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Status of Technological Devices for Students with Visual Impairment in the Inclusive Schools of Delhi, India

Attri Ajay Kumar[1, *], Rai Brijesh Kumar[2]

[1]Faculty of Education, ICDEOL, Himachal Pradesh University, Summer Hill, Shimla, India
[2]Department of Education, Himachal Pradesh University, Summer Hill, Shimla, India

Email address

sivattri@yahoo.co.in (A. A. Kumar)

[*]Corresponding author

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Abstract

Technology has made our life very easy and interesting; it helps us to do our work easily, gain knowledge and enjoy life with fun. Nowadays without technological devices nobody can think about day to day life. These devices are also playing an important role in education; it has changed the entire scenario of education. For students with disability, the importance of these devices is more than students without disability, because it reduces the limitation of disability. But the question arises that are technological devices for students with disabilities available in schools? To find out the answer of this question this topic was selected for the study. The study was conducted in the Government funded schools of Delhi, India. The objective of the study was to find out the current status of technological devices for students with visual impairment in the schools of Delhi, India. Descriptive survey method was used to collect data with the help of Checklist cum questionnaire schedule. The Sample of the study was 58 schools of 12 Educational District of Delhi. The study depicts the lack of technological devices for students with visual impairment. Some traditional devices like Braille Slate, Typo-scope, Long Cane etc. are available in the schools but modern devices like Smart Brailler, Refreshable Braille Display, Smart Cane etc. are not available in the schools of Delhi. Centre& State Govt. of India have made so many Schemes, Policies and Acts, but problems exist somewhere in implementation stage, that's why situation at gross root level is not up to the mark.

1. Introduction

Inclusive schools provide all students with a regular classroom, thus ensuring adequate and challenging educational opportunities fitted to their abilities and needs, according to the principle of educational inclusion defined in the Salamanca Declaration. Technology plays a major role in providing equal opportunity to students with disability in inclusive schools. Technology helps them to access information, to move freely in environment and to become independent. It has been proved by various researches [1], [2], and [3] that success in school, employment, and life is directly influenced by one's ability to gain access to information. An immense amount of this information is obtained or produced through the use of technology. It is already established that access to information is one of the most important human rights which allows the individual to develop himself and participate actively within a democratic society, fully exercising his/her rights and duties [4]. In this society, in which access to information is essential for full participation, rapid progress will continue to be made in all aspects of technology. If students with disability

are to participate on an equal basis with their non-disabled peers, then they must be given the opportunity to take advantage of the enormous benefits provided by technology to make the inclusive society. Keeping in mind of these benefits of technological devices researcher selected this topic to find out the status of these devices in inclusive schools of Delhi.

With the emergence of the social model of disability, it is increasingly being argued that the greatest barriers to the inclusion of children with disabilities results from inaccessible environments [5]. Besides, the attitude of teachers, and students, and their level of access and success with the technology use, the level of expertise and training of the teachers regarding the technology use and application; student perception, training and acceptance; and the curriculum adaptation and technology integration in the inclusive classrooms are some of the major challenges and decisive factors in the efficient use of assistive technology in inclusive education [6], [7]. The descriptive video service with a narrative verbal description of the visual elements displayed on the screen enables the students to automatically hear the descriptions of all the visual elements, providing the students with visual impairment an opportunity for better socialization and knowledge building [8].

Visual impairment should not limit the child's ability to compete with his peers. He should also be able to access facilities like education, health and social services. Full inclusion occurs when a child with visual impairments is accepted by his peers as a member of the regular class [9]. To this end, regular classrooms should be provided with adequate support to effectively enhance inclusion [10]. The regular classroom should be considered as the least restrictive environment of the learning process. Kirk et al. [11] concur that exciting technological advances open up a new world for people with severe visual disabilities. In the process of inclusion, assistive technology gives children with visual impairments greater participation and independence. Technology can be applied by both the specialist teacher and the child to promote effective inclusion. According to a research conducted in Ontario by Sider & Maich [12] on Assistive technology tools, they noted that a wide range of assistive technology including interactive white boards, text- to- speech software and classroom amplification system were being used by teachers to benefit both students engagement in the classroom and their independence in completing class activities and assignments.

