

ISSN 2454-4949

A Peer Reviewed Biannual Research Journal



EDUICATIONAL **R**ESEARCh **J**OURNAL

Volume VII (No.II), December, 2025

**Department of Research and Evaluation
STATE COUNCIL OF EDUCATIONAL RESEARCH
AND TRAINING (SCERT), ASSAM**

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**EDUCATIONAL RESEARCH
JOURNAL**

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**DEPARTMENT OF
RESEARCH AND EVALUATION,
STATE COUNCIL OF EDUCATIONAL
RESEARCH AND TRAINING (SCERT), ASSAM
Guwahati-19**

Educational Research Journal : A Half Yearly Educational Journal
published by SCERT, Assam
© State Council of Educational Research and Training (SCERT), Assam

Year of Publication : December, 2025

Published by

State Council of Educational Research and Training (SCERT), Assam,
Kahilipara, Guwahati-781019

Email : journal@scertassam.in
website : www.journal.scertassam.in
Phone No. : 0361-2382507

Compiled by : Department of Research and Evaluation, SCERT, Assam

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Message from the Director, SCERT, Assam

In the realm of education, research-based interventions have now attained the status of an essential tool, deemed indispensable for ensuring the quality of education. Conventional and stereotypical educational endeavours have proven to yield meagre outcomes in terms of advancing the educational landscape of a nation. Hence, it becomes imperative that our state embraces innovative, research-driven actions to propel itself forward in alignment with the contemporary advancements within the educational domain.

Since its inception, SCERT, Assam, has consistently underscored the importance of research and activities rooted in research, particularly pertaining to school and teacher education. It is with great pride that the Department of Research and Evaluation at SCERT, Assam, presents the Seventh volume (No.II) of its Educational Research Journal. This compilation showcases research contributions from scholars engaged in diverse educational spheres.

It is my anticipation that this enlightening journal will effectively facilitate the dissemination of research findings amongst educational practitioners. Moreover, I believe it will serve as a valuable resource for teachers, teacher educators, educational planners, and administrators, aiding them in comprehending the current status of school and teacher education. Furthermore, it will empower them to formulate pertinent, outcome-oriented strategies for the advancement of these domains.

I extend my heartfelt gratitude to all the diligent contributors of research papers, the esteemed members of the editorial board, the discerning reviewers, the assiduous editors, and the unwavering support group. Their painstaking efforts have culminated in the publication of this volume.

Dr. Nirada Devi
Director, SCERT, Assam, Ghy-19
Chief Editor

Editorial

The imperative integration of research-derived discoveries for the enhancement of quality control within educational endeavours is now an undeniable necessity for every educational institution. Through research-oriented planning, various indicators of quality education can be rigorously assessed, thereby formulating strategies for the judicious and optimal utilization of available educational resources. While research seminars and conferences have garnered favour among academicians in our state recently, the publication of research papers in the form of a journal remains considerably limited. Consequently, the constrained dissemination of findings from these research inquiries curtails their potential utility.

In an effort to address this shortfall, the Department of Research and Evaluation at SCERT, Assam, is pleased to present the Seventh volume (No. II) of its educational research journal, complete with an ISSN. This endeavour not only aims to disseminate the findings of these studies among educational stakeholders but also to instil motivation among educational practitioners to delve into research endeavours tackling diverse educational challenges within the state. Recognizing the scarcity of such opportunities in Assam, a concerted effort has been made to include a substantial number of research papers, fostering the proliferation of research-driven actions for elevating educational quality.

The editorial board has undertaken minor revisions, ensuring coherence in language and clarity of the content, while retaining the essence of the original submissions. Although individual researchers have undertaken studies, a systematic approach has often been underutilized, potentially due to a lack of orientation or awareness about methodological rigor in research. Consequently, those engaged in educational research should be equipped with proficient research techniques, allowing their comprehensive studies to effectively inform the formulation of education policies. While a significant portion of studies conducted are either action research or applied research, there is an evident need for fundamental and foundational studies across various dimensions of education to uphold quality standards. Thus, appropriate authorities are encouraged to provide comprehensive

exposure to individuals driven by research motivation, offering grant schemes that facilitate meaningful research endeavours.

A notable observation pertains to the fact that implementing departments are often less inclined toward research objectives. Consequently, even if high-quality research is conducted, the outcomes tend to languish within university libraries or other repositories, with limited accessibility for those who could enact these findings in practical educational contexts. It is essential to infuse a conducive research environment within the State, nurturing an appetite for innovative methodologies and techniques that yield superior outcomes. This involves continuous orientation of researchers and updates regarding evolving research paradigms from academic organizations.

In this edition, an earnest endeavour has been made to present a peer-reviewed journal, benefiting from the expertise of distinguished educational specialists, particularly in the realm of research. I extend my heartfelt appreciation to Dr. Mona Sedwal, NIEPA, Delhi; Dr. Hitesh Sharma, Tezpur University; Dr. Yeasmin Sultana, Tezpur University; Dr. Mohammad Asif, Tezpur University; Dr. Ashish Paul, Cotton University; Dr. Prithi Venkatesh, All India Institute of Speech and Hearing; for their commendable contributions, instrumental in refining the papers for publication.

Furthermore, I seize this moment to express my gratitude to the dedicated researchers who have contributed their papers to this journal, the members of the editorial board for their rigorous efforts, and the supportive group for their unwavering commitment in realizing this comprehensive volume of the educational research journal.

Dr. Jayanta Kr. Sarmah,
Editor

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Infrastructural Accessibility To The CWSNS in Govt. Elementary Schools

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Abstract

Inclusive education is a human right and a key to getting quality education that is equitable to everyone. Within the framework of the Right to Education Act (2009) in India, it is now a national agenda to see to it that Children With Special Needs (CWSNs) are completely included in the mainstream education system. Nonetheless, progressive policies notwithstanding, infrastructural accessibility are one of the greatest impediments to the effective integration of CWSNs in government elementary educational institutions. This quantitative study assesses the infrastructural accessibility available to Children With Special Needs (CWSNs) in government elementary schools under the Juria Elementary Educational Block of Nagaon District, Assam. The total population comprised 346 CWSNs belonging to four disability categories—Low Vision, Hearing Impairment, Locomotor Impairment, and Speech-Language Impairment. Using a stratified random sampling technique, a final sample of 192 students was selected. Data were collected through a structured questionnaire and analysed using descriptive statistics, Chi-square tests, and One-way ANOVA to examine differences in accessibility and inclusiveness across disability types.

Findings reveal critical infrastructural shortcomings: while 65.6% found ramps and railings useful, 34.4% reported that the available facilities were not accessible in their functional design; 100% schools lacked special educators and resource centres; 72.4% of students did not receive any aids and appliances under Inclusive Education; and none of the students had awareness of the RPWD Act (2016). Significant differences ($p < .001$) were detected across disability groups in teacher support, inclusive practices, and infrastructural accessibility, indicating that children with locomotor and speech-language impairments faced greater barriers than those with low vision. The results highlight persistent gaps between inclusive education policy provisions and actual infrastructural implementation at the school level. Strengthening audits, ensuring disability-responsive infrastructure, and improving support services emerge as essential steps toward achieving meaningful inclusion.

