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MISCONCEPTIONS OF VISUALLY IMPAIRED STUDENTS ABOUT LEARNING GEOGRAPHY

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Abstract

This study explores the common misconceptions held by visually impaired students regarding the subject of geography at the secondary school level. Despite the importance of geography in fostering spatial understanding and global awareness, visually impaired learners often face unique challenges in accessing and interpreting geographic content. Using a mixed-methods approach involving interviews, questionnaires, and observations, the research identifies key areas of misunderstanding—such as difficulties in interpreting tactile maps, confusion about spatial relationships like direction and distance, and misinterpretation of geographical features and data representation (e.g., graphs and globes). The findings also reveal a lack of accessible learning materials and limited exposure to hands-on activities, contributing to these misconceptions. All students in the study confirmed that geography was part of their curriculum, but only a few reported having access to tactile resources or GPS-based tools. The study recommends the incorporation of accessible teaching aids, experiential learning opportunities, and teacher training to support the diverse needs of visually impaired students. By addressing these misconceptions through inclusive pedagogical practices, educators can help bridge the learning gap and promote better conceptual understanding in geography for visually impaired learners.

Keywords: Visually Impaired, Geography Education, Tactile Learning, Inclusive Teaching.

Introduction

Education is an important aspect that plays a huge role in the modern, industrialized world. People need a good education to be able to survive in this competitive world. Modern society is based on people who have high living standards and knowledge which allows them to implement better solutions to their problems.

Education is important in the creation of any democratic society. As Franklin D. Roosevelt says, "*Democracy cannot succeed unless those who express their choice are prepared to choose wisely. The real safeguard of democracy, therefore, is education."* People need a good education if they want a good democracy.

Education is very important for the quality of the life according to John Dewy Said in his book Democracy and Education *"Education is not Preparation for Life ; education is life itself."*

Education creates hope for the future. Giving people hope that they can improve their lot in life is one of the more powerful effects educations has on a society.

As a matter of fact, education can be regarded as the society's cultural reproductive system. Through education, society reproduces itself, passing on its main characteristics to the next generation, though the process becomes complicated as time goes on due to the influence of philosophical, economic, political, and social forces acting on the mechanism. On the long run, each generation is different from where it sprang, yet it has been responsible for keeping the society alive.

Educational aims can be perceived differently by different people at different levels. Parents tend to think in terms of career prospects as the aim of education, the religious leaders think that education should be for the moral growth of the children.

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The politicians tend to look for developments that have national significance, whereas the pupils and the teachers that are directly involved may have different aims entirely from the ones stated.

The most essential aim of education is seeking to integrate each new generation into its own society. Each generation must not be cut off completely from the heritage of its past, there is need for continuity, hence the great need for education.

Persons with disability is also part of our mainstream society and Ensuring education for persons with disabilities (PWDs) is imperative for fostering equality, empowerment, and social inclusion. Education equips PWDs with the knowledge, skills, and opportunities needed to reach their full potential, participate actively in society, and contribute meaningfully to their communities. By promoting independence, enhancing employment prospects, and fostering personal development, education enables PWDs to break down barriers, challenge stereotypes, and overcome challenges. And Education for Persons with Disabilities (PWDs) is a crucial aspect of ensuring inclusivity and equal opportunities for all individuals.

Disabilities impact access to opportunities for learning and achievement of a learner's full potential. It is therefore imperative to design a flexible education system that caters to the individual needs and abilities of CWSN. Equitable, inclusive, and quality education identifies and attempts to eliminate barriers, promotes a sense of belonging lays the foundation for success ad better learning outcomes for all learners.

Vision impaired students rely on other means of communication such as sound, feel and smell. Olfactory sense has strong memory associations, which can be used in geography to establish a location in a student's mind. Teachers and support staff should use objects to convey geographical skills and locations - these techniques can go some way to help a student who is not able to learn by sight. Use tactile displays, graphs, maps, models, pictures, and audio devices to give information. Use smell and touch to establish locations – for example, scents for seaside, meadows, woods, and different countries. Use relief models, especially when teaching contours or map coordinates. Encourage students to feel different types of rocks and minerals to explore how their weights, texture and structure differ.