2. Objective

Theobjective of this study was to investigate the status of technological devices for students with visual impairment in inclusive schools of Delhi, India.

3. Operational Definition of the Key Terms

3.1. Technological Devices

In the context of present study technological devices

referred to any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain or improve the functional capabilities of a students with a disability.

3.2. Students with Visual Impairment

In the context of present study students with visual impairment referred to low vision and totally blind studying in schools of Delhi.

3.3. Inclusive Schools of Delhi

In the context of present study inclusive schools of Delhi referred to the Delhi Govt.'s school i.e. Directorate of Education's (DoE) schools where both types of students i.e. with disability (visual impairment) and without disabilities were studying together

4. Method& Procedure

A descriptive survey study was carried out in the inclusive schools of Delhi. The samples consisted of 58 inclusive schools of 12 educational districts of Delhi. Purposive sampling method was used to select sample. The sample was selected according to the two criteria: (i) Five schools from each district (ii) Schools where maximum number of students with visual impairment (low vision & totally blind) were enrolled.

A checklist cum questionnaire schedule was developed with the help of various experts from the field of visual impairment in India. This tool was divided into two parts, part-A contained 43 types of technological devices in different categories viz. reading, writing, mathematics, mobility, and leisure & recreation, while part-B contained questions. The respondent were asked to write the 'Yes' or 'No' against each technological device on the account of availability and non-availability in school, further they are asked to write the reason for not availability of device (if any device not available).

5. Data Analysis

A database was created and analyzed in the following manner. For understanding the status of technological devices for curricular activities for students with visual impairment, the availability and condition of technological devices for reading, writing and for mathematics were analyzed. Further, for studying the status of technological devices for co-curricular activities for students with visual impairment, availability and condition of technological devices for mobility, leisure & recreation were analyzed.

6. Results

In this study Availability and Condition of technological devices will reflect the status of technological devices for students with visual impairment in inclusive schools of Delhi.

6.1. Availability of Technological Devices for Curricular Activities

6.1.1. Availability of Reading Devices for Students with Visual Impairment in Inclusive Schools of Delhi

In the 58 inclusive schools of Delhi, Highlighter/Marker was only reading device which was found in in all schools (100%), while three devices i.e. Digital Access Information System (DAISY), Refreshable Braille Display, and Closed Circuit Television (CCTV) were not found in a single school of Delhi (0%). Very low cost devices like Typo-scope and Tactile Image/Map were available in approximately 50% schools only. The status of availability of different types of reading devices for students with visual impairment in the 58 schools of Delhi is tabulated in table 1.

Table 1. *Availability of reading devices for students with visual impairment in inclusive schools of Delhi.*

Reading devices for students with Visual impairment	Reading devices available in no. of schools (out of 58 schools)	Availability in Percent (%)
Highlighter/ Marker	58	100
Typo-scope	30	51.72
Stand Magnifier	7	12.07
Hand Held Magnifier	36	62.07
Large Print Books	32	55.17
Tactile Image/ Map	32	55.17
Tape Recorder & Cassettes	47	81.03
CD Plyer& CD	19	32.76
Recording deviceslikeMP3 and Mobile	35	60.34
Talking/Audio Books	21	36.21
Digital Access Information System (DAISY)	0	0.00
Refreshable Braille Display	0	0.00
Computer with Screen Reading Software	28	48.28
Closed Circuit Television (CCTV)	0	0.00
Any other device (specify name)	0	0.00

