Research Article

Availability and Usability of Screen Reading Software by Students with Visual Impairment – Current Scenario

J.B. Dheesha
Assistant Professor in Special Education,
Faculty of Disability Management and Special Education (FDMSE),
Ramakrishna Mission Vivekananda Educational and Research Institute (RKMVERI),
Coimbatore, Tamil Nadu,
Email: dheeshabojan@gmail.com

Abstract

Assistive technology plays a vital role in the education of students with disabilities and it also paves way for their independent living. Students with visual impairment have difficulty in accessing visual materials. Assistive technology helps students with visual impairment to access the general curriculum and improve their academic performance. The Optical Braille Recognition (OBR) software, Job Access with Speech (JAWS) software, Non Visual Desktop Access (NVDA) software are available and they help the students with visual impairment to read Braille documents, scan the Braille documents, translate the text to Braille and read text materials on the computer screen. The objective of this study is to find out the availability and usability of screen reading software by students with visual impairment. Totally 30 students with visual impairment from integrated and inclusive schools from Coimbatore District were selected as a samples. The result shows that availability and usability of software by students with visual impairment is very low. It may be because of the non-availability of screen reading software in the schools. It also shows that the special educators and general educators lack knowledge in using screen reading software to teach students with visual impairment.

Keywords: Assistive Technology, Screen Reading Software, Students with Visual Impairment.

Introduction

Individuals with disabilities (IwD) have unique needs and challenges. Assistive devices are designed or adopted to support IwD for their development in terms of mobility, education and employment. Govt. of India provides assistive devices to IwD at free of cost through Assistance to Disabled persons for purchasing / fitting of aids / appliances (ADIP) scheme. The main objective of this scheme is to assist the needy disabled persons in procuring durable, sophisticated and scientifically manufactured, modern, standard aids and appliances that can promote their physical, social and psychological rehabilitation by reducing the effects of disabilities and enhance their economic potential which improves their independent functioning. Traditionally students with visual impairment use Braille, Abacus and Taylor Frame for reading, writing and doing arithmetic calculations.

In this scientific era, many devices have emerged to help students with visual impairment for their education and mobility purpose. Assistive technology helps students with visual impairment to access the general curriculum and improve their academic performance. The most important assistive device is screen reading software. The Optical Braille Recognition (OBR) software, Job Access with Speech (JAWS) software, Non Visual Desktop Access (NVDA) software are available to read Braille documents, scan the Braille documents, translate the text to Braille and read text materials on the computer screen. These softwares are helpful for the students with visual impairment to read and study the print version into Braille version and vice versa.

Educational institutions such as schools and colleges should have the facilities including assistive devices, software and infrastructure to provide necessary concepts and skills among visually impaired students for academic, social and emotional development. This widens the scope to access the same opportunities and educational experiences for students with visual impairment like their peers. So, this study intended to know the availability and usability of the screen reading softwares by students with visual impairment studying at integrated and inclusive schools in Coimbatore District, Tamil Nadu.

Review of Literature

International

Kelly (2009) conducted a study on Use of Assistive Technology by Students with Visual Impairment: Findings from a National Survey. This study investigated the use of assistive technology by students in the United States who are visually impaired through a secondary analysis of a nationally representative database. It found that the majority of students were not using assistive technology.

The study done by Stoop et al (2013) on Reading and Learning from Screens versus Print: a study in changing habits recommended that electronic screens are more appropriate for communication, information gathering and navigation. These electronic devices provide more fast and comprehensive delivery of learning materials and also encourage for learning among students with visual impairment.

Osiceanu & Popa (2015) studied on Access Technologies for Students with Visual Impairments. The aim of this study is to highlight the benefit of studying the optional Information Technology (ICT) discipline, using access technologies (AT), for children with visual impairments. The result shows that students with visual impairments are attracted to new technologies and it helpful for personal and interpersonal development.

National

Verma et al (2012) mentioned that JAWS is a popular state-of-art screen reader developed by Freedom Scientific. Besides sequential access of web content, it has rich set of key shortcuts that can be used by visually impaired users to access the web. To use these shortcuts effectively, visually impaired user has to be trained properly. JAWS is

not freeware and user has to purchase and install on a local computer. Its cost may not be affordable for an average Indian user.

Bhatt & Kumari (2015) stated in their study that assistive technologies improved the educational outcome of the visually impaired children and for some children it is the sole means of independent living. They also mentioned the various barriers which likely to affect the adoption of the assistive technologies, such as high cost, reluctance of users, low availability.