Using assistive technology (AT) in geography gives vision impaired students access to more information when learning – here are some of the best pieces of assistive technology for geography.

Background and Rationale

Geography, as an interdisciplinary social science, explores spatial relationships between people, places, and environments—spanning topics like urbanisation, resource management, and sustainability.However, traditional geography instruction heavily relies on visual tools (maps, charts, graphs), inadvertently marginalising visually impaired (VI) learners who cannot access these essential resources. Despite emerging multisensory strategies—such as tactile maps, auditory descriptions, and 3D models—there remains limited empirical evidence on misconceptions held by VI students in Indian classrooms and how educators address them .

Scope of Disability and Inclusive Education

Globally, approximately 16 % of the population lives with disabilities, and India accounts for roughly 26.8 million people with disabilities, including a substantial number with visual impairment. Although inclusive education policies have increased enrolment, disparities persist: UNESCO reports that one-third of Indian children with disabilities do not complete primary school. This highlights an urgent need to improve instructional quality and accessibility in subjects like geography, where visual materials dominate.

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Special Education Context in India

Since the 1880s, India has pioneered special education for children with visual impairment. By 2000, around 3,000 specialised institutions existed. Yet, challenges in teacher-training still persist: curricula remain inconsistent, Braille literacy among teachers is low, and pedagogical support is often inadequate. Though the Accessible India Campaign (2015) aims to increase assistive infrastructure, implementation gaps continue to limit the reach of accessible educational tools.

Problem Statement and Research Gap

Despite growing awareness, no comprehensive study has yet documented the misconceptions VI students hold about geography in Indian classrooms or evaluated how teachers respond. The current research aims to bridge this gap by answering:

1. What misconceptions do VI learners hold regarding geographical concepts?
2. How do educator strategies influence these misconceptions?
3. Which multisensory and technological interventions best support learning in this context?

Multisensory Learning Approaches

Research shows that multisensory tools—such as tactile maps, audio-tactile interfaces, screen readers, and Braille graphics—can greatly enhance VI students' spatial knowledge and classroom engagement. For example, Brulé et al. (2018) found that multisensory maps significantly boost lesson comprehension and student autonomy . These findings underscore the promise of inclusive, sensory-rich pedagogies in geography education.

Graph Reading

Misconceptions in graph reading among visually impaired individuals often stem from limited visual access, unfamiliarity with graph types, and challenges in interpreting tactile or auditory representations. Common misunderstandings include:

1. **Difficulty recognizing graph types**: Without clear tactile shapes or auditory cues, identifying whether a graph is a bar chart, line graph, or pie chart becomes confusing, impeding comprehension of its purpose and structure.
2. **Misinterpretation of data trends**: In the absence of structured guidance, students may misread patterns or relationships between variables, leading to inaccurate conclusions.
3. **Limited understanding of graph components**: Key elements—such as axes, titles, labels, and legends—can be overlooked without explicit tactile or verbal marking, making navigation and interpretation more difficult.
4. **Challenges in reading numeric values**: Small or crowded numbers on axes and data points often become illegible, limiting precise data interpretation.
5. **Overreliance on verbal descriptions**: Excessive dependence on speech or audio cues, without tactile engagement, may inhibit the development of active graph-reading skills and learner autonomy.

Effective strategies to address these misconceptions include using tactile-friendly graph creation tools (e.g., tactile graph software), embedding clear Braille labels and distinct textures, and implementing scaffolded, hands-on activities. By encouraging learners to trace axes, explore chart elements by touch, and progressively tackle more complex graphs, educators can help visually impaired individuals build greater proficiency, confidence, and independence in interpreting data.

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Tactile Maps

Misconceptions around tactile maps among visually impaired learners can arise from limited exposure, lack of familiarity with tactile representations, and difficulty interpreting spatial information. Typical misunderstandings include:

1. **Equating tactile with visual maps**: Learners may expect tactile maps to match the visual detail of standard maps, even though tactile versions are simplified for clarity.
2. **Difficulty understanding scale and proportion**: Without explicit guidance, accurately gauging distances or relative sizes can pose major challenges.
3. **Limited interpretation of symbols and legends**: Overly dense or poorly differentiated tactile symbols can be confusing. Simplifying legends improves comprehension.
4. **Misinterpreting texture or elevation**: Textures representing terrain features may be misunderstood unless they are clearly distinguishable and consistently applied.
5. **Overreliance on verbal descriptions**: Listening without tactile exploration often limits the development of spatial awareness and independent interpretation skills.