The percentage of reading devices' availability for students with visual impairment in schools of Delhi is presented in following bar diagram (figure 1).
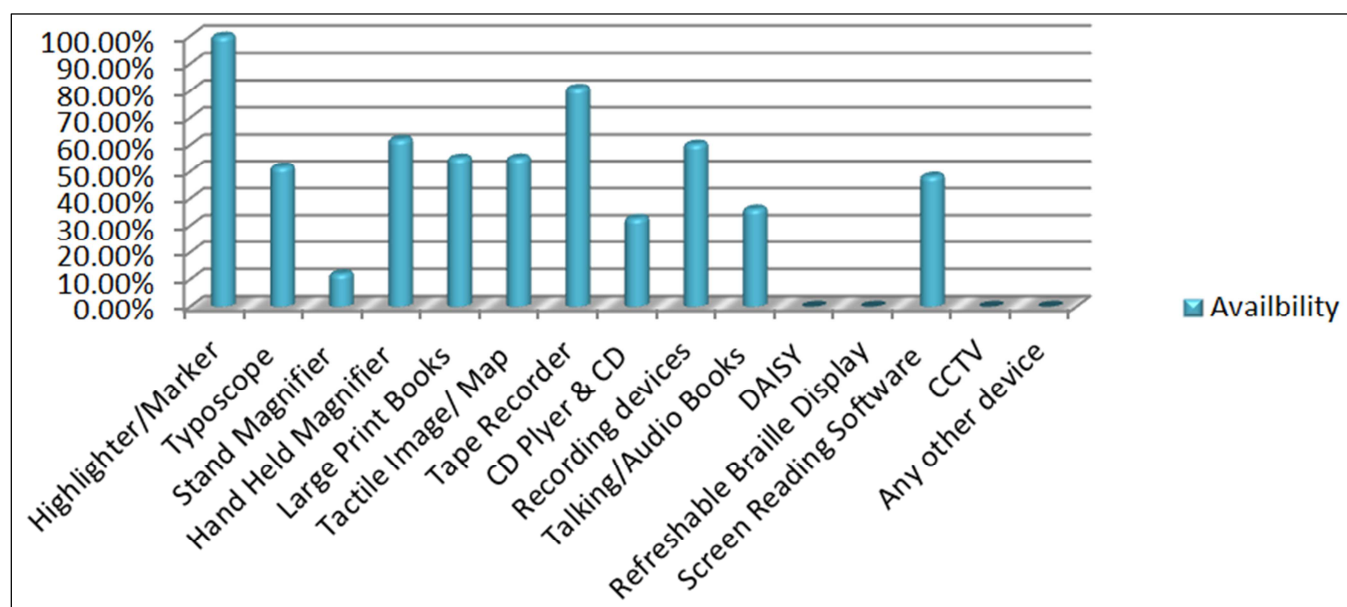

Figure 1. *Availability of reading technological devices for students with visual impairment in inclusive schools of Delhi.*

6.1.2. Availability of Writing Devices for Students with Visual Impairment in Inclusive Schools of Delhi

In the 58 inclusive schools of Delhi, only one writing device i.e. High Contrast Pen/Felt Tip Pen was available in all schools (100%), while four devices viz. Brailler, Braille Note Taker, Electronic/Smart Brailler and Alternate/Adapted Keyboard were not available in single school of Delhi. Braille Slate & Styles, Signature Guide and Computer with Screen Reading Software were available in almost 50% schools. The status of availability of different types of writing devices for students with visual impairment in the 58 schools of Delhi is tabulated in table 2.

Table 2. *Availability of reading devices for students with visual impairment in inclusive schools of Delhi.*

Writing devices for students with visual impairment	Writing devices available in no. of schools (out of 58 schools)	Availability in Percent (%)
Paper/Copy with bold lines	48	82.76
High Contrast Pen/Felt Tip Pen	58	100
Braille Slate & Stylus	38	65.52
Signature Guide	27	46.55
Brailler	0	0.00
Braille Note Taker	0	0.00
Electronic/Smart Brailler	0	0.00
Computer with Screen Reading Software	28	48.28
Alternate/ Adapted Keyboard	0	0.00
Any other device	0	0.00