Keywords: *Infrastructural, CWSNS, Government, Elementary Schools, Schools, India*

Introduction

In India, elementary education has a central role in the development history of the nation in general and following the passing of the Right of Children to Free and Compulsory Education Act, 2009 (colloquially, the Right to Education or RTE Act) (Lafleur, 2024). The Act has become a historical turnaround in the education world as education will be a fundamental right between the age of 6 and 14 years. The act focused on access to education and also emphasized on equity, inclusion and quality (Sharma, 2018). Focus on inclusive education was one of the most prominent features of the Act; children with special needs (CWSNs) should no longer be marginalized and offered unequal opportunities to learn in the mainstream educational system (Dash, 2018). Though policy and legislative framework has been doing a lot in ensuring inclusivity, there are numerous challenges when considering the ground implementation especially in regard to the infrastructural accessibility (Charate, 2020). In India, elementary government schools are the first point of access to formal education by most children particularly those of lesser means and rural origin. In case of CWSNs, the availability and flexibility of infrastructure have direct effects on their opportunity to engage in the process of learning (Kharlukhi, 2016). Many schools do not have ramps, handrails, barrier toilets, tactile paths, wide doors or classroom layouts that would facilitate the movement of wheelchair users. However, the provision of inclusive infrastructure through guidelines launched under Sarva Shiksha Abhiyan (SSA) and Samagra Shiksha Abhiyan is not being followed in the field significantly.

The primary objective of the present research is to examine the facilities and infrastructure available to children with special needs (CWSN) at the elementary school level.

- To examine the Inclusiveness of schools at the elementary level.
- To explore various infrastructural problems faced to the CWSN in elementary school.
- To examine the role of government in order to provide facilities & infrastructural accessible to the CWSN in elementary school.

Literature Review/Background analysis

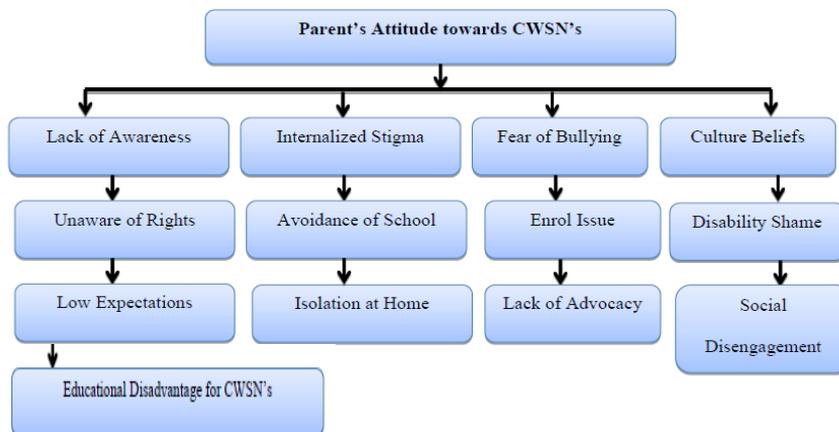
2.1 Parents attitude towards Inclusive Education for CWSN in Assam

Charate, (2020) examined that parents attitude towards Children with Special Needs (CWSNs) is important when influencing educational outcomes and also their social development. Parental views affect the amount of support that a child gets at home as well as his/her enrollment, attendance, and placement in formal school. Singha, et al., (2018) pointed out that regarding government elementary schools, particularly those in the rural or economically deprived regions, the attitudes of parents to disability

have a great influence on inclusion and empowerment of CWSNs. Kharlukhi, (2017) stated that the results of the present research expose a rather complicated combination of awareness, concern, stigma, and helplessness that defines the attitude of a great number of parents with CWSNs. Duarah, (2024) stated that a major percentage of the parents interviewed in the fieldwork showed an interest and an anxiousness in the well-being of their children, however also showed that they were not aware of their rights, and entitlements to education and the potential of inclusive education. Parents, especially those with low socio-economic status, viewed the disabilities of their children as a lasting impairment and that is why they had low expectations concerning their academic and social progress. There were parents who were afraid to send their children to normal schools in case they would be mocked at, or ignored, or the school system cannot address the specific needs of a particular child. The other common theme was an internalised stigma and a social pressure experienced by CWSNs families in their communities (Ahmed, 2024).

Figure-1

Concept Map: Barriers to Inclusive Education Arising from Parental Attitudes



The above Figure 1 conceptual map showing barrier to inclusive education that are caused by parental attitude. These include lack of awareness, stigma and social cultural misconception which contribute to educational exclusion of CWSNs. Disability is even still in some instances regarded as a view of shame, unfortunate accident or even supernatural belief. Naskar, (2019) analyzed that as a consequence of this stigma children with disabilities are frequently hidden away and kept out of the life of the community further alienating them in terms of education and interaction. Internalizing of this stigma by parents can deny their children an opportunity to live inclusive and fulfilling lives obviously. Bardhan, (2024) examined that moreover, mothers of CWSNs tend to carry an excessive burden where they are either accused or blamed about the child condition and this emotional strain further reduces their ability to speak up on behalf of the child regarding his/her educational rights. Borah, (2021) pointed out that parental disengagement is also caused by lack of adequate guidance and support systems. Majority of parents complained that they were not well informed about the availability of special educators and other

inclusive teaching resources and government programs meant to benefit CWSNs. Saikia, (2022) stated that such communication failure builds a vacuum between the schools and the families and parents feel deserted or alienated in the learning process. Sharma, (2018) pointed out that where it is implemented in schools; however, there is low use of these support structures brought about by ineffective outreach and follow-up. Lack of transport, financial inability, and unavailability of nearby inclusive schools are other factors which discourage parents to take their CWSNs to school. Parents were afraid that even after sending their children to school, their needs would not be met due to lack of available infrastructure and trained personnel.

Infrastructural development in Elementary schools

Majhi, (2019) examined that the important element in providing equitable, inclusive, and quality education to all children including Children with Special Needs (CWSNs) is the infrastructural development within the elementary schools. In the Indian situation, elementary schools, especially government schools, cater to a large and diverse community, usually in low resource settings. The creation of physical infrastructure does not only define how functional and safe a school will be but also demonstrates its willingness to host all learners regardless of their socio-economic background or physical ability. Kapur, (2019) analyzed that several national schemes like the Sarva Shiksha Abhiyan (SSA) and Samagra Shiksha Abhiyan have laid stress on school infrastructure development, but on-ground implementation still remains a challenge in several ways. The physical condition of school building has been recognized as one of the most fundamental but little looked at attributes of school infrastructure. Barrett, et al., (2019) pointed out that some of the building structures are semi-permanent or need repairs in some government elementary schools.

Table-1

Key Infrastructural Challenges in Government Elementary Schools

Infrastructural Element	Identified Issues
School Buildings	Broken walls, leaking roofs, poor maintenance
Classroom Environment	Poor lighting, inadequate ventilation
Boundary Walls	Insecure campuses, open to trespassers and stray animals
Water & Sanitation Facilities	Limited access to clean drinking water; unsafe or shared sources
Inclusive Physical Access	Absence of ramps, wide doorways, and handrails
Classroom Design	Overcrowding, lack of flexible furniture and sensory materials
Safety & Security	Unsafe environments, especially for girls and children with disabilities
Policy Implementation	Gaps between government schemes and actual field-level compliance

Broken walls, leaking roofs, broken windows, and battered floors not only make learning undesirable but also cause safety risks, particularly to younger children and physically challenged children. Jannah, et al., (2020) stated that lack of proper ventilation and lighting also decreases functionality of the classrooms making learning hard. Another issue of concern is the lack or bad state of the boundary walls. Shirrell, (2019) stated that boundary walls are critical in the safety and security of students especially the girls and young children. The lack of adequate enclosures makes schools open to trespassers, stray animals, and external interference. Cuesta, (2016) examined that an open or insecure campus is even more dangerous to CWSNs, particularly with cognitive or behavioral issues. Siswanto, (2020) examined that safe physical space is therefore essential towards facilitating frequent attendance and parental confidence in the system of schooling.

