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Research Article

Status of Science Education in The Secondary Schools of Kamrup Metropolitan District, Assam: A Study

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Abstract

The present study examines the status of science education in government and private secondary schools of Kamrup Metropolitan District, with particular focus on laboratory facilities, availability of teaching aids, teacher qualifications, teaching methods, and student interest in science. Data were collected from 10 government and 10 private schools to compare their facilities and practices through an interview schedule. The findings reveal that although both types of schools possess science laboratories, private schools are comparatively better equipped and maintain a higher quality of resources. Similarly, private schools have a greater number of trained teachers and employ more activity-based and project-oriented teaching methods, which enhance students' interest in science. In contrast, government schools face challenges such as a lack of student motivation, limited parental support, inadequate laboratory facilities, and insufficient funding. Despite these challenges, most government school teachers have participated in professional training programs organised by the government. The study emphasises the importance of enhancing infrastructure, providing regular teacher training, and implementing effective learning strategies to enhance science education. It further emphasises the importance of promoting equity in science learning opportunities between government and private schools.

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1. INTRODUCTION

The modern era is an age of scientific and technological advancements. No one can sustain themselves in this era without the influence of scientific literacy and basic science skills. In the year 1964-66, the Education Commission (commonly known as the Kothari Commission), chaired by Prof. D.S. Kothari, made a recommendation that the science subject should be made a compulsory subject up to class X to reform the Indian education system. Science has a dual nature – as both a process and a product. The process refers to the methods and skills involved in gaining scientific knowledge, while the product refers to the outcomes of the scientific process. According to A. D. Ritchie, Science is the process of exploring the external world. Dr. F. R. Schlessinger beautifully stated science as a process of the human intellect. "Science is an interconnected series of concepts and conceptual schemes which can be developed through experimentation and observation and are fruitful of further experimentation and observation" (Sharafudeen,2018).

Science education refers to the structured teaching and learning of scientific knowledge, principles, processes, and skills, enabling learners to understand the natural world, develop critical thinking, and apply their knowledge in daily life (Chunawala & Natarajan, 2012). The importance of science education lies in its ability to promote rational thinking, innovation, and informed citizenship, which are critical for societal development (India Science Report, 2010). Science education typically involves two complementary components: theoretical learning (lectures, textbooks, and discussions) and practical work (experiments, lab activities, and field trips). Research emphasises that effective science instruction should move beyond rote memorisation toward inquiry-based learning, where students engage in hands-on activities, ask questions, test hypotheses and reflect on results. In the Indian context, science-education research highlights that pedagogy must be sensitive to socio-cultural diversity and the varied contexts of learners (Chunawala & Natarajan, 2012). Society's diversity—linguistic, socio-economic, and regional affects how students experience science education, so curricula and pedagogy must adapt rather than assume a one-size-fits-all model.

Prof. B. Sharan of NCERT stated the objectives of science education: to make students aware of the environment and life, train the students in the use of scientific equipment, give emphasis on the use of the scientific method in problem solving, make pupils creative, develop mental faculty and open-mindedness, and prepare students for the changing life. Developing a scientific attitude and a scientific temper is also the aim of science teaching (Siddiqi & Siddiqi, 2009).

Science education is a crucial foundation for developing scientific literacy, cultivating problem-solving skills, and preparing students for careers in STEM (Science, Technology, Engineering, and Mathematics) fields. Despite the emphasis on science learning at the secondary level, many schools in India face persistent obstacles such as inadequate laboratory infrastructure, insufficient teacher training, and prevailing memorisation-based methods rather than hands-on inquiry (Pathak, Shukla, Shukla & Singh, 2025)

In the context of Assam, especially within the Kamrup Metropolitan District, secondary schools comprise a mix of government-run and privately operated institutions, each with differing levels of resources and operational contexts. Understanding the status of science education across these types of schools is essential in identifying where challenges lie. Especially important is the investigation of problems and challenges faced in teaching and learning science, including teacher preparedness, infrastructure, student engagement and socio-economic factors, which are documented concerns across India (Pathak et al., 2025).

Conducting this research in Kamrup Metropolitan District will provide locally relevant evidence on resource availability, instructional practices, and learner outcomes in science education. The findings can help policymakers, school leaders, and teacher educators design targeted interventions, such as upgrading laboratory facilities, offering professional development for science teachers, and promoting inquiry-based pedagogy, thereby contributing to improved equity and quality in science education. Therefore, the investigator urges the present study to investigate the current status of science education and its challenges, particularly in government and private secondary schools of Kamrup Metropolitan, Assam.