The percentage of writing devices' availability for students with visual impairment in schools of Delhi is presented in following bar diagram (figure 2).
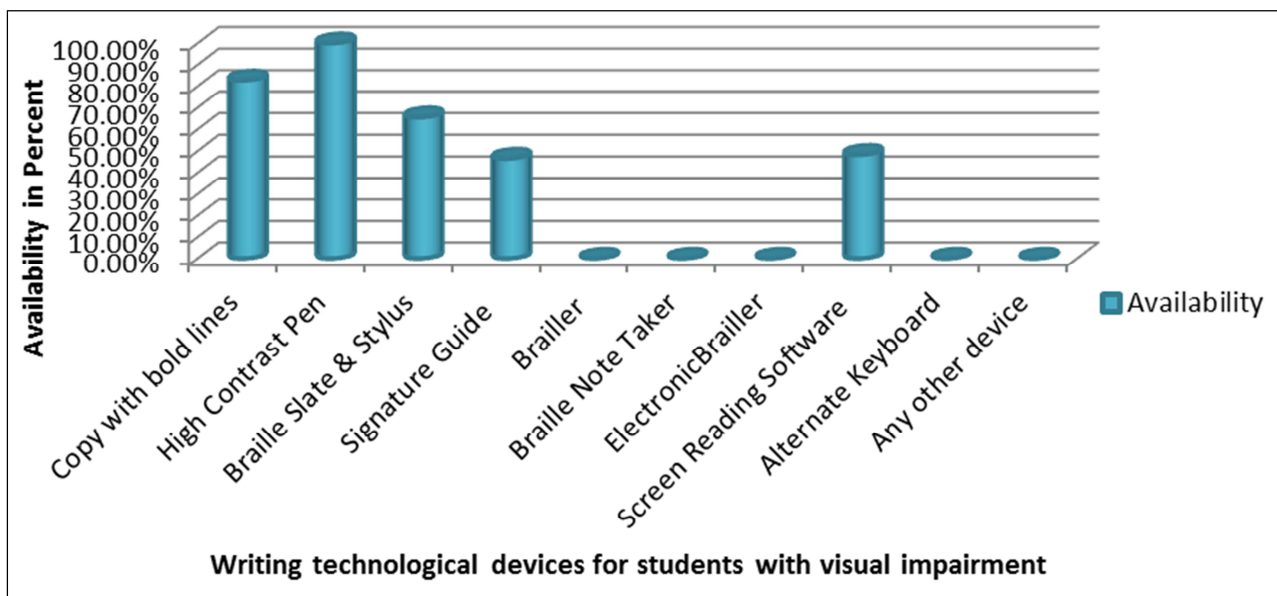
Figure 2. *Availability of writing technological devices for students with visual impairment in inclusive schools of Delhi*

6.1.3. Availability of Mathematical Devices for Students with Visual Impairment in Inclusive Schools of Delhi

At least one device for reading and writing were available in all 58 schools, but in the case of mathematical devices none of the device was found in all school. The maximum availability of mathematical technological devices in schools was Tactile Ruler, Talking Watch, and Model or 2D & 3D Geometrical shape (approx. 65%). Geometry Kit was not available in single school (0%), while talking calculator was available in only 3 schools (5%). The status of availability of different types of mathematical devices for students with visual impairment in the 58 schools of Delhi is tabulated in table 3.

Table 3. *Availability of mathematical devices for students with visual impairment in inclusive schools of Delhi.*

Mathematical devices for students with visual impairment	Mathematical devices available in no. of schools (out of 58 schools)	Availability in Percent (%)
Taylor Frame	23	39.66
Abacus	7	12.07
Talking Calculator	3	5.17
Tactile Ruler	39	67.24
Tactile Measuring Tape	12	20.69
Talking Watch	38	65.52
Braille Watch	25	43.10
Geometry Kit	0	0.00
Model or 2D & 3D Geometrical Shape	36	62.07
Large Print Maths Worksheets	27	46.55
Any other device	0	0.00