Peurach, (2015) stated that the provision of clean and safe drinking water is also a long-standing problem in most government schools, more so in those located in the rural areas or drought prone regions. The water sources that should be available and serve as functional water sources have been found to be non-existent or shared by the adjacent households in various schools that have been visited in the course of the field study and are therefore unreliable. Mokaya, (2013) examined that this issue impacts disproportionately girl students and CWSNs that can need access to water more often. Poor or inadequate drinking water provisions and facilities do not only affect health, but also lead to absenteeism and lack of participation in classroom activities. Hopkins, (2013) stated that the other source of extreme urgency is the classroom infrastructure. Schools have overcrowded and inadequately equipped classrooms that lack inclusive learning designs. There are no ramps, spacious doorframes, moveable furniture, or sensory-based materials that can enable the CWSNs to actively engage in classroom lessons.

2.3 Government role to provide facilities and infrastructural accessible to the CWSN in elementary school

Sharma, (2018) pointed out that one of the most ambitious and wide-reaching educational program initiated in India, the Sarva Shiksha Abhiyan (SSA) was introduced in 2001 with a goal to expand elementary education to all children. Priyanka, (2018) stated that this term Sarva Shiksha Abhiyan is an Indian term which simply means Education for All Movement, and it was a pure reaction against the constitutional call up given in the 86 th Amendment issuing free education compulsory to all children between age 6 and 14 years. Charate, (2020) examined that SSA is the effort of the Government of India to ensure that it can realize universal elementary education (UEE) in time bound manner that is in line with the global goals like the Education for All (EFA) and the Millennium Development Goals (MDGs). Bansal, (2016) stated that the most important working agenda of SSA is under the concept of quality elementary education to all children

irrespective of their socio-economic background, gender, and physical and mental ability. Sharma, (2018) examined that the program does not only attempt to expand the number of children enrolled in schools and retained in schools, but also to improve the quality of education and reduce gender and social category gaps. Nahdiyah, (2022) examined that among the most fundamental characteristics of the Sarva Shiksha Abhiyan, some take center stage in its design and delivery system. Singh, (2019) pointed out that it is a centrally sponsored scheme, which implies that it is funded by both the central and the state governments. Kumar, (2024) examined that SSA is planned and implemented in a decentralized way and gives local authorities like Panchayati Raj Institutions (PRIs), School Management Committees (SMCs), and Village Education Committees (VECs) a chance to participate actively. Such local participation aids in customizing educational programs to suit the local needs and also leads to more accountability and monitoring.

Table-2**Government Initiatives for Inclusive Infrastructure under SSA**

Focus Area	Key Highlights
Legislative Foundation	SSA launched in response to 86th Amendment mandating free education for ages 6–14
Universal Access Goals	Aims to achieve Universal Elementary Education (UEE) for all children, including CWSNs
Infrastructure Development	Emphasis on building classrooms, ramps, boundary walls, accessible toilets, drinking water
Decentralized Implementation	Local bodies like PRIs, SMCs, VECs involved in customizing and monitoring delivery
Inclusion-Focused Support	Ramps, resource rooms, and aids for CWSNs included in infrastructure norms
Mid-Day Meal Scheme	Supplements access and attendance by providing meals, uniforms, textbooks
Teacher Recruitment & Training	Focus on appointing teachers and providing TLMs and inclusive education training
Support Systems	Academic support through Block & Cluster Resource Centres (BRCs & CRCs)

Isnawati, (2025) stated that under Mid-Day Meal Scheme the free supply of textbooks, uniforms and midday meals supplements the SSA agenda to minimize the dropouts and also motivates students to attend school. Dash, (2018) pointed out that another important part is teacher recruitment and training. SSA has enabled massive appointments of teachers to support the concerns of pupil-teacher ratio (PTR) in the government schools. It focuses on continuous professional development of teachers by providing teacher training, development of Teaching Learning Materials (TLM)

and provides academic support through Block and Cluster Resource Centers. The first strategic pillar is access that entails the opening up of new schools in unfilled habitations and enhancement of infrastructure in existing schools.

Research Methodology

The proposed study uses a quantitative research design by focusing on the availability of infrastructural facilities in government primary schools, to Children with Special Needs (CWSNs). The quantitative method was selected to enable the implementation of systematic measurement, statistical analysis, and objective evaluation of the connection between infrastructural provisions and the experiences of CWSNs in the school setting. The central idea of the research is to accumulate empirical data about the role of infrastructural components that support or obstruct students with disabilities access to and engagement in education. A stratified random sampling technique was used. The total population of 346 CWSNs was divided into four strata (Low Vision, Hearing Impairment, Locomotor Impairment, Speech Impairment). From each stratum, 192 participants were randomly selected as the sample. This study sample has 192 students with various kinds of disabilities physical, visual, hearing, intellectual, multiple disabilities, etc. These students were selected among the different government elementary schools so as to have diversity and representativeness. The data collection procedure entailed the use of structured questionnaires which were used to collect data on perceptions and experience of students regarding school infrastructure. The questionnaire covered accessibility of school buildings, classrooms, toilets, playgrounds and transport facility, access to assistive devices and support services. The teachers and parents were also brought in, to give a background to the views of the students, more so where there was a communication gap. The reliability of the questionnaire was established using Cronbach's Alpha ($\alpha = 0.820$), indicating strong internal consistency. Face and content validity were ensured through expert review by three inclusive education specialists.

Results and Findings

The internal consistency of the scale was assessed using Cronbach's alpha. The results indicated good reliability, with a Cronbach's alpha of .820 across the 50 items, suggesting that the items consistently measure the same underlying construct.

1. Objective: To Examine the Inclusiveness of Schools at the Elementary Level Data Collection Approach:

Utilize questions related to teacher support, peer interaction, classroom engagement, and participation in co-curricular activities (e.g., Q3, Q7, Q9, Q29, Q35, Q37, Q38).

Table-3
Teacher support (Q3, Q4, Q9)

Questions	Response	n	%
Does your teacher help you to attend morning assembly?	YES	192	100.0%
Does your teacher help you in seating arrangement in the class?	YES	192	100.0%
Is Teacher use sign language, gesture along with verbal command during classroom transaction?	NO	90	46.9%
	YES	102	53.1%

The support of teachers is an important factor in establishing inclusiveness. One hundred percent (100%) of all the 192 students claimed to have been helped by their teachers to go to the morning assembly and their sitting arrangement in classroom. Moreover, 53.1% (n=102) of students indicated that their instructors do communicate through the use of sign language, gestures, and verbal commands, whereas 46.9% (n=90) of students replied that these inclusive communication methods were not applied regularly. Interaction with other children in group tasks is one of the factors that will encourage a welcoming environment in school.

Table-4
Peer interaction in group activities (Q7).

Questions	Response	n	%
Are you engaged with your friends in group activities?	YES	192	100.0%

The survey revealed that 100 percent (n=192) of students are active in group activities with their friends and this shows high level of socialization and inclusivity of students in the group activities with their friends. Inclusion is also a vital indicator of participation in school events. The findings show that the 100% (192) of school students participate in Annual School Week and World Braille Day (January 4th).

Table-5
Participation in school events (Q35, Q37, Q38).

Questions	Response	n	%
Do you participate in Annual school week?	YES	192	100.0%
Did you attend last Gunatsav ?	YES	192	100.0%
Do you participate in World Braille Day on 4th January?	YES	192	100.0%

The participation in the final Gunotsav was 100% (n=192) stressing the good involvement in institution-level initiatives. Inclusive teaching programmes improve the experience of learning every student. The result of the survey indicates that 100% (n=192) of the students will benefit when teachers use short sentences to enhance understanding. In addition, all of the students stated that they had been receiving certain educational services that were aimed at attributing to taking part in usual education programs. Nevertheless, 53.1 percent (n=102) of students found that their instructors use sign language, gestures, and verbal orders during classroom attention, but 46.9 percent (n=90) of them did not get any such assistance. These results demonstrate positive teacher support, interpersonal connection and engagement in school activities.

Table-6
Use of inclusive teaching methods (Q9, Q19, Q29).

