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CURRENT FACILITIES FOR VISUALLY IMPAIRED STUDENTS TO LEARN SCIENCE AT SECONDARY LEVEL

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Abstract

Current facilities for science education at the secondary level often present significant challenges for visually impaired students. Traditional methods heavily rely on visual aids like diagrams, textbooks, and laboratory demonstrations, leaving these students with limited access to crucial information. This study is focused on status of current facilities for visually impaired students to learn science at secondary level. For this research, survey method was used. Data collection tool – checklist was developed and used by researcher. Based on the collected data form checklist data analysis was done. The findings of the study are most of the schools having facilities for visually impaired students to learn science at secondary level in Pune city but lack of the unavailability of science learning teaching aids is major issue in the VI schools.

Keywords: *Visually Impaired Students, Science Learning*

Introduction:

Science subject is core subject in secondary education. It is about exploration and discovery. It is a journey to understand the complexities of the world around us. However, for visually impaired students at the secondary level, traditional science classrooms can often feel like a world unexplored. Current facilities heavily rely on visual elements like textbooks overflowing with diagrams, complex charts displayed on whiteboards, and intricate laboratory

demonstrations. While these methods are effective for sighted students, they leave visually impaired students struggling to access and grasp crucial scientific concepts.

This paper delves into the limitations of current facilities for science education at the secondary level for visually impaired students. We will explore the specific challenges they face in understanding scientific concepts due to the lack of accessible learning materials. However, amidst these challenges, there lies an opportunity. By acknowledging the limitations and exploring alternative learning methods, we can pave the way for a more inclusive and engaging science education for visually impaired students.

Visually Impaired:

Visual impairment including blindness is defined in the Individuals with disabilities Education Improvement Act (IDEA) (PL 108-446) as impairment in vision that, even with correction, adversely affects an individual's educational performance. The term includes both partial sight and blindness.

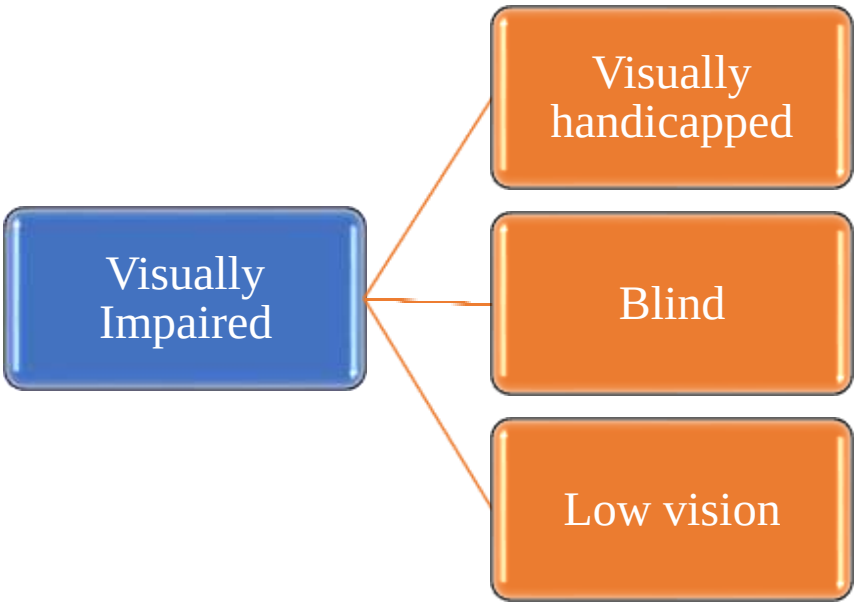

Figure 1

Types of Visually Impaired (Mangal, 2011)

There are three types of Visually Impaired –

- Visually Handicapped: The total group of children who require special educational provisions because of visual problems.
- Blind: Having either no vision or, almost, light perception (the ability to tell light from dark) but no light projection (the ability to identify the direction from which light comes).

- Low Vision: Limited distance vision but some useful near vision at a range of several feet; function varies with light, task, and personal characteristics; adjustments are possibly necessary in lighting, size of print or objects and distance.