The percentage of mathematical devices' availability for students with visual impairment in schools of Delhi is presented in following bar diagram (figure 3).
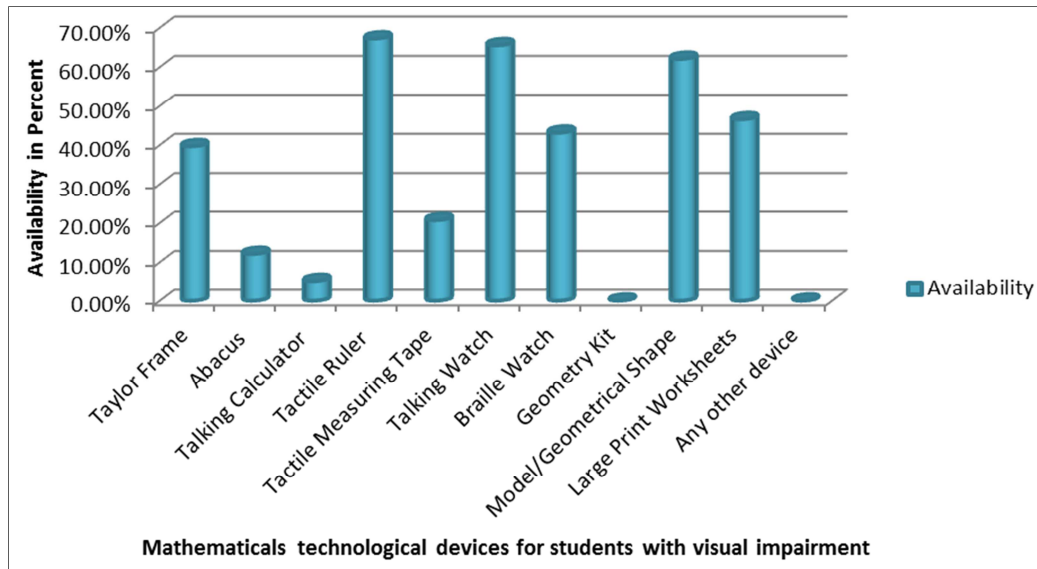

Figure 3. Availability of mathematical technological devices for students with visual impairment in inclusive schools of Delhi.

6.2. Condition of Technological Devices for Curricular Activities for Students with Visual Impairment

6.2.1. Condition of Reading Devices

Out of 14 reading technological devices for students with visual impairment, three devices was not found in any school, while 11 devices were found, but in very few schools. It means status of reading technological devices in terms of availability in various schools is poor, but in terms of availability of different types of reading devices, the status of schools is looking quite good (78.57%) (11 out of 14 devices were available).

6.2.2. Condition of Writing Devices

Out of 9 writing technological devices for students with visual impairment, 4 devices were not found in any school,

only 5 devices were available in the schools, that also in very few schools. It means status of writing technological devices in terms of availability in various schools is poor, and in terms of availability of various types of writing devices, the status of schools is not so good 55.55% (4 out of 9 devices were available).

6.2.3. Condition of Mathematical Devices

Out of 10 mathematical devise for students with visual impairment, only one device was not found in any school, while 9 devices were available, but in very few schools. It means status of mathematical devices in terms of availability in various schools is poor, but in terms of availability of different types of mathematical devices, the status of school is looking good (90%) (9 out of 10 devices were available).
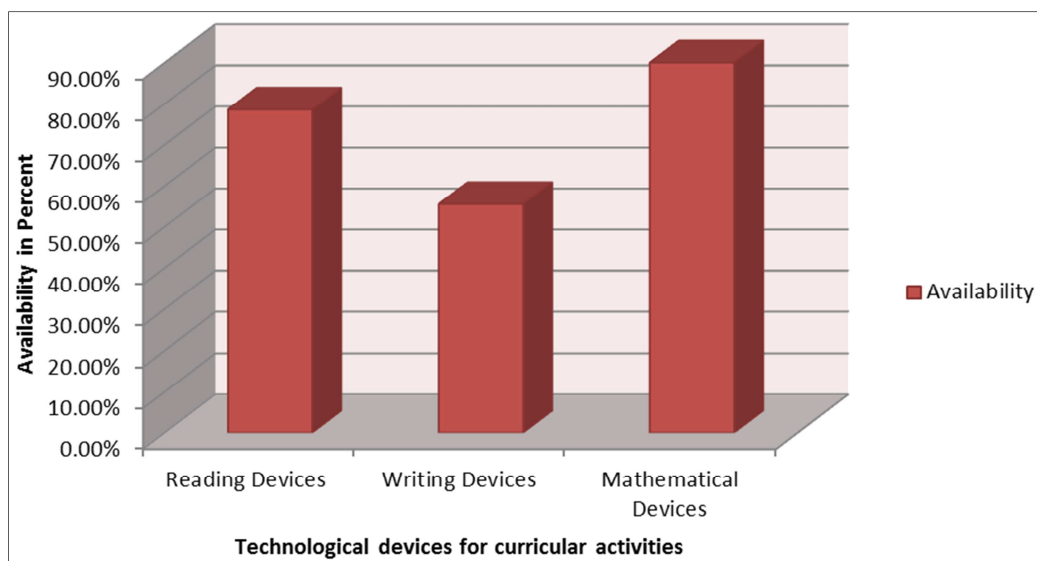

Figure 4. Condition of technological devices for curricular activities for students with visual impairment in inclusive schools of Delhi.

