



ROLE OF ASSISTIVE TECHNOLOGY IN HIGHER EDUCATION OF VISUALLY IMPAIRED STUDENTS.

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Abstract: The concept Assistive Technology focuses on how it can help the visual impaired students. Make the learners free from the vision based content obstacles and offering flexible learning in academic environment. Effective Assistive Technology support services are vital means of enabling students to cope with the academic and personal life management. This research article explored the usage of Assistive Technology at UG, PG, PhD level education. An online questionnaire was used for the collection of primary data that contained 32 items based on the Assistive Technology tool for reading, writing, Assistive Technology to support social life and mobility of visual impaired students higher education. A random sample of 30 visually impaired students of Karnataka was selected for study. The questionnaire consists of 4 points scale like 1. Frequently, 2. Occasionally, 3. Rarely, 4. Not yet used. The data was analyzed using percentage statistical techniques. The findings try to indicate awareness about the Assistive Technology that can help visual impaired students in their higher education.

Keywords- Assistive Technology, visually impaired students, higher Education

Introduction:-

Technology has become an integral part of the every human life, without use of information and communication technologies an individual cannot lead his comfortable life. In many ways people use technology to gain a competitive advantage hence the need of information and communication technological skill is essential for every one. People who are blind also rely on technology and internet for information which is essential for their academic learning and progress. Now days with the usage of Assistive Technology, visually impaired people also have started to do their higher education like UG,PG and PhD in different subjects. Assistive Technology helps them to access the information through social medias like whats app,face book, Instagram and internet. To use this technology like normal people they need special assistance by Assistive Technology. Assistive Technology aids the visual impaired get higher education.With the help of .Assistive Technology they are capable to use e-mail,MS-word and how to search the information through internet for their academic learning. A scan of the literature on accessible e-learning, using screen readers and magnification of screen to access information results in the way of new developments for visual impaired students higher education. Assistive Technology enables those with a vision disability to be better equipped to take on higher education and employment, which support them to lead an independent and respectful life in a society.

Objectives of the Study

The main aim of this paper is to investigate the use of Assistive Technology among the visually impaired students in higher education.To fulfill this aim the following specific objectives were identified

A) Examine the Assistive Technology usage by UG,PG and PhD students

Assess the use of Assistive Technology help for visually impaired students and assess the e-learning usage of assistive technology.

Research Design

The data was collected among the visually impaired students in UG,PG,B.Ed and PhD students in Karnataka. A representative sample of 30 visually impaired students were selected for data collection. Through the Google form data was collected. There are 32 questions of multiple choice on usage of Assistive Technology.The Researcher used computation of percentage as the statistical technique for the purpose of analysis.Graphical representation also used to analyse the data.

Role of Assistive Technology in Higher Education of Visually Impaired Students

In recent years there has been an increase in the number of visually impaired students in higher education. The society, parents and students mind set is changing and they have started getting higher education. This also involves the quality of social and learning experiences of visually impaired students. In essence of inclusion policy visually impaired students are getting admissions to UG, PG and PhD courses in different institutions and universities. Assistive Technology should aid in transition of visually impaired students in higher education. Many research data available had highlighted that Assistive Technology play a compensatory role for people's visually impairments. The student himself is enrolling in the inclusive education scenario of higher education level like UG, PG and PhD. However the students have not received any text book from the university. The textbooks were mostly in the form of file in the PDF format, furthermore if there were any notes written on a paper it was done voluntarily. Usually the students scanned the notes and converted it in to JPEG format. Open book and Adobe reader applications required to convert the JPEG formatted notes in to the PDF format. The strategies Utilized by visually impaired students at higher education were screen reader, magnifier and braille and in the computer the applications used as NVDA, JAWS and magnifier. For the cell phone, the application used is talkback.

Assistive Technology :

“Any item, piece of equipment, or product system, whether acquired commercially or self modified, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities.”