2. RESEARCH QUESTIONS

i) What is the present status of science education in government and private secondary schools of Kamrup Metropolitan District, Assam?

ii) How do government and private secondary schools differ in terms of infrastructure, laboratory facilities, and learning resources for science education?

iii) What are the problems and challenges of science education in the Government and Private Secondary Schools of Kamrup Metropolitan District, Assam?

3. OBJECTIVES OF THE STUDY

i) To examine the present status of science education in Government and Private Secondary Schools of Kamrup Metropolitan District, Assam

ii) To identify the problems and challenges faced in the teaching and learning of science in secondary schools of Kamrup Metropolitan District, Assam.

4. REVIEW OF RELATED LITERATURE

Studies conducted both abroad and within India identify the development and challenges of science education. The studies of (2012), Kumar (2021) and M. L. Dash (2024) focused on the adequacy of laboratory facilities, better infrastructure, qualified teachers, extracurricular activities and regular parental encouragement to attract students to learning science subjects. The study by Natarajan & Chunawala (2011) highlighted the importance of fellowship programs, the use of ICT, government schemes, and science events in promoting science education. Jones (2012), Hasni et al. (2017), Natarajan & Chunawala

(2011), and Pagutayao (2024) supported the inclusion of ICT in science classrooms as a means to promote effective science education. A minor gap was found in professional qualifications in some private schools; therefore, post-service teacher training programs should be organised to support and upskill their teaching staff. A positive effect of the home and school environment on the development of science-related skills among students was found in the studies by Phukan (2007), Kharnaior (2013), Sharma (2010), and Bora (2022).

5. METHODOLOGY

The present study employed a descriptive survey method to investigate the current status of science education and the challenges encountered during its development. The study involved both primary and secondary data. The primary data were collected through visiting the schools, and the secondary data were obtained from *UDISE+ (2022-2023)* records. The study population comprised all headmasters/mistresses of secondary schools in the Kamrup Metropolitan district, Assam. The sample consisted of 20 respondents, 10 from government schools and 10 from private secondary schools, using a purposive sampling method. A self-structured interview Schedule for Headmasters/headmistresses on the Status of Science Education in schools (ISHSSES-BS & CM-2022) was used to collect the challenges and development of science education.

6. RESULTS

The investigator analysed the data according to the statements of the interview schedule tabulation and calculated a simple percentage.

Table 1: Availability of the science laboratory

School	Yes		No	
	No.	%	No.	%
Government (N=10)	8	80	2	20
Private (N=10)	9	90	1	10

Source: Field Survey, 2023

Table 1 indicates that both government and private secondary school science laboratories are available, but the availability is slightly higher in private schools. This indicates that private schools are better equipped with laboratory facilities, which provide more effective hands-on science learning activities. A total of 85% schools have laboratory facilities.

Table 2: Well-equipped Laboratory

School	Yes		No	
	No.	%	No.	%
Government (N=10)	4	40	6	60
Private (N=10)	9	90	1	10

Source: Field Survey, 2023

Table 2 shows that only 65% of schools have well-equipped laboratory facilities, while the remaining 35% have laboratories that lack adequate facilities for conducting science activities. Furthermore, a noticeable difference was found between the private and government schools regarding the well–equipped laboratory facilities.

Table 3: Laboratory classes in the class routine

School	Weekly		Monthly	
	No.	%	No.	%
Government (N=10)	4	40	6	60
Private (N=10)	7	70	3	30

Source: Field Survey, 2023

Table 3 shows that 55% secondary schools conduct laboratory classes weekly, while 45% schools conduct them monthly. The results indicate that private schools organise laboratory classes more frequently in their regular class routine compared to government schools.

Table 4: Availability of teaching aids (models, charts, ICT tools)

School	As per the requirement		Less than the requirement	
	No.	%	No.	%
Government (N=10)	7	70	3	30
Private (N=10)	9	90	1	10

Source: Field Survey, 2023

Table 4 shows that overall, 80% schools reported having teaching aids as per the required standards, while only 20% of schools reported having fewer teaching aids than required. After comparing the data. The results revealed that private schools possess a greater number of teaching aids that help teachers clarify scientific concepts more clearly.

Table 5: Availability of science teachers

School	2 to 3		More than 3	
	No.	%	No.	%
Government (N=10)	2	20	8	80
Private (N=10)	2	20	8	80

Source: Field Survey, 2023

Table 5 indicates that most schools have a sufficient number of science teachers in the schools. About 80% of secondary schools have more than three science teachers, which facilitates individualised attention and helps in clearing the scientific concepts effectively.