6.3. Status of Technological Devices for Co-curricular Activities

6.3.1. Availability of Mobility Devices for Students with Visual Impairment in Inclusive Schools of Delhi

In the 58 inclusive schools of Delhi, only two mobility devices for students with visual impairment were availableviz. Long Cane and Folding Cane, these devices were found in only 28 schools (48%) and 12 schools (20%) respectively. Three mobility devices i.e. Smart Cane, Braille/Talking Compass, and Mobile with GPS were not found in any school. The status of availability of different types of mobilitydevices for students with visual impairment in the 58 schools of Delhi is tabulated in table 4.

Table 4. Availability of mobility devices for students with visual impairment in inclusive schools of Delhi.

Mobility devices for students with visual impairment	Mobility devices available in no. of schools (out of 58 schools)	Availability in Percent (%)
Long Cane	28	48.28
Folding Cane	12	20.69
Smart Cane	0	0.00
Braille/Talking Compass	0	0.00
Mobile with GPS	0	0.00
Any other device	0	0.00

The percentage of mobility devices' availability for students with visual impairment in schools of Delhi is presented in following bar diagram (figure 4).
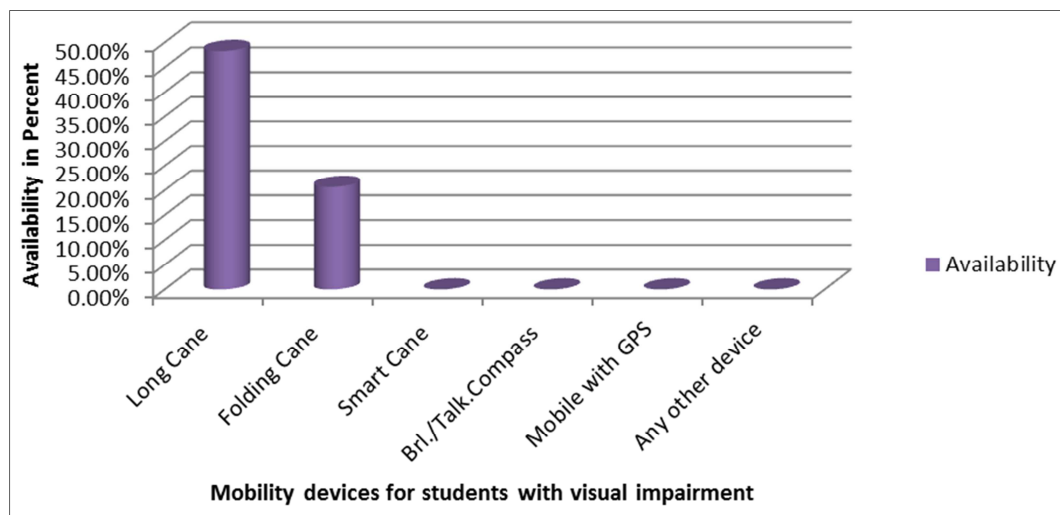

Figure 5. Availability of mobility devices for students with visual impairment in inclusive schools of Delhi.

6.3.2. Availability of Leisure and Recreational Devices for Students with Visual Impairment in Inclusive Schools of Delhi

In the 58 inclusive schools of Delhi, maximum percentage of availability of leisure and recreational devices was 29% which was Adapted Cricket Ball and Stumps. Adapted table Tennis was not found in any school, while availability of adapted Ludo, adapted Chess Board, and adapted Playing Card was 15%, 7% &&7% respectively. The status of availability of different types of leisure and recreational devices for students with visual impairment in the 58 schools of Delhi is tabulated in table 5.

Table 5. Availability of leisure & recreational devices for students with visual impairment in inclusive schools of Delhi.