In this paper researcher covered the Assistive Technology tools in three dimensions, they are as follow

1. Reading Assistive Technology
2. Writing Assistive Technology
3. Assistive Technology to support social life and mobility

I. Reading Assistive Technology

1. NVDA Screen Reader
2. JAWS Talking Software
3. Audio Books
4. Bonita -Low cost portable reading device
5. ZOOM EX Instant reader
6. SARA CE Instant text reading machine
7. Kurzweil K 1000 OCR

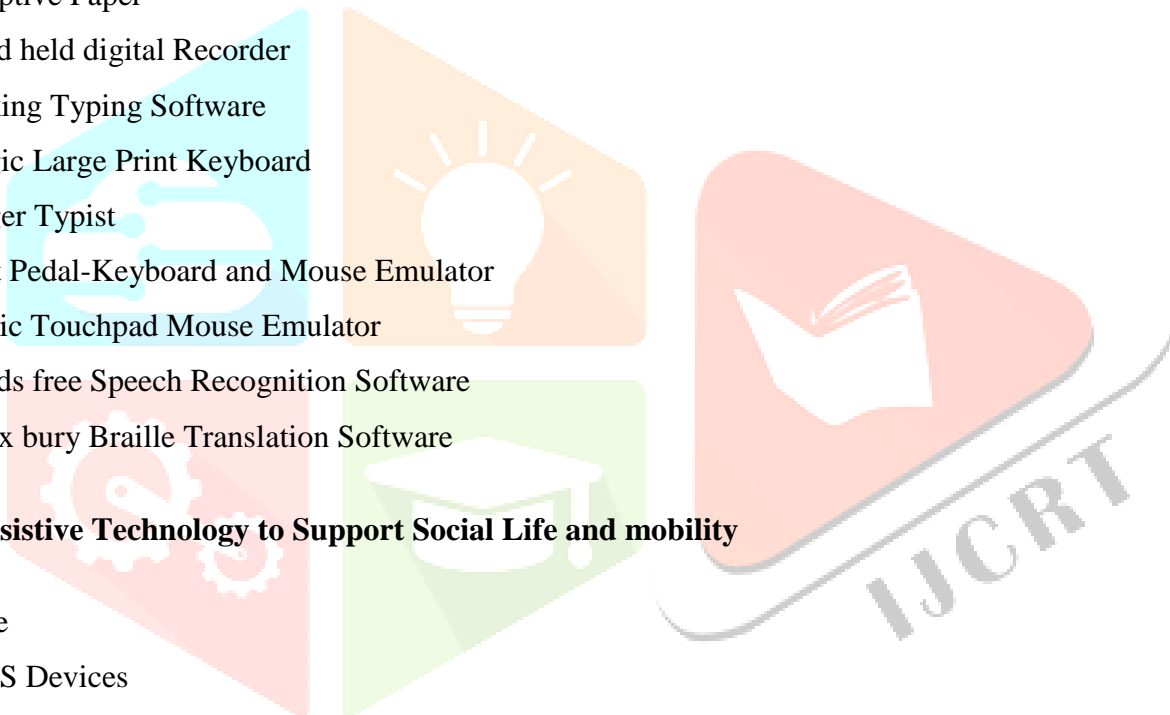
8. Talking English Dictionary
9. Eye Tracking System
10. Topaz Desktop Video Magnifier
11. Zoom Twix Portable near and Distance Magnifier
12. Prisms Print Magnifier
13. Hand held video Magnifier
14. Magic magnification Software

II. Writing Assisitive Technology

1. Slate and Stylus
2. Adoptive Paper
3. Hand held digital Recorder
4. Talking Typing Software
5. Magic Large Print Keyboard
6. Finger Typist
7. Foot Pedal-Keyboard and Mouse Emulator
8. Tactic Touchpad Mouse Emulator
9. Hands free Speech Recognition Software
10. Dux bury Braille Translation Software

