

Abstract

Theme/Subject: (School Education/ Teacher Education/Science Education /Language Education /Value Education/ Educational Technology/Inclusive Education/Educational Psychology/Gender Education and Allied Subjects.	School Education and Science Education
Stage of Education:	Middle and Secondary Level
Topic of Research:	Intervention to Achieve quality learning in science in selected schools in ST dominated districts of Nagaland: A Case Study.
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Name of the Institution where the Research was conducted	NCERT
Category: (Research study/Action research/Other)	Research Study
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<p>Introduction: (200 Words)</p> <p>The North-Eastern region of India is distinguished by its hilly terrain, scenic rivers, mountains, rich biodiversity, and unique cultural heritage. This region, comprising Sikkim, Tripura, Nagaland, Mizoram, Manipur, Meghalaya, and Arunachal Pradesh, is renowned for its rich ethnic diversity, vibrant festivals, and diverse linguistic heritage. Geographically, it shares international boundaries with Nepal, China, Myanmar, and Bangladesh, which further contribute to its cultural exchanges and external influences. While the region has preserved its traditional practices and indigenous heritage, contemporary developments have also shaped its socio-cultural and educational landscape. Nagaland, one of the important states of the North-East, reflects these dynamics through its education system. Schools in the state are administered by the state government, the central government, and private organisations, with English serving both as the medium of instruction and the official language. The state records a literacy rate of 80.1 per cent, reflecting significant progress in educational attainment. Following the 10+2+3 structure, students completing higher secondary education may pursue general or professional degree programs. The interplay of tradition and modernity in Nagaland's educational framework highlights both opportunities and challenges, situating the state within the broader discourse on the development of education in the North-Eastern region of India.</p>	
<p>Objectives:</p> <ul style="list-style-type: none"> • Assessment of baseline situation in the selected schools, in terms of students' achievement, resource availability, and teacher competencies in learning of science. • To identify the factors responsible for the low performance of the students in science. • Designing interventions to achieve quality learning in science. 	

- Study the effect of interventions on the learning of science among secondary school students.

Methodology: (200 Words)

The study adopted a descriptive survey design with a mixed-methods approach to examine science learning in secondary schools of Nagaland, particularly in Zunheboto district. Schools were purposively selected based on students' performance in the National Achievement Survey (NAS) and state examination results. The sample consisted of 333 students of class IX, 16 science teachers (trained and untrained), and 11 headmasters from 11 government secondary schools. A range of tools was developed and finalised in workshop mode involving subject experts, teachers, and state officials. These included: (i) an achievement test in science (20 multiple-choice questions) for students, (ii) a 25-item competence test for teachers assessing pedagogical knowledge, content mastery, and integration of technology, (iii) classroom observation schedules, (iv) questionnaires and checklists for assessing resource availability, and (v) focus group discussion guides for students, teachers, and headmasters. Data collection involved classroom observations, interviews, and surveys, supplemented by focus group discussions. Both qualitative and quantitative analyses were employed. Baseline data on student achievement, teacher competence, and resource availability informed the design of targeted interventions, which included workshops, content enrichment activities, and pedagogical training. A post-test was administered after interventions to evaluate their effectiveness and to finalise a framework for improving science education.

Findings: (200 Words)

The study revealed significant gaps in science learning outcomes among secondary school students in Zunheboto district, Nagaland. Out of 333 class IX students tested, 79.6 per cent demonstrated low performance (0–34%), 20.4 per cent showed average performance (35–60%), and none achieved high performance. Teacher competency assessments also highlighted critical deficiencies: while some teachers displayed moderate pedagogical knowledge and conceptual understanding, most showed weak content knowledge, limited use of teaching-learning materials, poor integration of technology, and inadequate assessment practices. Classroom observations further corroborated these findings. Only a small proportion of teachers engaged students in active learning, encouraged hands-on experiences, or facilitated inquiry-based learning. Feedback mechanisms were largely limited to verbal remarks, with minimal written evaluation. Resource management was found to be poor, with science laboratories either non-existent or inadequately equipped. Most schools lacked essential teaching aids, laboratory manuals, functional equipment, and access to multimedia or ICT resources. The analysis of school environments showed that while classrooms often maintained a democratic and learner-friendly atmosphere, infrastructural and resource limitations severely constrained effective science teaching. Overall, the findings underscore a pressing need for systematic interventions targeting teacher training, resource enhancement, and student-centred pedagogical practices to improve science learning outcomes in the region.

Implications: (200 Words)

The findings of the study carry several important implications for strengthening science education in Nagaland. At the pedagogical level, the low achievement of students and weak teacher competencies highlight the urgent need to shift classroom practices from rote

methods to activity-based and inquiry-oriented learning. Teachers require continuous professional development to enhance subject knowledge, improve pedagogy, and integrate assessment practices that go beyond verbal remarks. The provision of structured training and mentoring can enable teachers to use locally available resources more effectively and make science learning engaging and meaningful.

At the policy level, the lack of well-equipped laboratories, teaching aids, and ICT resources suggests that systematic investments in school infrastructure are essential. Policies must ensure equitable distribution of resources, especially in rural and remote areas, to bridge disparities. Moreover, curriculum planning should align with competency-based learning and encourage practical work, project activities, and contextual examples to deepen understanding. Systemically, the study indicates the need for stronger governance, monitoring, and school leadership to sustain improvements. Empowering headmasters, strengthening school management committees, and ensuring accountability can help address gaps in implementation. Taken together, these implications stress the importance of integrated reforms in pedagogy, infrastructure, and governance to enhance the quality of secondary science education in Nagaland.

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Science Pedagogy; Teacher Competence; Student Achievement; Learning Resources; Infrastructure Gaps; Educational Reform