Kurangi & Jayakumar (2017) elucidated that education is a serious problem for persons with visual impairment. They also face difficult situations for accessing information. The application software transforms the information which accessible them.

Jindal et al (2019) stated that the screen reader is a type of assistive technology and it is useful to people who are visually impaired, learning disabled and illiterate by merging other assistive technology such as screen magnifiers.

Sadh (2020) explained that the screen reader is application software which is useful for persons with visual impairment to use computer without the help of sighted person. It provides detailed information which is presented in the screen to the persons with visual impairment.

Need and Significance of this Study

Many assistive devices such as Braille, Abacus, Taylor Frame, Geo Kit are available for students with visual impairment for learning. Screen reading software is the technology based application that provides access to information on a computer for students with visual impairment and converts the information from the computer screen into speech and it enhance the accessibility among them. The students can search the characters, words and choose to repeat a given word and passage with their own speed control options. Screen reading softwares help them to get more information and can develop the knowledge related to their content.

Educational institutions should ensure the accessibility to provide quality education for all students including those with visual impairment to meet their diverse needs by using the assistive devices and software. Student's participation and involvement in the education program is important to develop their knowledge and skills. Many of the educational bodies like schools, colleges and universities do not have these facilities such as assistive devices and learning materials to ensure accessibility for students with visual impairment (Sadh, 2020). Hence the researcher intended to know the availability and usability of these screen reading software by students with visual impairment.

Methodology

Objective of the Study

- To find out the availability of screen reading software to students with visual impairment
- To find out the usability of screen reading software by students with visual impairment.

Research Design: Survey method under descriptive research design was adopted for this present study.

Sample: 30 students with visual impairment from ten schools (five integrated and five inclusive) situated in and around Coimbatore District, Tamil Nadu State were selected as sample for this present study through purposive sampling method.

S. No.	Item			Number of SwVI
1	Type of School	Integrated School	5	24
		Inclusive School	5	6
Total			**10**	**30**

Variable

- Type of School – Inclusive/ Integrated

Research Tool: A questionnaire on the various aspects of availability and usability of screen reading software was prepared by the researcher to collect the data. It consists of 15 questions with yes or no options.

Data Collection Procedure: The researcher obtained prior permission from the Heads of the institutions before data collection. Before collecting the responses, the objectives of this study and the instructions about the questionnaire were clearly explained to the samples. The questions in the questionnaire were asked by the researcher to the samples on face to face mode. The responses of samples were noted by the researcher. The collected data was then analyzed for further interpretation.

Findings and Discussion

The findings and discussion of this study were mentioned based on the objective such as availability and usability of screen reading software by the students with visual impairment.

Availability of Screen Reading Software:

Table - 1: Availability of screen reading software in selected schools

S. No.	Type of School	Availability of Screen Reading Software				
		School 1	School 2	School 3	School 4	School 5
1	Integrated	Yes	No	Yes	Yes	No
2	Inclusive	No	Yes	No	No	No

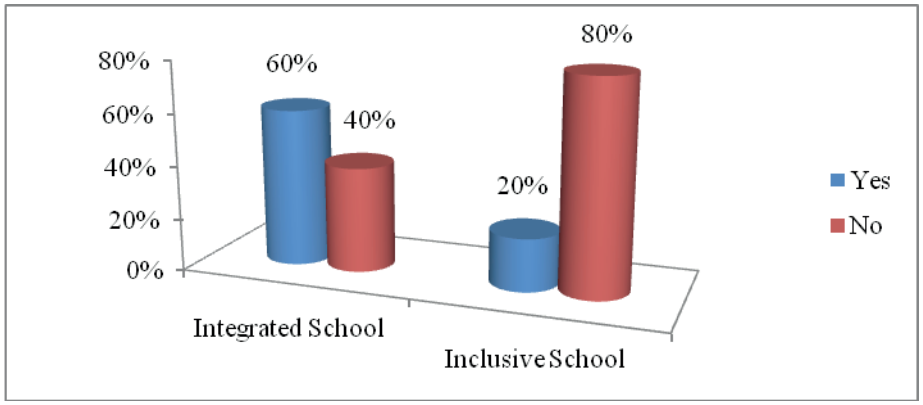

Figure – 1: The percentage of availability of screen reading software in selected schools

Schools are the responsible authority for providing appropriate and accessible facilities to students with visual impairment. These students can make use of these materials to compete with their peer groups. Most of the schools have the traditional learning materials such as Braille slate, Brailler, Abacus, Geo Kit etc. The result shows that 3 integrated schools (60percent) and 1 inclusive school (20percent) have screen reading software – NVDA (Non Visual Desktop Access) for the use of their students.