Theoretical Background:

Johnstone (2009) found that the time for students with VI reading large print or braille requires a longer time to complete the task when compared to students who have normal vision. Azeta (2018) the voice-based e-examination system can immensely benefit to the VI students in ODL in respective of distance and complement the existing web-based method for online examination. Haptic Based learning aligns with constructivism by providing hands-on-experiences that allows students to explore scientific concepts through touch, fostering a deeper understanding through active engagement. Sensory integration suggests that learning is enhanced when multiple senses are involved. Since vision is limited for visually impaired students, haptic based science learning programmes utilize touch provide a crucial alternative pathway for information processing and knowledge construction. Compensatory theory proposes that individuals with sensory impairments develop heightened abilities in their remaining senses. Haptic based science learning capitalizes on this by leveraging the sense of touch, which is often more developed in visually impaired students, to facilitate science learning.

Objective:

To find out current facilities for visually impaired students to learn science at secondary level in Pune city.

Research Question:

What are the current facilities available for visually impaired students to learn science at secondary level in Pune city?

Research Methodology:

In the present research initially, the current facilities for visually impaired students to learn science were identified using checklist analysis. For this objective the main purpose was checking the facilities for visually impaired students in secondary schools as per Government of India guidelines and policies. These findings were considered for the HBSL programme development. For this objective survey was conducted to identify the current facilities for visually impaired students to learn science at secondary level in Pune city. All VI schools in Pune city were the population of this study. 100% schools were taken for the study as a sample

and purposive sampling was selected. Sample size was 4 VI schools in Pune city. Checklist was the data collection tool. The statistical tool was qualitative and quantitative analysis.

Analysis and Interpretation:

For this objective researcher used checklist of current facilities for VI students to learn science at secondary level in Pune city, the analysis of checklist as below:

Table 1 Checklist Analysis – School wise current facilities for VI

Sr. No.	Particulars	S1	S2	S3	S4
	A. Building				
1.	Tactile floor guidance/path guidance (from the building to drop of area)	X	√	X	X
2.	Antiscit floor surface	√	X	√	X
3.	Texture difference around the doorway from rest of flooring	X	X	X	X
4.	Tactile pavers leading to main entrance (bracket may be put at all main entrance)	X	X	√	√
5.	Audio system at the entrance	X	X	X	X
6.	No obstacles or projections in pedestrian areas such as walkways, halls, corridors, passageways, or aisles	X	X	X	X
7.	Door colour is contrast with wall colour and surface of the floor	√	√	√	√
8.	Vision panel for two-way swing doors	X	X	X	X
9.	Two-way opening bathroom doors	X	X	X	X
10.	Grab bars, slip resistant with round ends	√	√	√	√
11.	Wall mounted drinking water provision	X	X	X	X
12.	Use of OL tactile letters on signages visual contrast and lighting	X	X	X	X
13.	Steps with consistence height and depth & Number of Steps	√	√	√	√
14.	Contrast colour between landings and the steps (warning blocks)	X	X	X	X
15.	Audible alarms with voice instructions	X	X	X	X
	B. Library				
1.	Digital library (e-books) Audible books	√	√	√	√
2.	Braille books	√	√	√	√
3.	Daisy library (daisy player)	X	X	X	X
4.	Sugamya pustakalya	√	√	√	√
5.	Tactile Graphical Material	√	√	√	√
	C. Computer Lab				
1.	Computers with screen magnifiers	√	√	√	√
2.	Computers with screen reader (Jaoos Software)	√	√	√	√
3.	Braille script writing tools (Brailles)	√	√	√	√
4.	Mouse cum video magnifier	X	X	X	X
5.	Tablets / Laptop with reading software	X	X	X	X
6.	Scanning & Reading Software	√	√	√	√
7.	Speech Recognition Software	X	X	X	X
	D. Science Lab Aids				