Table 6: Availability of trained teachers for each subject (Physics/Chemistry/Biology)

School	Yes		No	
	No.	%	No.	%
Government (N=10)	2	20	8	80
Private (N=10)	6	60	4	40

Source: Field Survey, 2023

Table 6 presents the availability of trained science teachers in government and private secondary schools within the Kamrup Metropolitan District. Out of 10 government schools, only 2 schools (20%) have trained teachers in all three science subjects — Physics, Chemistry, and Biology — while the remaining 8 schools (80%) do not have properly trained subject teachers. This indicates a serious shortage of qualified science teachers in government institutions. In contrast, among 10 private schools, 6 schools (60%) have trained teachers for all three science subjects, whereas 4 schools (40%) lack such teachers. This means that private schools are comparatively better staffed with trained science teachers than government schools

Table 7: Regular teacher training programs attended

School	1 to 2 days		More than 2 days	
	No.	%	No.	%
Government (N=10)	2	20	8	80
Private (N=10)	8	80	2	20

Source: Field Survey, 2023

Table 7 indicates that science teachers in government schools have received more training in science subjects. The government organises residential training programs for science teachers, and about 80% of government schools have availed these facilities to enhance their professional skills.

Table 8: Use of activity-based/ project learning

School	Every unit		Randomly	
	No.	%	No.	%
Government (N=10)	2	20	8	80
Private (N=10)	7	70	3	30

Source: Field Survey, 2023

Table 8 shows that among 10 government schools, only 2 schools (20%) reported using activity-based or project learning in every unit, while 8 schools (80%) use such methods only randomly. In comparison, out of 10 private schools, 7 schools (70%) reported using activity-based or project learning in every unit, and only 3 schools (30%) do so randomly.

Table 9: Opting science stream after high school

Response	Government (N=10)		Private (N=10)	
	No.	%	No.	%
Less than 20%	6	60	2	20
20-40%	2	20	2	20
40-60%	1	10	3	30
Above 60%	0	0	3	30

Source: Field Survey, 2023

Table 9 shows that students from private schools expressed a stronger interest in choosing the science stream after high school compared to those from government schools. Approximately 30% of private schools reported that more than 60% of their students demonstrated progression towards the science stream, whereas none of the government schools reported having more than 60% of their students showing interest in pursuing science.

Table 10: Organising science exhibition/ quiz, eco-club to motivate the students

Response	Government (N=10)		Private (N=10)	
	No.	%	No.	%
Rarely	2	20	1	10
Sometimes	4	40	2	20
Frequently	4	40	7	70

Source: Field Survey, 2023

Table 10 highlights that among the government schools, 2 schools (20%) reported organising such activities rarely, 4 schools (40%) do so sometimes, and another 4 schools (40%) organise them frequently. In contrast, among private schools, only 1 school (10%) conducts such programs rarely, 2 schools (20%) organise them sometimes, and a majority of 7 schools (70%) conduct them frequently.

Table 11: Challenges in science education

Response	Government (N=10)	Private (N=10)
Lack of teachers	2	2
Poor lab facilities	6	1
Lack of student interest	10	4
Insufficient funding	5	8
Lack of parental support	10	3
Lack of training	5	8

***Source*:** Field Survey, 2023

Table 11 shows that among the government schools, the most serious problems identified are lack of student interest (10 schools) and lack of parental support (10 schools). This shows that in government institutions, motivating students toward science learning and gaining family involvement remain major concerns. Additionally, poor laboratory facilities (in 6 schools) and insufficient funding (in 5 schools) also pose significant barriers to effective science teaching. Half of the government schools also reported a lack of training opportunities (5 schools) for teachers, which may limit their ability to adopt modern, activity-based methods.