Questions	Response	n	%
Do the teachers use short sentences in the classroom?	YES	192	100.0%
Do you engage in any specific educational services in order to make you participate in regular education programme?	YES	192	100.0%
Is Teacher use sign language, gesture along with verbal command during classroom transaction?	NO	90	46.90%
	YES	102	53.10%

The potential exists to further enhance inclusion in teaching practices, specifically by ensuring the regularity in the instruction format, sign language and multimodal approaches to learners. The Pearson correlation between the type of disability and main inclusive indicators demonstrates significant tendencies.

Table-7
Correlations between Disability Type and Various Inclusiveness Indicators

Dependent Variable	df	F	p	η^2	95% CI η^2	ϵ^2
Teachers Support	3	22.158	<.001	.261	[.152, .350]	.249
Participation	3	1.059	.368	.017	[.000, .055]	.001
Inclusive	3	22.158	<.001	.261	[.152, .350]	.249
Infrastructure	3	60.901	<.001	.493	[.388, .566]	.485
Tools	3	1.059	.368	.017	[.000, .055]	.001
Special	3	.828	.480	.013	[.000, .047]	-.003

A one-way ANOVA was conducted to examine differences across four categories of children with special needs (CWSN)—Low Vision, Hearing Impairment, Locomotor Impairment, and Speech-Language Impairment—on six dependent variables: Teachers’ Support, Participation, Inclusive Practices, Infrastructure, Tools, and Special Provisions. The analysis revealed significant group differences for Teachers’ Support ($F(3,188) = 22.16, p < .001, \eta^2 = .261$), Inclusive Practices ($F(3,188) = 22.16, p < .001, \eta^2 = .261$), and Infrastructure ($F(3,188) = 60.90, p < .001, \eta^2 = .493$), indicating medium to large effect sizes. No significant differences were observed for Participation ($F(3,188) = 1.06, p = .368, \eta^2 = .017$), Tools ($F(3,188) = 1.06, p = .368, \eta^2 = .017$), or Special Provisions ($F(3,188) = .83, p = .480, \eta^2 = .013$), suggesting negligible differences among groups for these variables. Post-hoc comparisons using the Bonferroni method showed that for Teachers’ Support and Inclusive Practices, children with Locomotor Impairment scored significantly higher than those with Low Vision and Hearing Impairment, while children with Speech-Language Impairment scored significantly lower than all other groups. For Infrastructure, Low Vision scored lower than Locomotor Impairment but higher than Hearing Impairment and Speech-Language Impairment in certain pairwise comparisons; Locomotor Impairment scored significantly higher than Hearing Impairment and Speech-Language Impairment, whereas Speech-Language Impairment scored significantly lower than both Low Vision and Locomotor Impairment. No significant post-hoc differences were found for Participation, Tools, or Special Provisions. Overall, these findings suggest that differences in Teachers’ Support, Inclusive Practices, and Infrastructure are most pronounced among children with Locomotor and Speech-Language Impairments, while Participation, access to tools, and special provisions were relatively uniform across CWSN categories.

2. Objective: To Explore Various Infrastructural Problems Faced by CWSN in Elementary Schools

Data Collection Approach:

Focus on questions about physical accessibility and infrastructure (e.g., Q5, Q6, Q13, Q15, Q20, Q22)

Table-8
Physical infrastructure (ramps, railings, steps—Q5, Q13)

Questions	Response	n	%
Ramp & Railing is useful for you or not?	Yes	126	65.6%
	No	66	34.4%
Are the steps equal, even height and non slippery?	YES	192	100.0%

Physical infrastructure availability and accessibility is very crucial when it comes to the creation of an inclusive learning environment. 65.6% students (n=126) consider ramps and railings helpful, whereas 34.4% (n=66) found them not helpful, which indicates that their design or installation could be improved to make them more accessible. Positively, 100% (n=192) of students indicated that the peddles in their school are of equal height, flat, and slip-free thus, portraying a good walking environment with no slip- hazards to the students. Although basic infrastructure seems to be established, the efficiency and the accessibility of ramps and railings may still be enhanced to better serve students who use it to move. The absolute majority of 192 (100 percent) students answered that yes, tactile Teaching-Learning Materials (TLMs) have been used in their classrooms, which demonstrated a high attempt of implementing sensory-based learning strategies. Equally, 100% (n=192) indicated that the blackboard is spotted and visible when seated hence good participation in the classroom. Nevertheless, 100% (n=192) of students reported that no different signage is used within the school, which may deteriorate the accessibility, especially of students with visual shortcomings or who have to use the visual information to navigate.

Table-9

Educational tools (blackboard visibility, tactile materials, signage—Q6, Q18, Q12).

Questions	Response	N	%
Do you know Indian Sign Language?	NO	192	100.0%
Is there use of tactile TLMs in the Class?	YES	192	100.0%
Is there use of different signage in the school?	NO	192	100.0%

The students do not all know Indian Sign Language (ISL), another aspect of exclusion in communication practices. Special educators and resource centers are also needed in order to offer special care to students with varying learning needs. The survey shows that not one of the students (100%, n=192) can have a resource center or a special educator on the territory of their school. The lack of a separate model of support services shows that there is a major deficit in delivering inclusive education, which can potentially restrict the individual support that specific students might need in their academic and personal growth. In order to create an environment that is really inclusive, it is of essence that resource centers are introduced and special educators, capable of giving special instruction and support to students of varying abilities are employed.

Table -10.

Availability of special educators and resource centers (Q22, Q23).

Questions	Response	n	%
Is there any resource centre in your school?	NO	192	100.0%
Is there any Special Educator in your School?	NO	192	100.0%

The presence of special educators and resource centers is essential for providing tailored support to students with diverse learning needs.

3. Objective: To Examine the Role of Government in Providing Facilities and Infrastructure.

Data Collection Approach:

Include questions about government-provided facilities and support services (e.g., Q25, Q39, Q41, Q46).

Variables:

Table-11
Government interventions (e.g., stipends, aids, and appliances—Q39, Q41).

Questions	Response	n	%
Did you get any Aids and Appliances under Inclusive Education?	NO	139	72.4%
	YES	53	27.6%
Did you get Transport/Escort/Girls Stipend under Inclusive Education?	NO	90	46.9%
	YES	102	53.1%

Stipends, aids, and appliances provided by the government are important in ensuring inclusive education occurs because a student with disabilities is provided with adequate resources to help him or her excel in academic work. The survey shows that not all students have access to the necessary assistive measures with only 27.6 percent (n=53) receiving aids and appliances as part of Inclusive Education, with the rest, 72.4% (n=139) receiving none. Regarding financial and transport support, a greater part of students 53.1% (n=102) received transport, escort, or girls stipends as part of Inclusive Education programs, and 46.9% (n=90) of them did not. It indicates that, although more than half of the students are covered through such interventions, a significant segment of the population is outside the coverage area. The findings reveal that even though there are government interventions, there is no equity in getting the aids, appliances, and financial aid. To increase the effectiveness of such initiatives, it is necessary to strengthen the distribution channels and outreach services to guarantee that every deserving student would have the required assistance.

Table-12
Visits by resource persons (Q25, Q31)

Questions	Response	n	%
Does Resource Person Regularly visit your School?	NO	192	100.0%
Does your resource Person discuss about your academic progress with school teachers?	YES	192	100.0%

The role of resource persons is crucial in facilitating inclusive education where they offer specialized guidance and help to both students and teachers. A resource person is not visiting the school on a regular basis (n=0, 100%), according to the students. This is a missing indication of direct sustained intervention by professionals that would provide specific interventions to students with special educational needs. All students, 100% (n=192) said that they have resource person who discusses his/her academic progress with teachers in the school. This means that resource persons are not necessarily in the schools, but to some extent, academic monitoring and communication is being implemented.

Table -13
Awareness of policies like RPWD Act 2016 (Q45).