To counter these misconceptions, educators should use comprehensive tactile map literacy instruction covering scale, symbols, textures, and spatial relationships. Interactive, real-world activities—like exploring campus layouts through tactile maps—can deepen spatial understanding. Incorporating multisensory learning through audio descriptions, texture variations, or 3D icons (such as **TactIcons**), further enriches comprehension and retention. Consistent, supportive practice across diverse tactile maps bolsters confidence and promotes independent navigation and geographic insight.

Review of Literature

The position of Geography in India is neither uniform nor static. The Kothari Education Commission (1964–66) emphasized that geography should be introduced through an integrated social studies curriculum in the lower primary levels. Later, in upper primary, students should begin to see geography as a distinct subject, with full specialization at the secondary and higher secondary level.

Johnston (1985) argued that geography should be used to understand the great variety of cultures in the contemporary world, and to show how they have evolved as a response to environment, place, and people. Overall, these studies emphasize the importance of engaging teaching methods, practical experiences, and the development of critical thinking skills in geography education. Integrating real-world examples and fostering a deeper understanding of geographies can help students relate their learning to their everyday encounters, thereby making geography more meaningful and relevant in their lives.

Verma and Deshpande (2015) examined first-year B.Ed. student perceptions of geography at Fiji National University and found that students generally had poor attitudes toward the subject. Zaki Salman (2018) identified various misconceptions related to seasons in school geography classes. Additionally, Das and Choudhury (2019) observed that visually impaired students often misunderstood spatial relationships—such as distance and direction—in their study of geography .

Multiple research studies conducted in the United States have indicated that students generally hold negative perception about social studies (Chapm, 2006; Joyce, 1986; Schug, Todd, & Berry 1984 ; Zhao & Hoge, 2005). One significant factor contributing to these negative perception is the perceived lack of relevance of social studies to students' future lives (Chapin, 2006; Schug et a;. 1984).

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Quain, A.J. (2014) assessed high school students' attitudes towards Geography in a problem - based learning environment. The study also assessed preference for group work and problem solving. efficacy with reference to problem-based learning instruction. The research found no significant relationship between problem-based learning environment and students' attitudes· towards Geography, preference for group work, and problem-solving efficacy.

Sarkar,P., Dey, K.K., and Maiti, N.C. (2015) attempted to determine whether the attitude of the students towards Geography is in consonance with the growing importance of the subject in the society. The result depicted that :

1) Habitats of the students have more significant influence on the attitude of the students than gender,
2) Boys of rural and urban habitats differ significantly in attitude towards Geography,
3) Students' attitude has positive correlation the academic achievement in Geography.

Biddulph and Adey (2004) conducted semi-structured small group interviews with Year 8 students to explore their perceptions of effective teaching and subject relevance in history and geography. They found that teaching strategies that facilitated student-cantered learning were teach in a stimulating and engaging manner could contribute to changing negative attitudes towards geography (Aydin 2018).

Research by Clark, C. el al. (2017) emphasizes the positive impact of incorporating everyday geographies in geography education. By relating classroom content to students' personal experiences interests, and spatial dimensions of their daily lives, educators can enhance student engagement, motivation, and learning outcomes.

According to Mishra and Swain (2019), "Specialized training programs for geography educators should focus on adapting curriculum materials and instructional methods to cater to the diverse learning needs of visually impaired students." (Mishra & Swain, 2019, p. 108)

Research Methodology

This study uses a mixed-methods approach, combining quantitative and qualitative data to gain both numerical and in-depth insights. Quantitative data—such as ages, test scores, and percentages—are collected via surveys and experiments. Qualitative data—reflecting beliefs, motivations, and experiences—are gathered through interviews and focus groups.

Research Design

A descriptive survey was used to collect data on current experiences and perceptions.

Population

All visually impaired secondary school students learning geography in special schools in Delhi.