Leisure & recreational devices for students with visual impairment	Leisure & recreational devicesavailable in no. of schools (out of 58 schools)	Availability in Percent (%)
Adapted Chess Board	4	6.90
Adapted Playing Card	4	6.90
Adapted Ludo	9	15.52
Adapted Cricket Ball & Stumps	17	29.31
Adapted Table Tennis	0	0.00
Any other device	0	0.00

The percentage of leisure & recreational devices' availability for students with visual impairment in schools of Delhi is presented in following bar diagram (figure 6).
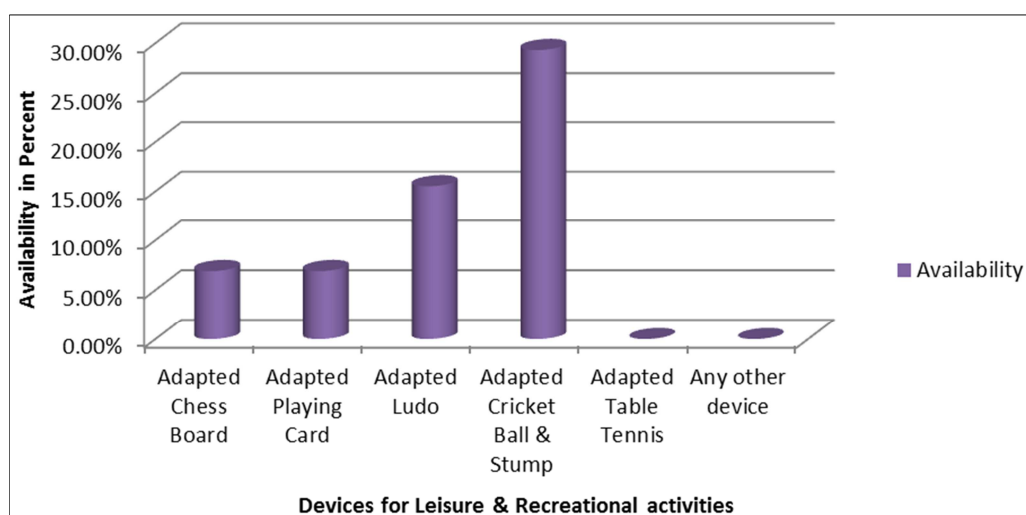
Figure 6. *Bar diagram showing availability of leisure & recreational devices for students with visual impairment in inclusive schools of Delhi*

6.4. Condition of Technological Devices for Co-curricular Activities for Students with Visual Impairment

6.4.1. Status of Mobility Devices

Out of 5 mobilitydevicesfor students with visual impairment three devices were not found in any schools, only 2 devices were available but in very few schools. It means status of availability of mobility devices in various schools are not good, and in terms of availability of different types of mobility devices the status is also poor (40%) (2 out of 5

devices were available).

6.4.2. Status of Leisure and Recreational Devices

Out of 5 leisure & recreational devices only one device was not found in any schools, while 4 devices were available but in very few schools. It means status of availability of leisure &recreational devices in various schools are poor, but in terms of availability of different types of leisure & recreational devices the status of schools is looking quite good (80%) (4 out of 5 devices were available)
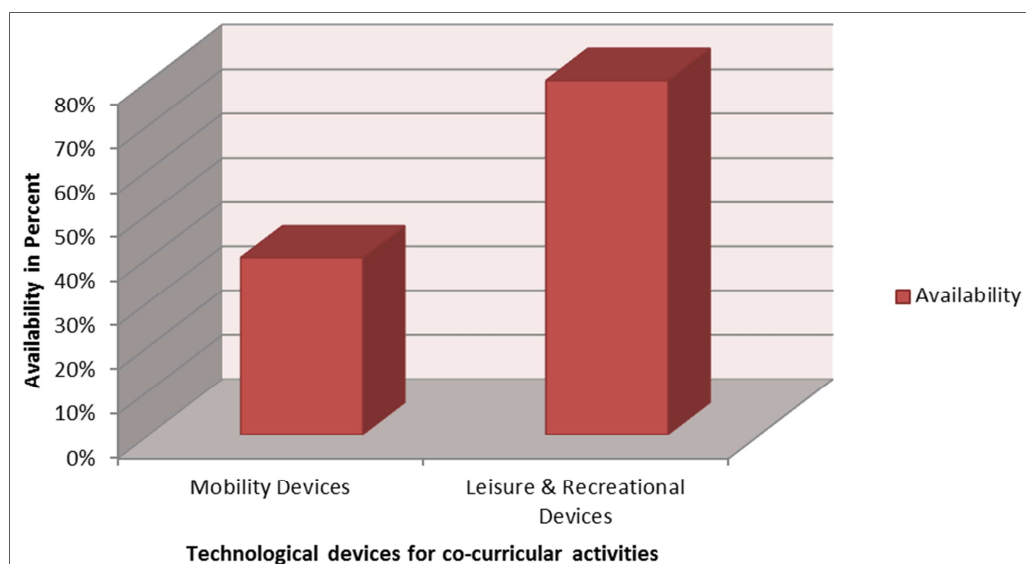