1.	Refreshable Braille display	X	X	X	X
2.	Cubarithm (Arithmetic Calculations)	X	X	X	X
3.	Braille slate	√	√	√	√
4.	Taylor frame (Arithmetic Calculations)	√	√	√	√
5.	Tactile drawing board	√	√	√	√
6.	Tactile Measuring kits	√	√	√	√
7.	Interpoint braille slate	X	X	√	X
8.	Tactile diagram set / Graphics Material	X	X	X	X
9.	Scrabble board (word learning)	X	X	X	X
10.	Audio labeller	X	X	X	X
11.	Talking thermometer	X	X	X	X
12.	Talking calculator	X	X	X	X
13.	Need based optical / non-optical devices	X	X	X	X
14.	Ball and stick model	X	X	X	X
15.	Talking Weight Machine	X	X	X	X
16.	Science rubber/plastic clay model of science objects	√	√	√	√
E. Teacher					
1.	Braille script knowledge	√	√	√	√
2.	Assistive technology knowledge (Screen Magnifier, Screen Reader)	√	√	√	√
3.	Special needs or visually impaired students	√	√	√	√
4.	Knowledge & accessible environment	√	√	√	√
5.	Knowledge & accessible course delivery mechanism (to teach blind students)	√	√	√	√

Observation:

According to the table 4.1, the Current facilities for visually impaired students to learn science at secondary level in Pune city is based on five particulars – A. Building, B. Library, C. Computer Lab, D. Science Lab Aids, and E. Teacher. In the table, S1 is for The Poona School & Home for the Blind Boys, S2 is for Patashibai Lunkad Blind School, S3 is for NFBM's Jagruti Andh Kanya Vidyalay, and S4 is for The Poona School & Home for the Blind Girls. The table shows the available current facilities for VI in schools.

Interpretation:

The table explains that, the all four schools having almost same facilities, the major interpretation is as below-

1. All four VI schools have good library facilities, Computer Labs, Science Lab Aids and Teacher knowledge as per requirements.
2. Some science laboratory teaching aids are not sufficient in all schools.
3. These schools do not have the sufficient and appropriate science teaching aids required for the Visually Impaired students learning, that impact on VI students understanding of basic concepts of the science at secondary level.

Findings:

1. All four VI schools have good library facilities, Computer Labs, Science Lab Aids and Teacher knowledge as per requirements.
2. Some science laboratory teaching aids are not sufficient in all schools.
3. These schools do not have the sufficient and appropriate science teaching aids required for the Visually Impaired students learning, that impact on VI students understanding of basic concepts of the science at secondary level.

Conclusion:

This research had focused on find out the current facilities in VI schools. When VI students cannot access information due to inaccessible facilities, it creates an exclusive environment. Addressing these challenges fosters inclusivity and allows VI students to participate fully in science education. By providing alternative learning methods through touch and other senses, VI students can grasp scientific concepts more effectively, leading to better learning outcomes. For those reasons, better understanding and learning of the science concept for VI students the blind school current facilities are important.

References:

Atika, I. N., Ediyanto, E., & Kawai, N. (2018). Improving Deaf and Hard of Hearing Students' Achievements Using STS Approach: A Literature Review. International Journal of Pedagogy and Teacher Education, 2, 13-24.

Hatton D. D., (2014). Advancing the Education of Students with Visual Impairments through Evidence-Based Practices. International Review of Research in Developmental Disabilities, Volume 46. pp. 9-10, 18.

Johnstone, C., Altman, J., Timmons, J., & Thurlow, M. (2009). Students with visual impairments and assistive technology: Results from a cognitive interview study in five states. Minneapolis, MN: University of Minnesota, Technology Assisted Reading Assessment (TARA).

Joseph, Chris. Challenges of Being Blind. Retrieved from - http://www.ehow.com/about_5185162_challenges-being-blind.html

Mangal, S. K., & Mangal, S. (2013). Research methodology in behavioural sciences. New Delhi, Indıa: PHI Learning.

Nguyet, D. T. and Ha, L .T. (2010). How-to Guide Series Preparing teachers for Inclusive Education. Catholic Relief Services Vietnam.

Olivier, M. (2011). Development of need based programme of guidance and counseling for secondary school students in the southern province of Rwanda. University of Pune, Pune.