Sampling

A purposive sample of 30 such students was selected.

Tools for Data Collection

Data were collected using an interview–questionnaire combo and an observation checklist. The researcher visited a special school, interviewed each student individually, and recorded responses in the questionnaire.


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Findings

1. Geography as a Scheduled Subject

- Every student (100%) confirmed that geography is a formal part of their school curriculum, complete with dedicated class time. This indicates strong institutional recognition of geography in the educational structure for visually impaired learners.

2. Access to Adapted Learning Materials

- Only half of the students (50%) reported receiving learning resources tailored to their needs (e.g., Braille, tactile charts, accessible documents). This highlights a significant disparity in material accessibility, affecting half of the cohort.

3. Availability of GPS and Tactile Resources

- None of the students (0%) had access to tactile geography tools, such as globes, maps, diagrams, or GPS training. Such resources are critical for developing spatial awareness; their absence represents a major barrier to effective geographic education.

4. Basic Geographic Knowledge

- All students (100%) successfully identified continents and oceans as the main landmasses and largest water bodies, demonstrating a solid foundation in fundamental geography concepts.

5. Understanding of Earth's Layers

- Only 30% answered correctly when asked about the number of layers of the Earth. This suggests a gap in deeper conceptual understanding beyond surface-level topics.

Interpretation

These findings show a mixed profile: visually impaired students consistently receive basic geography instruction and exhibit sound foundational knowledge, yet only half have adapted materials, and none have access to critical spatial tools. While they can identify continents and oceans confidently, they struggle with more complex concepts like Earth's interior structure.

Educational Implications

The study highlights key challenges and suggests practical improvements:

- **Field Trips**: Integrate field visits into the curriculum with government support to give students real-world experiences.
- **Teaching Aids**: Equip schools with tools—like laptops, projectors, and tactile resources—to make geography lessons more hands-on.
- **Innovative Teaching**: Encourage creative methods tailored to making complex geographic topics easier to grasp.
- **Curriculum Review**: Streamline the syllabus to reduce overload and focus on meaningful, practical content.

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- **Experiential Learning**: Use local environments and experiential case studies—such as climate change effects, migration, and urbanization—to connect lessons to real life.
- **Interdisciplinary Approach**: Blend geography with other social sciences to enrich contextual learning.
- **Map-Based Exercises**: Encourage students to draw, interpret, and analyze maps to boost spatial awareness.
- **Real-World Examples**: Introduce case studies to show geography's link to global issues and its practical relevance.

Discussion and Conclusion

This study explored the misconceptions visually impaired students hold about learning geography and identified key challenges contributing to their difficulties. Although all students acknowledged geography as a subject in their curriculum, only half had access to learning materials designed to meet their specific needs. A lack of tactile tools such as raised maps, 3D models, or GPS resources severely limits their ability to understand spatial and physical geography concepts. This absence directly contributes to misconceptions related to direction, distance, terrain, and map interpretation.

The findings also reveal that misconceptions stem from inadequate instructional strategies. Teachers often rely on verbal explanations without integrating tactile or experiential methods. While some students show a solid grasp of basic concepts such as continents and oceans, their understanding weakens with more complex topics, such as Earth's layers and map scales. This suggests that students memorize facts without developing deeper comprehension.

Moreover, the lack of field trips and practical experiences further isolates visually impaired students from connecting theoretical content to real-world geography. Geography is inherently spatial and environmental in nature, and without direct experiences, students struggle to form accurate mental models of geographic concepts.

Despite these challenges, the study also identifies a foundation for improvement. Students have the potential to build strong geographic understanding when provided with appropriate tools and teaching methods. Teachers need specialized training to employ inclusive and tactile learning strategies effectively. Schools must invest in accessible materials and integrate assistive technologies to make geography more engaging and meaningful.

In conclusion, addressing the misconceptions of visually impaired students requires a shift towards inclusive pedagogy, better resource allocation, and experiential learning opportunities. This research highlights the urgent need to design geography education that promotes equitable learning, enabling visually impaired students to actively participate and develop spatial understanding. By doing so, educators can foster deeper learning, correct existing misconceptions, and empower students to connect geography to their lived experiences and the broader world.

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