Questions		n	%
Do you know about RPWD act 2016 and scope of it?	NO	192	100.0%

The Rights of Persons with Disabilities (RPWD) Act, 2016, is an important policy that is instrumental in fostering inclusivity and guaranteeing the provision of equal opportunities to the people with disabilities. But the current survey results indicate that all the students (100%, n=192) are not conscious of the RPWD Act 2016 or the scope. This ignorance implies that there is a major disparity in the knowledge of the rights of the students, how to seek support systems, and what kind of legal defense they have under the Act.

Table-14
Summary of all questions

SI No	Questions		n	%
1	Do you come to school regularly?	YES	192	100.0%
2	Do you feel any difficulty in coming to school?	NO	192	100.0%
3	Does your teacher help you to attend morning assembly?	YES	192	100.0%
4	Does your teacher help you in seating arrangement in the class?	YES	192	100.0%
5	Ramp & Railing is useful for you or not?	NO	66	34.4%
		YES	126	65.6%
6	Is blackboard reachable to you in the class?	YES	192	100.0%
7	Are you engaged with your friends in group activities?	YES	192	100.0%
8	Is the Blackboard well visible or enough lightened to you from your seating position?	YES	192	100.0%

9	Is Teacher use sign language, gesture along with verbal command during classroom transaction?	NO	90	46.9%
		YES	102	53.1%
10	Is there use of large print book in the classroom?	NO	192	100.0%
11	Do you provide training for reading & writing on Braille?	NO	192	100.0%
12	Is there use of different signage in the school?	NO	192	100.0%
13	Are the steps equal, even height and non slippery?	YES	192	100.0%
14	Do you get any difficulty in taking PM-Poshan meal in the school?	NO	192	100.0%
15	Is the hand washing tape is reachable to your height?	YES	192	100.0%
16	Do you know Indian Sign Language?	NO	192	100.0%
17	Are the class teachers using Indian Sign Language?	NO	192	100.0%
18	Is there use of tactile TLMs in the Class?	YES	192	100.0%
19	Do the teachers use short sentences in the classroom?	YES	192	100.0%
20	Are there low vision kits, magnifying glass available in the school?	NO	192	100.0%
21	Do you require assistance during toileting?	NO	192	100.0%
22	Is there any resource centre in your school?	NO	192	100.0%
23	Is there any Special Educator in your School?	NO	192	100.0%
24	Do you know about Resource Person under Inclusive Education?	YES	192	100.0%
25	Does Resource Person Regularly visit your School?	NO	192	100.0%
26	Do you ever test your current academic level?	YES	192	100.0%
27	Does Resource Person teach you in school?	YES	192	100.0%
28	Is there any annual goal set including any short term objective for your academics?	NO	192	100.0%
29	Do you engage in any specific educational services in order to make you participate in regular education programme?	YES	192	100.0%
30	Do you determine whether instructional objectives are being achieved or not?	NO	90	46.9%
		YES	102	53.1%
31	Does your resource Person discuss about your academic progress with school teachers?	YES	192	100.0%

32	Does your Resource Person/ Teacher discuss with your parents about your academic progress?	YES	192	100.0%
33	Do your Parents attend monthly Parents Teacher Meet?	YES	192	100.0%
34	Is your parent included in School Management Committee?	NO	153	79.7%
		YES	39	20.3%
35	Do you participate in Annual school week?	YES	192	100.0%
36	Did you attend last Gunatsav ?	NO	80	41.7%
		YES	112	58.3%
37	Do you participate in International Day for Person with Disabilities on 3rd December?	YES	192	100.0%
38	Do you participate in World Braille Day on 4th January?	YES	192	100.0%
39	Did you get any Aids and Appliances under Inclusive Education?	NO	139	72.4%
		YES	53	27.6%
40	Does your teacher know about use of Aids and Appliances?	NO	95	49.5%
		YES	97	50.5%
41	Did you get Transport/Escort/Girls Stipend under Inclusive Education?	NO	90	46.9%
		YES	102	53.1%
42	Have you ever bullied by any other children in school?	NO	192	100.0%
43	If bullied, did teacher punish him/her?	NO	192	100.0%
44	Did you ever go for field trip with your class friend?	YES	192	100.0%
45	Do you know about RPWD act 2016 and scope of it?	NO	192	100.0%
46	Do you provide extra time during evaluation?	NO	108	56.3%
		YES	84	43.8%
47	Do you provide large print question papers in the evaluation?	NO	192	100.0%
48	Do you provide objective type questions rather than essay type questions in the evaluation?	NO	108	56.3%
		YES	84	43.8%
49	Do you use Braille during evaluation?	NO	192	100.0%
50	Have you got UDID card?	NO	84	43.8%
		YES	108	56.3%

Discussion

Inclusiveness of Elementary Schools

Additional subgroup analysis (according to the type of disability) was performed through Pearson correlation, as well as it showed that teacher support and inclusive teaching methods had moderate positive correlations with some types of disability. The split-analysis by age and PTR was not provided, however, because at this level it is impossible to get the information about the PTR of the individual schools. Such omissions restrict a more detailed perception of the patterns of inclusiveness. The recommended practice in order to make the classroom inclusive is adapting the regular application of Indian Sign Language (ISL) in the classroom to students with hearing impairment. The inclusion of disability-related training plans to teachers can significantly enhance the level of pedagogical responsiveness.

Infrastructural Problems Faced by CWSNs

The responses collected during the survey indicate that visits by the Resource Person are irregular, and students reported no regular contact. However, field observations and anecdotal evidence suggest that visits may occur once or twice a week. This inconsistency highlights the need for improved communication and systematic record-keeping regarding the frequency and impact of such visits, and has been considered in the analysis of the findings.

To enhance inclusiveness, schools should improve the visibility and accessibility of signage, particularly for students with visual impairments (VI). In addition, design audits of ramps and railings are recommended to address usability issues reported by students with locomotor impairments (LI).

Role of Government in Providing Facilities and Infrastructure

The survey ascertained that none of the respondents had heard of the existence of the RPWD Act, 2016 or provisions of the same even though this is a cornerstone policy in the inclusive education. This total ignorance shows a huge gap in implementation and also indicates the gap between policy frameworks and on-ground performance. Disability rights should be given a compulsory orientation (i.e. RPWD Act, 2016) to the students, teachers, and the parents at the school level. Moreover, government programs, i.e. provision of aids and appliances, should have more robust outreach mechanisms so that there is equitable access and higher awareness amongst those who can avail them.

Conclusion and Recommendations

Findings of this research give a complete understanding of the existing situation to the accessibility of infrastructures to Children with Special Needs (CWSNs) in government elementary schools. The evidence shows that although the Right to Education Act and inclusion education policy have enabled equal learning, infrastructural inadequacy has been a key impediment to most students with disabilities (Bikram, 2022). With the sample size of 192 CWSNs, a significant number of them indicated that they encountered challenges accessing the required facilities, including playgrounds, toilets, and classrooms. The analysis of data with the help of Pearson correlation method revealed significant correlations between the kind of disability and the kind of accessibility issues (Ringu, 2024). Students that have physical impairment were always more affected in

their difficulty to navigate around school premises in areas where there were no ramps, handrails, or wheelchair-friendly toilets or in areas where these facilities were poorly designed (Kharlukhi, 2016). A critical look at the findings indicates that lack of a problem is not only a matter of lack of a policy, but rather a matter of implementation and monitoring of the same. Although infrastructural guidelines can be found in the programs of inclusive education, such as the Samagra Shiksha Abhiyan, compliance with these guidelines is not always followed (Singh, 2021). The field data also emphasized differences among schools, some being partially compliant with provisions, but some not even having basic facilities to support CWSNs. This gap indicates systemic problems like insufficient funds, less sensitization of the school personnel, and non-involvement of stakeholders in the planning of inclusive infrastructures.

