

**TEACHING SCIENCE TO VISUALLY IMPAIRED STUDENTS****Meenakshi Vandana***M. Phil Research scholar Centre- ACCER***Abstract**

Sciencesubject have abstract concepts. Traditional science teaching has been depended mostly on visual instruction.Hurdles arise for visually impaired (VI) or partially sighted students in inclusive classroom to understand same science concepts with sighted students. VI students adapt to use multi sensory approach to learn using such as tactile and aural. Teacher for VI should implement instructional strategies for science teaching to VI students. .aim of this study is to explore the acquisition of instructional strategies by employing a qualitative approach. The findings of the data were acquired by means of questionnaire circulated among visually-impaired students, as well as an interview with an instructor who has experience in teaching visually-impaired students. The findings indicate that the students face difficulties in biology, physics and chemistry being the most challenging.

PURPOSE: Purpose of this study was to investigate how VI students understand abstract science content at secondary level in inclusive classroom.

Key words: visually impaired; science teaching; , instructional strategies



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1. Introduction:

Vision serves as an integrating bridge for the information that is received by other modalities and for the formation as well as refinement of concept .This paper focus on teaching science to students who are visually impaired in the inclusive classroom along with sighted peers. Visual sense is the most versatile of all the major sense and coping with loss of vision is challenged .visually impaired student understanding abstract concept same like sighted peer .Researcher has come across at specific discipline which is inaccessible to visually impaired student as science is a branch which have diversified in other subject too .Science teachers should strive and fill the lacuna to develop scientific literacy in visually impaired like manipulative skills ,process skills and concept development skill .Teacher face special challenges how to teach abstract concept and need to tailored concept to make understanding . How to make teaching strategies fit to all at the same time and making adaptation to the concepts.Sighted peers have continual open to visual stimulation from surrounding,which

prompt them to inquire and exploration .visually impaired students are stimulated with certain sense organ by tactile development of motor skill and aural. science is all about observation and experimentation for abstract concepts and this lead in difficulty to understanding .Remedial time need to be spend with visually impaired to teach difficult concepts because non availability of enough resources and opportunity andlack of observation .it's found visuallyimpaired students have poor mobility ,psychomotor skills ,lack of readiness and spatial relationship.

2. Status of Education of the Visually Impaired in India

“Special education is a form of education provided for those who are not achieving, or are not likely to achieve through ordinary educational provisions, the level of educational, social and other attainments appropriate to their age, and which has the aim of furthering their progress towards these levels” UNESCO (1983). “Education for all “as one of the main goals of national development. Universalization of primary education is a step towards realization of this goal(NPE,1986). Child population in the age group 0-6 years for 2001 was 157.86 million with boys accounting for 51.88% of the population and girls constituting 48.12% Maharashtra (8.35%) (Census, 2001) .Educational opportunities for thosechildren with disabilities in regular school (NPC, 1974). The SarvaSikshaAbhiyan,2001 concerns of children with disabilities, or those it terms as “children with special needs under the framework of “inclusive education” (IE). NCERT, a premier institute run under the auspices of theMinistry of Human Resources Development has established the Department of Special Education for promoting education of persons with disabilities. Full Participationand Equality of the People with Disabilities in the Asian andPacific Region, the Parliament enacted the Persons with DisabilitiesAct (Equal Opportunities, Protection of Right and FullParticipation) Act, 1995 which came into force with effectfrom 7th February, 1996.The National Sample Survey Organization (NSSO) 58th round (July-December 2002) survey reported that 1.8 percent of the population (18.5 million) had a disability(NidhiSingal, 2009).Rehabilitation Council of India Act (1992)states that CWSN will be taught by a trained teacher. Persons with Disabilities Act (1995)educational entitlement for all CWSN up to 18 years in an appropriate environment.

3. Objectives:

1. understanding the Problem associated with visually impaired student in learning science content
2. Understanding teaching –learning strategiesin inclusive classroom.

3. Understanding Attitude of teachers teaching science content to visually impaired student.

4. Problem statement

This study is going to investigate how teachers teach abstract science concept to VI students. VI students depending upon their learning disabled; more time and resources to learn the same things as their sighted peer do. Visually impaired if given opportunity, they can learn anything and achieve the same success in exams as their sighted peers do. To provide an equal opportunity of education for VI students, there must be some accommodations in learning atmosphere and in the curriculum materials with the help of strategies. Visual opportunities have right for equal opportunity like others therefore it is teacher who should fill the gap and teach visually impaired students to develop scientific literacy. Most of the students can use Braille code to read and write (Cox and Dyks, 2001). Teaching and learning abstract concepts of science is a very broad concept. In addition this study is a small scale research in terms of data collection and its purpose.

5. Literature review:

In regular, classroom must attention is given to visual but its belief that teachers teaching visually impaired students should focus on the learning modalities like visual auditory and tactile which help even the cognitive skills (Gadt-Jhonson, 2000; Willis, 2001). It's seen when students are able to understand any problem in a meaningful way it becomes more accessible this leads to higher cognitive understanding (Fennell & Rowan, 2001).