In private schools, however, the pattern is different. The main issues reported are insufficient funding (8 schools) and lack of teacher training (8 schools), followed by lack of student interest (4 schools). Although private schools generally have better infrastructure, many still face financial constraints and limited opportunities for teacher professional development. A few private schools also mentioned a lack of parental support (3 schools) and poor lab facilities (1 school), suggesting that resource quality varies even among private institutions

7. Major Findings of the Study

- Both government and private secondary schools in Kamrup Metropolitan District have science laboratories, but private schools show slightly higher availability (85%).
- Only 65% of schools have well-equipped laboratories. Private schools are generally better equipped, while government schools often face a shortage of adequate facilities.
- Around 80% of schools possess adequate teaching aids. Private schools have a greater number and variety of aids that support effective teaching and a better understanding of scientific concepts.
- Most schools (80%) have more than three science teachers, allowing better attention to students and clearer explanation of scientific ideas.
- A significant gap exists between government and private schools. Only 20% of government schools have trained teachers in all science subjects, compared to 60% in private schools.
- About 80% of government school teachers have received training through government-organised programs, indicating a focus on professional development.
- Private schools adopt activity-based and project-based learning more frequently (70%) than government schools (20%).
- Students from private schools show greater interest in pursuing science after high school than those from government schools.
- Private schools frequently organise science exhibitions, quizzes, and eco-club activities (70%), compared to only 40% of government schools.
- Government schools face challenges such as a lack of student interest, limited parental support, poor lab facilities, and inadequate funding. Private schools, on the other hand, report insufficient funding and limited training opportunities for teachers.

8. CONCLUSION

The study reveals that while both government and private secondary schools in Kamrup Metropolitan District have made progress in promoting science education, private schools are comparatively better equipped with resources, trained teachers, and student engagement activities. Government schools continue to struggle with inadequate facilities, a lack of parental involvement, and insufficient funding. To enhance the quality of science education, it is essential to focus on improving laboratory infrastructure, ensuring regular professional development for teachers, promoting activity-based learning, and motivating students to engage in scientific inquiry. Collaborative efforts from school authorities, parents, and education departments are crucial to bridge the existing gap and achieve equitable, effective science education for all students.

9. SUGGESTIONS

Government schools should improve laboratory infrastructure and provide sufficient funds for maintenance and modern equipment to promote hands-on learning.

Continuous professional development programs should be organised for both government and private school teachers, focusing on modern and activity-based teaching strategies.

Schools should conduct regular science exhibitions, quizzes, and project-based learning to increase student interest in science subjects.

Awareness programs should be conducted to involve parents in their children's science learning process, especially in government schools.

Both government and private institutions require adequate financial assistance to strengthen science education facilities and teaching resources.

Efforts should be made to reduce the gap between government and private schools by ensuring equal access to trained teachers, teaching aids, and quality facilities.

REFERENCES

1. Bora M. Development of science-related skills among secondary school students in Assam. Gauhati University; 2022.
2. Chunawala S, Natarajan C. Science education: Current status and challenges in India. Mumbai: Homi Bhabha Centre for Science Education; 2012.
3. Dash ML. Science education and infrastructure development in secondary schools. New Delhi: Discovery Publishing House; 2024.
4. Hasni A, Lenoir Y, Larose F. Integrating ICT into science classrooms: A comparative study. Int J Sci Educ. 2017;39(5):645–62. https://doi.org/10.1080/09500693.2017.1281635
5. National Council of Applied Economic Research. India Science Report: Science education and literacy in India. New Delhi: NCAER; 2010.
6. Jones B. ICT integration and innovation in science teaching: An overview of global practices. J Sci Educ Res. 2012;18(2):112–29.
7. Kharnaior R. Influence of home and school environment on science learning among tribal students of Meghalaya. North-Eastern Hill University; 2013.
8. Government of India, Ministry of Education. Report of the Education Commission (1964–66): Education and national development (Kothari Commission). New Delhi: Ministry of Education; 1966.
9. Kumar S. A study on the adequacy of laboratory facilities and science learning in Indian secondary schools. J Educ Stud. 2021;29(1):45–58.
10. Natarajan C, Chunawala S. Promoting science education through ICT and fellowship programs in India. Sci Educ Int. 2011;22(4):283–96.
11. Pagutayao MC. Enhancing science learning through ICT integration: A Philippine perspective. Asia Pac J Educ. 2024;44(1):57–74.
12. Pathak S, Shukla A, Shukla P, Singh R. Challenges in science education in Indian schools: An empirical analysis. Indian J Educ Res. 2025;41(2):102–18.
13. Phukan R. Home environment and development of scientific skills among secondary students of Assam. Gauhati University; 2007.
14. Sharafudeen M. Scientific literacy and its impact on society. J Sci Hum Dev. 2018;7(3):21–8.
15. Sharma D. Influence of parental support on students' achievement in science at the secondary level. Indian Educ Rev. 2010;48(2):56–70.
16. Siddiqi MI, Siddiqi F. Teaching of science today and tomorrow. New Delhi: Doaba House; 2009.

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