Additionally, the results indicate that infrastructural inadequacies are usually aggravated by the lack of assistive learning tools and support systems (Kumar, 2024). Some students who are both visually and hearing impaired indicated that they lacked Braille books, audio devices, or sign language assistance. Their absence in these facilities does not only influence the physical access but also academic involvement and psychosocial inclusion (Kumar, 2024). One area that the study found conspicuous was the lack of inclusive design thinking in infrastructure planning and design facilities erected in most cases did not fit the broad range of disabilities that were found in the classroom. Based on these results, the research has a number of recommendations (Rajendran, 2018). To start with, an elaborate audit of the infrastructure of all government elementary schools must be compulsorily conducted with specific attention being paid to accessibility with different forms of disability (Mahapatra, 2016). Second, repeated training and sensitization sessions should be subjected to school administrators and staff in the move to embrace a practice of inclusion and what it takes to understand the diverse needs of CWSNs. Third, inclusive infrastructure should also be ring fenced in the school development budgets so that construction and maintenance of the facilities are prioritized. School structures can be more contextual and responsive when parents, special educators, and community members are more involved in school infrastructure planning.

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Teachers' Perception on Use of Vedic Mathematics in Schools: A Survey in the Bargarh District

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Abstract

The study examined teachers' perceptions of the use of Vedic Mathematics in school education. A descriptive survey was conducted among 78 teachers from Bargarh Block of Odisha, using a self-developed scale with a reliability coefficient of 0.816. Data were analyzed using descriptive statistics, percentages, and independent t-tests. The findings revealed a predominantly positive perception of Vedic Mathematics among teachers, with no significant differences based on teaching level, subject background, school type, gender, or location. A large proportion of teachers advocated for introducing Vedic Mathematics at the elementary level to enhance foundational numeracy, student engagement, and confidence. Notably, even teachers without formal training expressed interest in adopting and recommending Vedic Mathematics, indicating strong perceived pedagogical value. The results highlight teacher readiness for curricular inclusion and suggest the need for professional development and policy support to ensure meaningful classroom implementation.

Keywords-*Vedic Mathematics, Indian Knowledge System, Mathematics Education, Teachers' Perception*

Introduction

Mathematics holds a central place in school education across the world due to its universal applicability and cognitive significance. It is widely regarded as a foundational subject essential for developing numeracy, logical reasoning, analytical thinking, and problem-solving competency among learners (Obradovic & Mishra, 2020). In India, mathematics has been integral to formal schooling for decades, forming a critical component of the curriculum at both primary and secondary levels. However, despite its importance, many students struggle to engage meaningfully with mathematics. National reports such as ASER (2023; 2024) highlight persistent gaps

in basic arithmetic and numeracy among school-aged children. Similar concerns are reflected internationally, where students often express fear, anxiety, and disengagement when learning mathematics (Mangarin & Caballes, 2024; Wang, 2021). Research attributes these challenges to factors including heavy reliance on rote memorization, lack of conceptual clarity, procedural overload, and teacher-centred instructional methods (Priyadarshini, 2024; Sharm & Bhardwaj, 2024). These difficulties underscore the need for innovative, learner-friendly pedagogical approaches that make mathematics meaningful, accessible, and less intimidating.

One such emerging pedagogical approach gaining prominence in recent years is Vedic Mathematics, a system of rapid mathematical techniques derived from ancient Indian knowledge. Traced to the work of Jagadguru Swami Bharati Krishna Tirthaji (1965), Vedic Mathematics is based on sixteen sutras and sub-sutras that simplify computational processes. The system emphasizes mental calculation, creativity, speed, accuracy, and flexibility in solving mathematical problems (Parajuli et al., 2020; Kaur et al., 2021). Research indicates that the application of Vedic methods helps learners handle arithmetic operations more efficiently and reduces dependence on memorized procedures (Kakkar, 2016; Chauhan & Ali, 2021). Studies further report that Vedic Mathematics encourages alternative strategies, fosters deeper engagement, and supports students with varying mathematical abilities (Katgeri, 2017; Shriki & Lavy, 2018; Devaraj, 2019). As a result, learners often perceive mathematics as more enjoyable, intuitive, and less stressful when taught through Vedic approaches (Shastri et al., 2017; Behera, 2021; Yogeshwari & Indu, 2022).

The increasing relevance of Vedic Mathematics is also reflected in contemporary educational reforms. The National Education Policy (NEP 2020) stresses the integration of Indian Knowledge Systems (IKS), competency-based learning, foundational numeracy development, and pedagogical innovation. Frameworks emerging from NEP, including the NCF 2023 and NIPUN Bharat Mission, advocate teaching approaches that cultivate reasoning, mental computation, and learner autonomy (NCERT, 2023; Pallathadka & Roy, 2025). In this context, Vedic Mathematics resonates with the policy shift toward meaningful learning, reduced cognitive load, and enhanced numerical proficiency. Globally as well, interest in mental-math frameworks and holistic numeracy programs has increased as educators seek methods that strengthen reasoning, fluency, and confidence in mathematics (Aviory et al., 2025; Feng et al., 2025). As a result, Vedic Mathematics has begun to find a place in school enrichment programs, Olympiad preparation, teacher-training workshops, and curriculum experimentation in various educational settings (Raikhola, 2024; Devaraj, 2019).

Despite growing evidence of its potential benefits, Vedic Mathematics continues to attract both support and criticism. Scholars report positive outcomes such

as improved computational speed, enhanced confidence, reduced math anxiety, and stronger problem-solving orientation among learners (Shastri et al., 2017; Pathak & Kumari, 2023). However, concerns persist regarding the consistency of instructional practices, the conceptual depth of certain techniques, limited empirical validation within mainstream pedagogy, and variability in teacher competence (Lee, 2024; Borji et al., 2021). Some critics argue that without adequate teacher preparation, the system risks being used as a set of shortcuts rather than a conceptual enrichment tool (Samuelsson, 2010; Stewart & Ball, 2023). These differing perspectives highlight the need to examine not only the pedagogical potential of Vedic Mathematics but also the readiness and perceptions of teachers who serve as key facilitators of classroom implementation.

Teachers occupy a pivotal role in shaping students' mathematical engagement, classroom experiences, and achievement outcomes. Their attitudes, beliefs, confidence, and instructional practices significantly influence students' motivation and learning trajectories (Wang & Eccles, 2013; Ryan et al., 2021). Successful integration of new pedagogical models, such as Vedic Mathematics, depends largely on teachers' acceptance, perceived usefulness, professional competence, and willingness to adopt and adapt innovative instructional methods (Stovner & Klette, 2022; Su et al., 2016).

While Vedic Mathematics has been increasingly acknowledged within policy, practice, and scholarship, systematic research exploring teachers' perceptions remains limited, particularly at the school level. A recent study by Pathak and Kumari (2023) explored the influence of various factors; including age, brain IQ, parents' economic status, and the perceptions of both parents and students regarding the importance of Vedic Mathematics. In Haryana, it was observed that teachers who are aware of the benefits of Vedic Mathematics have incorporated it into their teaching practices to enhance student interest and performance in mathematics (Kausik, 2022). The study also highlighted that even teachers without formal training in Vedic Mathematics express a keen interest in receiving training, believing it can significantly improve calculation speed. However, the absence of government guidelines on the integration of Vedic Mathematics into school curricula constrains them to traditional teaching methods.

The need for this study arises from the intersection of several critical factors in the context of Indian education. Firstly, the National Education Policy of 2020 places a strong emphasis on grounding the education system in Indian values and traditions, recognizing the wealth of knowledge within the country's heritage. Vedic Mathematics represents a unique and valuable component of this heritage, but its integration into the modern education system has been limited. Secondly, the demonstrated benefits of Vedic Mathematics in terms of improving students' mathematical abilities, reducing

fear of the subject, and making learning more enjoyable and effective, as evidenced by previous research, underscore its potential as a powerful teaching tool.