6. Background

Most of the visually impaired students differ in their cognitive development compared with sighted students as there is a difference in the visual and tactile kinesthetic experience (Dragana Mac'estic'-petrovic' et al. 2010)

Teachers say there is a large gap between visually impaired student resources availability and instructional material as this does not lead student with full potential for learning abstract concepts. Lack of student with disability are not given equal opportunity to experience science as sighted peer. To fill the lacuna in teaching learning visual impaired student emphasizes the necessity for an one-on-one tutorial as the primary mechanism of learning. Inclusive classroom requires some adjustment in the learning environment and in the instructional techniques. In general successful classroom teachers having skill to teach student with visual impaired. The instructional methods are tailored in such a way that it emphasizes on every student as they have same potential that appears at different level with different teaching methods for fruitful outcome. Visually impaired students read and write in Braille code as it

take more time than their sighted peer reading and writing the printed material. To learn abstract concept in science need lot of hand on activities for visually impaired students . science experiment depend lot on visual data and it depend on how visually impaired follow and learn with pace depend on them.(eichenberger,1974) suggested that since a visually impaired student seriously lack the skill in tracking down and recording data ,it is helpful if the visual impaired student can work with a sighted peer in conduction and recording data in the inclusive programme.while visually impaired can perform the operation in lab ,sighted peer can explain the result and taking record .chemical experiment causes problem since they require visual observation in most cases such as chemical reaction .if their is a color change in experiment they need sighted peer to explain the changes and note it.

7.Instructionalstrategies :

Its seen that teaching strategies have a great impact on student (Eley,2006)teaching with skill in biology, physics and chemistry help visually impaired student to take part in hand on experience so manipulative skill and verbal explanation fill the gap for the abstract concept (Hidayah,2014).Flexibility is important since the design of actual lesson will vary with the need of particular visual impaired student .educators for visually impaired should be flexible when it comes to assessing a student understanding of concept in three discipline in science with the help of accommodation .in chemistry –tactile graphics ,auditory tapes , sensing 3dmodel and using Braille code are few material which help student to experience.

8. Methodology :

This study is qualitative in nature. Researcher observe instruction performed by teaching science to VIstudents. Instead, the purpose of this study is to investigate, describe, and explore the waysthat VI students understand science..Data collection methods were participant observation and semi-structured interviews.

Data Collection

Data collection was carried out in two parts:

1. Records and observations of the teaching programme during which science content was taught to the participant.
2. Interviewing the participant. The first interview was held half way through the programme and the second interview at the end of the teaching programme.

In addition to this, a number of informal conversations took place throughout the programme. This study was conducted in shri.Patashibai blind school ,bhosari .It is a self aided school .Researcher as a participant observed the science session and took notes. Semi

structured interview was planned with principal, teacher, student. Observation and interview was transcribed and analyzed by the researcher.

9. Findings

1. Visually impaired student provide with right tool and instruction it build the abstract concept and increase the potential in them.
2. As chemistry is the most difficult discipline in science giving them remedial time will enhance their interest.
3. Cognitive challenges will always affect the visually impaired student depending upon their learning disabilities.

Student with visually impaired have well developed auditory sense .therefore being blind does not mean they are not capable of doing certain activities in inclusive classroom. however they need more time to cover a particular topic since all of them need to pass the common examination .since science curriculum heavily rely in abstract concept it depend on the visual instruction and this lead to the difficulty to connect and construct the abstract information due to lack of visual input. To understand science visually impaired student need to be provide with lot of audiotapes as input. Visually impaired student can carry out experiment and assume in a collaborative way, Just as a way one use in regular class. According the analysis of the interview its found visually impaired student take long time to read and write and they become tired .visually impaired student are less mobile and depend on sighted peer and which doesn't accommodate into regular classroom .since things move very quickly in classroom .visually impaired have difficulties in understanding in traditional way like access to textbook, classroom presentation and library .

10. Discussion

Facilitators of visually impaired teaching strategies to visually impaired students understand science abstract should be aware with the need and strive to teach them in a meaningful way. As there is planned program for instructional strategies and environmental adaptation according to the need of the visually impaired students ,as they have strong hearing sense ,unnecessary voice need to be avoided and maximum time to be given for the cognitive development according to the learning disability .laboratory equipment should have collaborative way to handle with sighted peer to build self-esteem and independence .teacher can help visually impaired student with the orientation of classroom layout .teachers according to the need should focus on individual need and take remedial measure. visually impaired student need notes in alternative form like audio tapes and Braille

code and lab assistance for the dependent learners. visually impaired students use their tactile –kinesthetic input to learn about their environment. material used for visually impaired need to be adapted which are without visual effect like 3d charts, models, graphs .the goal and objective set for sighted students are same for the visually impaired students rather there is a different approach that need to be implemented to achieve the objects for secondary students so that scientific literacy can be increased.. Teachers and school must emphasize orientation and mobility training daily living skills and social skills need to be addressed.

11. Conclusion

This case study offers many implications for classroom and teachers including encouraging them to move beyond their preexisting ideas about individuals who are visually impaired. This research provides educators with pragmatic tools and strategies to use in facilitating the learning of students who are visually impaired. Based on the findings, it is recommended that teachers utilize available resources to learn about their students' conditions and about effective teaching strategies. Teaching approaches should be supplemented by auditory stimuli, tactile materials, and multi-sensory approaches. Finally, teachers should learn to utilize the technology and specialized equipment available to meet the needs of their students who are visually impaired. It is my hope that this study may encourage schools, I hope that the findings from this study encourages educators, to apply this information in developing curricula for visually impaired.

12. Implications for School Practices

Research showed that students attending inclusive Schools study science concept as those in the mainstream. Students at Special Schools have multiple disabilities that restrict them from coping with the demanding content of the science syllabus.. But it seems that there is a gap between the policy of inclusion and the reality in which these schools are operating. Schools lack the appropriate resources and materials, which help the visually disabled students, learn science .if they are trained with instructional strategies vi students can build concepts and achieve better skills as like their visual peers

13. Suggestion:

1. Inclusive teachers are resource facilitators for any inclusive programme with vi students, it is important that teachers are provided with training on regular basis.
2. Necessary teaching –learning material need to be available for firsthand experience.
3. Society needs to be sensitized towards the inclusive school

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