III. Assisitive Technology to Support Social Life and mobility

1. Cane
2. G.P.S Devices
3. Electronic Travel Aids
4. Talking Compass
5. Provide Tactile cues or Braille lables for Landmark
6. Adaptive Time Pieces-Clock, Watch and Calendars
7. Talking Money Identifier
8. Adaptive Calculators



Result and Discussion

Reading Assistive Technology Assistive: Technology plays an essential role in education and lifelong learning of visually impaired student. Rapid developments in technology especially in portable hand held devices, improvement in voice reader and magnification software and accessible websites present tremendous opportunities for visually impaired students. The students were asked to fill the google form questions regarding use of Reading Assistive Technology and the responses are given by 30 students like 8UG students 15 PG students and 7 PhD students.

Table No 1. Reading Assistive Technology

Sl.no.	Reading Assistive Technology Tool	Frequently	Occasionally	Rarely	Not yet used
1	NVDA Screen Reader	70%	16.7	10	3.3
2	JAWS Talking Software	43.3	23.3	16.7	16.7
3	Audio Books	53.3	30	10	07
4	Bonita -Low cost portable reading device	20	13.3	16.7	50
5	ZOOM EX Instant reader	16.7%	20%	6.6%	56.7%
6	SARA CE Instant text reading machine	10%	3.3%	16.7%	70%
7	Kurzweil K 1000 OCR	16.7%	23.3%	23.3%	36.7%
8	Talking English Dictionary	36.7%	6.6%	16.7%	40%
9	Eye Tracking System	6.7%	13.3%	3.3%	76.7%
10	Topaz Desktop Video Magnifier	10%	10%	13.3%	66.7%
11	Zoom Twix Portable near and Distance Magnifier	10%	13.3%	3.4%	73.3
12	Prisms Print Magnifier	13.3%	00%	3.4%	83.3%
13	Hand held video Magnifier	00%	20%	3.3%	76.7%
14	Magic magnification Software	3.3%	6.7%	13.3%	76.7%

The above table reveal that NVDA screen reader was used by most frequently 70% of the students and Hand held video Magnifier frequently used 00% of students.

The responses are summarized as follows. The above table no.1 shows that NVDA screen reader was used by most frequently 70% of the students,occasionally by16.7%, rarely by 10%, not yet used by 4.3% students. 43.3% ,students frequently used JAWS talking software, 53.3% ,students frequently used audio books,50% students not yet used Bonita portable reading device.56.7% students not yet used and 20% students frequently used ZOOM EX Instant reader. SARA CE Instant text reading machine not yet used 70% of the students. Below 50%

that means 36.7% of students frequently used and 40% students not yet used Talking English Dictionary. Eye Tracking System device is not yet used 76.7% students. 66.7% students not yet used Topaz Desktop Video Magnifier machine. Zoom Twix Portable near and Distance Magnifier not yet used 73.3% students. Prisms Print Magnifier occasionally used 00% and not yet used 83.3% students. Hand held video Magnifier frequently used 00% and not yet used 76.7% students. Magic magnification Software frequently used 3.3% and not yet used 76.7% students.

Writing Assistive Technology: Assistive Technology can be of great value to visually impaired students as it empowers them to independently complete tasks which they would normally not be able to accomplish without help from others. Visually impaired can write the information by using hand held digital recorder, slate and stylus, talking, typing, software etc. Student with low vision can use screen magnification software, which makes text and graphics on screen bigger.

Table No.2 Writing Assistive Technology

Sl.n.	Writing Assistive Technology Tool	Frequently	Occasionally	Rarely	Not yet used
1	Slate and Stylus	50%	23.3%	13.3%	13.3%
2	Adoptive Paper	36.7%	30%	16.7%	16.7%
3	Hand held digital Recorder	36.7%	20%	23.3%	20%
4	Talking Typing Software	36.7%	23.3%	16.7%	23.3%
5	Magic Large Print Keyboard	10%	6.7%	6.7%	76.7%
6	Finger Typist	40%	3.3%	10%	46.7%
7	Foot Pedal-Keyboard and Mouse	13.3%	6.7%	6.7%	73.3%
8	Tactic Touchpad Mouse Emulator	13.3%	00%	13.3%	73.3%
9	Handsfree Speech Recognition Software	23.3%	20%	10%	46.7%
10	Dux bury Braille Translation Software	23.3%	13.3%	6.7%	56.7%

The above table shows that visually impaired 50% of students frequently used Slate and Stylus and not yet used 76.7% students Magic Large Print Keyboard.