However, despite these merits, there appears to be a gap in terms of teachers' awareness and training in Vedic Mathematics. Many teachers express interest in acquiring these skills, but the absence of government guidelines hinders their ability to incorporate it into their teaching practices. Therefore, there is a growing need to understand how teachers perceive the relevance, applicability, and classroom usefulness of Vedic Mathematics. Such insights are critical for determining implementation feasibility, identifying professional development needs, informing curriculum planning, and shaping teacher-training frameworks aligned with NEP 2020 goals.

Thus, the present study seeks to address this gap by investigating teachers' perceptions of Vedic Mathematics, and their views on its potential benefits. By understanding these aspects, the study aims to provide valuable insights for education policymakers and institutions, helping them make informed decisions about the integration of Vedic Mathematics into the curriculum. Ultimately, the study's findings may contribute to the realization of NEP-2020's vision of a more holistic and Indian-rooted education system, benefiting both teachers and students alike.

Objectives

1. To explore the teachers' perception on the use of Vedic Mathematics in schools.
2. To compare the perception of teachers on Vedic Mathematics in relation to their stage of school (Elementary and Secondary), subject (Mathematics and Non-mathematics), type of school (Government and Private), gender (Male and Female), and location (Rural and Urban).
3. To know the opinion of the teachers on the use of Vedic Mathematics in Schools.

Hypotheses

1. There exists no significant difference in the perception of Elementary and Secondary school teachers on the use of Vedic Mathematics in schools.
2. There exists no significant difference in the perception of Mathematics and Non-mathematics teachers on the use of Vedic Mathematics in schools.
3. There exists no significant difference in the perception of Government and Private teachers on the use of Vedic Mathematics in schools.
4. There exists no significant difference in the perception of Male and Female teachers on the use of Vedic Mathematics in schools.
5. There exists no significant difference in the perception of Rural and Urban teachers on the use of Vedic Mathematics in schools.

Methodology and Procedure

This study used a descriptive survey method and focused on school teachers from the Bargarh district. The population included teachers working in different types of schools, at different teaching levels and in different locations. A questionnaire was developed to collect data after reviewing related literature and receiving feedback from experts. Initially, the tool contained 34 statements on a 5-point Likert scale, with response options ranging from strongly agree to strongly disagree. A factor analysis was then conducted, and based on the results; the questionnaire was refined and reduced to 25 items. The reliability of the final tool was assessed, and the reliability coefficient was found to be 0.816, indicating that the questionnaire was dependable and consistent. The study was delimited to the Bargarh Block of the district, and the final questionnaire was shared with more than 100 teachers using Google Forms to facilitate data collection. Participation in the study was voluntary. Teachers from 14 government schools and 8 private schools, totaling 22 schools from both rural and urban areas, participated in the survey. A total of 84 responses were received, out of which 78 were complete and included in the final analysis. The collected data were scored and analyzed using descriptive statistics. The hypotheses of the study were tested using independent sample t-tests, as this method was appropriate for comparing groups and drawing meaningful conclusions.

Result and Discussion

Table-1
Demographic Analysis

	Demography of Sample	N
Gender	Female	42
	Male	36
Location	Rural	43
	Urban	35
School Type	Government	55
	Private	23
Level	Elementary Teacher	38
	Secondary Teacher	40
Subject	Mathematics Teacher	41
	Other Subject Teacher	37
Training	Trained in Vedic Mathematics	8
	Untrained in Vedic Mathematics	70

Table 1 presents a comprehensive overview of the sample composition, highlighting key demographic characteristics. The sample consists of 42 female and 36 male participants. In terms of location, 43 teachers are from rural areas and 35 are from urban settings. With respect to school type, the majority (55) are employed in government schools, while 23 work in private schools. The sample further includes 38 elementary teachers and 40 secondary teachers, offering representation across teaching levels. Subject-wise, 41 participants teach mathematics, whereas 37 teach other subjects such as science, social science, or language. Regarding professional preparedness, only 8 teachers reported receiving formal training in Vedic Mathematics, while the majority (70) had not undergone such training. This detailed breakdown of the sample provides valuable insights into the diversity and distribution of teachers involved in the study, setting the foundation for a nuanced analysis of their perceptions of Vedic Mathematics.

Table-2
Perception of Teachers on Vedic Mathematics

N	Mean	SD
78	97.76	8.94

Table 2 provides key statistical indicators, revealing a sample mean of 97.76 and a standard deviation of 8.94. Utilizing these metrics, the level of perception is categorized across a spectrum ranging from the least favourable to the most favourable categories, as detailed in Table 3. These categorizations are essential in gauging the overall sentiment and variation in teachers' perceptions regarding Vedic Mathematics. The mean and standard deviation serve as crucial parameters in understanding the distribution and intensity of these perceptions within the surveyed sample.

Table-3
Level of Perception of Teachers on Vedic Mathematics

Level of Perception	Range	Frequency	Percentage
Least Favorable	72-79	4	5.13
Less Favorable	80-88	5	6.41
More Favorable	89-106	56	71.79
Most Favorable	107-115	13	16.67

Table 3 provides insights into teachers' perceptions of Vedic Mathematics, with approximately 71.79% expressing a favourable outlook, while an additional 16.67% hold the most favourable perception. In contrast, only 6.41% and 5.13% of teachers exhibit less and least favourable perceptions of Vedic Mathematics, respectively. The data illustrates that a substantial majority, comprising 88.46% of teachers, regardless of their training in Vedic Mathematics, teaching level, school type, gender or location, harbour favourable perceptions of Vedic Mathematics and acknowledge its associated benefits. This suggests a prevalent positive attitude among teachers towards the incorporation of Vedic Mathematics in their educational practices.

Table-4
Comparison of Perception of Elementary and Secondary Teachers

Variable	N	Mean	SD	df	t-value	Sig. Value
Elementary Teacher	38	98.34	9.22	76	0.549	0.585
Secondary Teacher	40	97.23	8.76			

The table 4 illustrates the mean perception scores for Vedic Mathematics, revealing values of 98.34 (SD = 9.22) for elementary teachers (N = 38) and 97.23 (SD = 8.76) for secondary teachers (N = 40). The computed t-value for this comparison is 0.549, and the associated significance value is 0.585, surpassing the conventional significance level of 0.05. This concludes that there is no statistically significant difference in the mean perception scores between elementary and secondary teachers regarding Vedic Mathematics. The findings suggest that, based on the collected data, there is a comparable level of positive perception among both elementary and secondary teachers with respect to Vedic Mathematics. The absence of a significant difference underscores uniformity in the positive attitudes and perceptions of teachers across different educational levels concerning the integration of Vedic Mathematics into their teaching practices.

Table-5
Comparison of Perception of Mathematics and Non-mathematics Teachers

Variable	N	Mean	SD	df	t-value	Sig. Value
Other subject Teacher	37	98.24	7.82	76	0.442	0.66
Mathematics Teacher	41	97.34	9.93			

Table 5 reveals a distinction in the mean scores of teachers' perception of use of Vedic Mathematics, where mathematics teachers (N = 41) exhibit a mean perception score of 97.34 (SD = 97.34), while teachers of other subjects (N = 37) have a slightly higher mean value of 98.24 (SD = 98.24). The computed t-value for this comparison is 0.442, with a corresponding significance value of 0.66, surpassing the conventional significance level of 0.05. This results in the absence of a significant difference between the perceptions of mathematics teachers and those teaching other subjects. This outcome implies that, based on the collected data, there is no statistically significant contrast in the mean perception scores between teachers of mathematics and teachers of non-mathematics subjects regarding Vedic Mathematics. In essence, both groups of teachers hold a similar level of positive perception toward Vedic Mathematics. The findings emphasize uniformity in the positive attitudes and perceptions of teachers across various subjects when it comes to incorporating Vedic Mathematics into their teaching practices.

