewise PDF, Word, Text, and MP3. According to the convenience of the user, the voice, volume, and pace of reading may be changed. There is also an option for a person having low vision to magnify the screen and convert the color of the screen background and text.
- **NVDA & Braille Embosser:** NVDA is software to open a file (containing printable matter) to convert into Braille format. **Braille Embosser** is hardware (printer) that can print a file in Braille. It has the facility to print/emboss on both sides of a page simultaneously.

Additional Facilities / Devices

- **Talking Typing:** This device helps new users practice typing and the operation of computers.
- **Daisy Book Reader:** It is a small portable device (like a Kindle for e-book reading) that can read any file (PDF, Word, Text, doc, audio, and video). This device can also do voice recording in any language. This reader also has FM radio with a direct recording facility.
- **Adjustable High-Power Optical Lens Spectacles:** This spectacle has two layers of the lens which can be adjusted according to one's visibility requirements. It is helpful for the persons having low visibilities.
- **Special Keyboards:** This is an exceptional keyboard with comparatively large font and fluorescent yellow color keys to enhance visibility. It is also helpful for the persons having low visibilities.
- **Magnifier Mouse:** It is helpful for persons having low visibilities. The magnifier has a camera, and when it scrolls over the text,

it magnifies the document's current position on the screen, and hence users can read the enlarged text very quickly.

- **Seika Cell Braille Display:** This is also a small portable device (like a mathematical instrument box) that helps to read texts that appear on the computer screen as Braille and have the option to stop in any line and correct the spellings on the text.
- **BAT (Single Hand Keyboard):** This compact input device performs all the functions just like the full-size keyboard, and it is operated by one hand. It is an ultimate typing solution for persons having physical or visual impairments.
- **Foot Mouse (Slipper Mouse) with Programmable Paddle:** It is conducive to persons with physical impairment as not having both hands. It has all the features and functions of a regular mouse, only the difference in its mode of operation because it is operated by foot.

Audio recording: Considering the requirements of the disabled students' books

in the Bengali Language library is taking care to convert the books into audio form. The work of voice recording has been done by the current students and well-wishers of Visva-Bharati or others willing to do the job voluntarily.

Special Toilets (Gents & Ladies): Annex Building at Periodical Section

Accessible Signage: Braille is also required on signage that helps to identify various sections, facilities, and directions, especially for emergency doors and exits.

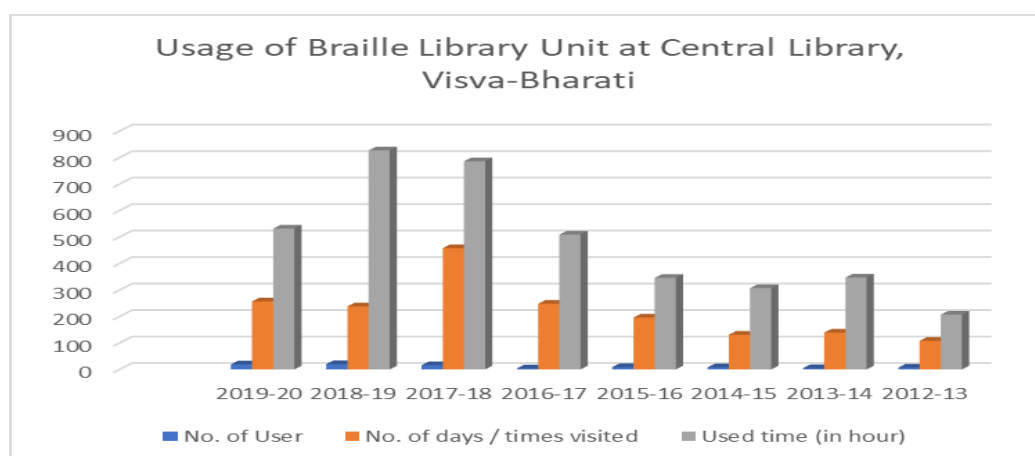
Ramps: It is a sloping surface that connects two levels of height. Ramps are built at the entrance of the main building and both sides of the annex building so that physically challenged users can easily enter the library by wheelchair (Visva-Bharati, 2019).

Usage of Braille Library Unit at Central Library, Visva-Bharati

Table 1: Usage Data of Braille Unit at Central Library

Year	No. of User	No. of days/times visited	Used time (in hours)
2019-20	19	257	532
2018-19	20	238	827
2017-18	16	458	786
2016-17	04	248	509
2015-16	09	196	346
2014-15	08	131	307
2013-14	05	139	347
2012-13	07	108	207

(Sources: Visva-Bharati Annual Reports)



Graph 1: Graphical representation of Usage of Braille Unit

From the above table & graph, it is clear that since the inception of this particular unit at Visva-Bharati Library, the usage of this unit has been established. Also, its use is increasing yearly in terms of the number of days visited / times visited and the overall spending time at this unit.

CONCLUSION

Assistive technology should be chosen based on specific needs rather than disability labels. Each assistive technology is designed with a particular objective; therefore, choosing the right technology for the proper purpose is necessary. However, through this paper, I would emphasize that addressing individual challenges is not enough for successful IE implementation. This paper highlights the different assistive technology in terms of hardware and software applications for the smooth functioning of inclusive education.

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