Figure 7. *Condition of technological devices for co-curricular activities for students with visual impairment in inclusive schools of Delhi.*

7. Discussion

The use of technological devices enables students with visual impairment to better adjust to regular learning process and academic domains. It gives these students access to the same information source their peers use. With the help of computer with screening reading software and internet

students with totally blind would be able to communicate with the other persons sitting anywhere in the world, and can access any library. These students can use leisure time in more appropriate way with the help of technological devise. Despite all these consideration many of schools of Delhi not have any technological devices for these students. The main reasons for non-availability of technological devices for students with visual impairment in inclusive schools of Delhi,

is that (i) State Govt. has not allotted budget to school to procure technological devise for student with disability, (ii) unawareness of these devices (iii) unavailability of special education teachers, and (iv) unawareness of importance of these devices.

8. Conclusion

The inclusive schools where special education teachers were working have technological devices for these students. Since special education teachers are aware about various devices and their importance for these students hence they have managed anyhow to make available these devices for students with visual impairment. But where special education teachers were not working status of those schools in terms of availability of technological devices is not good. Centre & State Govt. of India have made so many Schemes, Policies and Acts, but problems exist somewhere in implementation stage, that's why situation at gross root level is not up to the mark.

References

[1] Parette, H., Smith, S., & Gray, T. (2006). The state of assistive technology: Themes from an outcomes summit. *Assistive Technology Outcomes and Benefits*, *3* (1), 15-33.

[2] Anderson-Inman, L. & Horney, M. A. (2007). Supported e-Text: Assistive technology through text transformations. *Reading Research Quarterly*, *42*, 153-160.

[3] Judge, S. Floyd, K., & Jeffs, T. (2008). Using an assistive technology toolkit to promote inclusion, *Early Childhood Education Journal*, 36, 121-126.

[4] Todaro, A. J. (2005). Library services for people with disability in Argentina, *New Library World,* Vol. 106, no. 1212/1213, pp. 253-268.

[5] Gal, Eynat., Schreur, Naomi. and Engel-Yeger, Batya. (2010): Inclusion of Children with Disabilities: Teachers' Attitudes and Requirements for Environmental Accommodations. International Journal of Special Education vol. 25 no 2.

[6] Lang, Raymond (2001): "The Development and Critique of the Social Model of Disability". Overseas Development Group. University of East Anglia.

[7] Reed, P. and Bowser, G. (2005): "Assistive technologies and the IEP" in Edyburn, D., Higgins, K., Boone, R. (Eds.) Handbook of Special Education Technology Research and Practice. Knowledge by Design Inc. Whitefish bay.

[8] Petty, R. E. (2012): Technology Access in the Workplace and Higher Education for Persons with Visual Impairments: An Examination of Barriers and Discussion of Solutions. Independent Living Research Utilization at TIRR: Houston, Texas.

[9] Mastopieri, M. A. and Scruggs. T. E. (2007). The inclusive classroom. Strategies for effective instruction (3rd ed). New Jersey: Pearson.

[10] Stainback, S., and Stainback, P. (2004). Inclusion: A guide for education. Baltmore: Paul Brooks.

[11] Kirk, S. A., Gallagher, J. J., Anastasiow, N. J., and Coleman, M. R. (2006). Educating exceptional children. (11th ed). Boston: Houghton Mifflin.

[12] Sider S., Maich K. (2014). Assistive technology tools: Supporting literacy learning for all learners in the inclusive classroom. What Works? Research into Practice, 50. Retrieved from http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/whatworks.html Google Scholar.