The above table shows that out of 30 visually impaired students sample, 50% of students frequently used and 13.3% students not yet used Slate and Stylus. Adoptive Paper, Talking Typing Software and Hand held digital Recorder devices frequently used 36.7%. Very few mean 10% frequently used and not yet used 76.7% students. Magic Large Print Keyboard. Foot Pedal-Keyboard and Mouse and Tactic Touchpad Mouse Emulator devices frequently used 13.3% students. Hands free Speech Recognition Software and Dux bury Braille Translation

Software devices frequently used 23.3% students. Most of the devices are not yet used by many of the students because they are not available and not aware of those devices.

Assistive Technology to Support Social Life and mobility: Visual impaired students faces difficulties in leading life in society, they can use Assistive Technology to lead comfortable life. Various forms of Assistive Technology are available to help visually impaired to live in the social environment. Cane GPS devices, electronic travel aids, braille labels, time pieces and talking money identifier etc. These technologies are key driving force to equip Visual impaired students to support social life and mobility, that allow visually impaired to lead a social life in the main stream of society. The students were asked to indicate above Assistive Technology tools whether they use frequently, rarely, occasionally, not yet used.

Table No.3 Assistive Technology to Support Social Life and mobility

Sl.no.	I. Assistive Technology Tool to Support Social Life and mobility	Frequently	Occasionally	Rarely	Not yet used
1	Cane	56.7%	23.3%	13.3%	6.7%
2	G.P.S Devices	40%	23.3%	10%	26.7%
3	Electronic Travel Aids	16.7%	16.7%	10%	56.7%
4	Talking Compass	16.7%	3.3%	13.3%	66.7%
5	Provide Tactile cues or Braille labels for Landmark	16.7%	30%	10%	43.3%
6	Adaptive Time Pieces-Clock, Watch and Calendars	43.3%	23.3%	13.3%	20%
7	Talking Money Identifier	40%	23.3%	10%	26.7%
8	Adaptive Calculators	(8) 26.7%	20%	26.7%	26.7%

The above table indicate that cane was frequently used by 56.7% students and talking compass was not yet used by 66.7% students.

The above table shows that Most of the students used talking money identifier and cane devices frequently. Cane not yet used only 6.7% and frequently used 56.7% students. G.P.S Devices frequently used 40% students and rarely used 10% students. Electronic Travel Aids, Talking Compass and Braille labels for Landmark devices frequently used 16.7% students. Adaptive Time Pieces-Clock, Watch and Calendars frequently used 43.3% and rarely used 13.3% students. Talking Money Identifier and Adaptive Calculators not yet used 26.7% students. However sufficient training is needed to visual impaired students to use Assistive Technology tool for social life and also the design of the tool need to provide enough degree of modification to assist visual impaired.

Conclusion:

The study reveals that large majority of visually impaired students are well versed in usage of technology. However, they are deprived of getting the benefits of Assistive Technology. The benefits of Assistive Technology is not provided adequately in all the higher education institutions. Assistive Technology can effectively be used for imparting knowledge on visually impaired students. The support of government, friends, institutions and family members are very helpful for the students to compete with normal students. It is found that a large majority of the students use free of cost screen reading software like NVDA and talking back software in their mobile phones. This research paper data shows most the Assistive Technology tools were not used by visually impaired students. The students face difficulties in using costly devices, as they are not available at affordable prize. So educational institutions should get enough funding from government and NGO's to purchase such costly Assistive Technology tools for every higher education institution.

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