Usability of Screen Reading Software

Usability can be assessed based on the availability. The study results show that, out of ten schools only four schools (3 integrated and 1 inclusive) have the screen reading software facility. Totally 30 students with visual impairment were selected for this study. Among them, twenty four students study in the integrated setup and the remaining six students were enrolled in inclusive setup.

Table- 2: Usability of screen reading software in selected integrated schools

S. No.	Integrated School	Number of SwVI	Availability	Usability
1	School 1	7	Yes	3
2	School 2	3	-	-
3	School 3	8	Yes	4
4	School 4	4	Yes	-
5	School 5	2	-	-
Total		**24**	**-**	**7**

Table- 3: Usability of screen reading software in selected inclusive schools

S. No.	Inclusive School	Number of SwVI	Availability	Usability
1	School 1	1	-	-
2	School 2	2	Yes	2
3	School 3	1	-	-
4	School 4	1	-	-
5	School 5	1	-	-
Total		**6**	**-**	**2**

From table- 2 and 3, it is evident that the integrated school number two, and five do not have the screen reading software and inclusive school number one, three, four and five also do not have screen reading software. The data shows that the 70percent of (21 students) students with visual impairment have the facility of screen reading software in their respective schools. Remaining 30percent (9 students) of the students are not having this facility in their school.

Usability of screen reading software by students with visual impairment was calculated with these 70percent (21 students) of students. These 70percent of students with visual impairment have the opportunity to access the screen reading software. The result shows that only nine students with visual impairment are using screen reading software for their education purpose. The remaining twelve students are not using screen reading software though they have the availability. The reasons behind are:

- The students those who are studying in primary class do not utilize the service.
- Few students are not interested to use screen reading software, because of the problem in understanding the pronunciation of the language which is supported by the study Jindal et al (2016) in which it is mentioned that many of the screen readers do not have any option of speaking in Indian languages. The fluency of speaking words needs improvement, so that it will be easy for a student with visual impairment to hear the words spoken by screen reading software.
- Teachers who are handling class for students with visual impairment are not practically sound in teaching with screen reading software. This result supported by the following study Zhou et al (2011) reported based on their survey of 165 teachers of students with visual impairments in Texas to examine their perceptions of their knowledge of assistive technology. The results showed that they lacked adequate confidence about teaching assistive technology to students.

Educational Implications

Assistive technology is gaining a momentum in the field of education.

The impact of Assistive technology on students with disabilities particularly on visually impaired is noteworthy. The present study attempted to find out the availability and usability of screen reading software by students with visual impairment. The following are some of the implications of this present study.

- Teaching learning process: Screen reading softwares are helpful for the teachers and students with visual impairment in the teaching learning process. It enhances the skills such as listening, reading and comprehension skills among the learners.
- Self-pacing learning: Screen reading software provides the opportunity to the students with visual impairment to read and develop knowledge according to their own pace.
- Accessible to the learning materials: This software helps the students to access the e-materials into speech and Braille format.
- Equal opportunities: Students with visual impairment can learn the content like their peer group.

Recommendations of the Study

Assistive technology is the key element in educational rehabilitation of students with visual impairment. The following recommendations are pointed based on the findings of the study.

- Each and every school should have the educational facilities such as assistive devices and software and infrastructure for students with visual impairment.
- Teacher should undergo training programmes on educating students with visual impairment with assistive technological devices, tools and software

Conclusions

Assistive devices play a major role in the life of individuals with disabilities. It helps them to be independent in education, mobility and employment. It is important to select what devices, tools and technologies will be appropriate to meet the student's individual learning needs. Screen reading software is the tool to help students with visual impairment to develop their knowledge. The availability of the screen reading software in their school environment itself is the big question mark to them. Even if it is available, then the usability of the same is noticed as very nominal. So it is the responsibility of the school authority/ government to provide adequate facilities to meet their basic needs. It is also important that the teacher should update their knowledge based the up gradation of technology. When provided with adequate facilities and qualified professionals, the students with visual impairment will be able to use the assistive devices effectively and efficiently. This is in line with the recommendations of the study done by Senjam et al (2019) that teachers should be trained in the use of various assistive technologies for reading, writing, maths, sciences, sports, mobility and activities of daily living

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