Table-6
Comparison of Perception of Government and Private Teachers

Variable	N	Mean	SD	df	t-value	Sig. Value
Government	55	97.42	11.04	76	0.533	0.595
Private	23	98.61	7.98			

Table 6 shows the comparison of government and private school teachers' perceptions. The government teachers (N=55) yield a mean score 97.42 (SD = 11.04) and private teachers (N = 23) have a mean score of 98.61 (SD = 7.98). The comparison yields a t score 0.533 with computed significant value 0.595 which is greater than the conventional value 0.05. Therefore, there is no significant difference in the perception of government and private school teachers, indicating uniformity in the perception of teachers about the use of Vedic mathematics in schools irrespective of the type of schools they teach.

Table-7
Comparison of Perception of Male and Female Teachers

Variable	N	Mean	SD	df	t-value	Sig. Value
Male	36	98.25	8.33	76	0.437	0.663
Female	42	97.36	9.52			

The table 7 presents a comparison of mean scores of teachers' perception with respect to their gender, revealing that male teachers (N = 36) have a mean score of 98.25 (SD = 8.33), while female teachers (N = 42) have a slightly lower mean score of 97.36 (SD = 9.52). The computed t-value for this comparison is 0.437, with a corresponding significance value of 0.663, which is greater than the conventional significance level of 0.05. Consequently, this outcome suggests that there is no statistically significant difference in the mean perception scores between male and female teachers regarding Vedic Mathematics. In other words, the data indicates a similar level of positive perception among both male and female teachers in relation to Vedic Mathematics. The findings underscore a gender-neutral perspective, emphasizing a consistent positive perception of Vedic Mathematics irrespective of the teacher's gender.

Table-8
Comparison of Perception of Rural and Urban Teachers

Variable	N	Mean	SD	df	t-value	Sig. Value
Rural	43	98.05	8.93	76	0.302	0.764
Urban	35	97.43	9.08			

The Table 8 indicates rural teachers (N = 43) have a mean score of 98.05 (SD = 8.033) and urban teacher (N = 35) have a mean score of 97.43 (SD = 9.08). The computed t value for the comparison is 0.30 and the corresponding p value is 0.764, which is greater than the conventional significant value 0.05. Therefore, there is no statistically significant difference between rural teachers and urban teachers on their perception scores. This indicates that teachers' perceptions did not differ based on whether they belong to rural or urban areas. These findings suggest that geographical location does not influence how teachers view Vedic Mathematics. Both rural and urban teachers demonstrated almost similar levels of perception, indicating uniformity in their understanding and exposure.

Table-9
Teachers' Opinion on Implementation of Vedic Mathematics in Schools

Training Status	Trained		Untrained	
	Yes	No	Yes	No
Uses Vedic Mathematics	8	0	13	57
Recommends use of Vedic Mathematics	8	0	65	5

Among the 78 respondents, 8 teachers reported receiving formal training in Vedic Mathematics, while the remaining 70 teachers indicated that they had not undergone any formal training in this method. Interestingly, the trained teachers not only incorporate Vedic Mathematics in their teaching practices but also actively endorse its utilization within schools. Conversely, the data also reveals that, among the untrained teachers, 13 have independently chosen to integrate Vedic Mathematics into their classes. This suggests a self-driven interest among these teachers to learn and apply Vedic Mathematics techniques in their teaching. Additionally, a noteworthy 65 untrained teachers, despite lacking formal training, express a favourable stance and recommend the incorporation of Vedic Mathematics at the school level. This indicates a widespread interest and recognition of the potential benefits of Vedic Mathematics, even among those who have not undergone formal training in the method.

Discussion

The findings of this study reveal a predominantly positive perception of Vedic Mathematics among teachers, irrespective of their teaching level, subject background, types of school, gender, or geographical location. More than 88% of participating teachers expressed favourable views, and a significant proportion endorsed its early curricular introduction at the elementary stage. This widespread acceptance suggests that teachers perceive Vedic Mathematics not merely as an additional mathematical strategy, but as a pedagogical resource with distinct advantages for improving learner engagement and performance.

A key reason for teachers' positive perception is the perceived effectiveness of Vedic Mathematics in addressing persistent challenges in mathematics learning, particularly low numeracy levels, fear of mathematics, and procedural dependency. National surveys, including ASER (2023; 2024), repeatedly highlight deficiencies in basic arithmetic and comprehension among Indian school children, especially at the foundational stage. International literature similarly documents widespread difficulties arising from rote learning, procedural overload, and limited conceptual understanding (Mangarin & Caballes, 2024; Abugri & Mereku, 2024).

Against this backdrop, Vedic Mathematics is perceived by teachers as a means to simplify computational processes, enhance student confidence, and make mathematics more accessible. Empirical studies show that Vedic techniques improve speed and accuracy and reduce learners' dependence on memorization (Chauhan & Ali, 2021; Kakkar, 2016). This aligns with teachers' interest in methods that can resolve learning difficulties and support low achievers, rather than merely accelerate high achievers.

Another reason for teacher preference relates to the motivational and affective benefits associated with Vedic Mathematics. Research indicates that learning mathematics through flexible, mental strategies contributes to reduced anxiety, improved confidence, and increased enjoyment (Shastri et al., 2017; Yogeshwari & Indu, 2022). Teachers' responses in this study likely reflect similar observations from their own practice. Existing literature suggest that alternative mathematical heuristics serve as powerful tools for developing positive dispositions toward the subject (Shriki & Lavy, 2018). In contexts where mathematics anxiety is prevalent and performance gaps are chronic, pedagogical approaches that improve engagement are especially valued.

The study also found no significant difference in perception between mathematics and non-mathematics teachers. This suggests that Vedic Mathematics is perceived not only as a suitable tool for specialists but as a cross-disciplinary pedagogical innovation. Teachers of other subjects recognised its potential to develop cognitive skills such as reasoning, attention, and mental flexibility. Research supports this belief: mathematics training contributes to improved logical thinking, working memory, and problem-solving abilities (Cresswell & Speelman, 2020; Cheng et al., 2022). Vedic Mathematics, through its emphasis on mental computation, aligns with this cognitive-developmental orientation.

Vedic Mathematics is also valued because it can help students develop both quick calculation skills and deeper understanding. Research shows that focusing only on procedures can limit real learning (Borji et al., 2021), but studies indicate that Vedic methods can improve speed while still encouraging meaningful thinking when taught properly (Katgeri, 2017; Parajuli et al., 2020). This balance matches teachers' preference for approaches that go beyond shortcuts and help students build strong overall mathematical skills.

Global and national policy frameworks advocate pedagogies that prioritize understanding, fluency, flexibility, and autonomy in learning (Oroszi, 2020; NCERT, 2023; Rhoney et al., 2024). From this perspective, Vedic Mathematics can be seen as a complementary pedagogical model that supports cognitive efficiency, self-efficacy, and adaptability. Its heuristic nature resonates with constructivist views of mathematics learning, where learners build meaning through strategy selection and creative reasoning rather than algorithmic compliance. Furthermore, its alignment with the Indian Knowledge System (IKS) framework reinforces teachers' cultural and pedagogical affinity with indigenous knowledge traditions. NEP 2020 explicitly encourages integration of IKS and innovations that enhance foundational numeracy.

Teachers' endorsement of early-grade implementation may reflect this policy influence, as well as recognition that foundational years are critical for habit formation and reducing anxiety (Barik, 2023; Surksha, 2023).

An interesting finding is that even untrained teachers not only held favourable views but some independently adopted Vedic Mathematics strategies. This indicates a perception of instructional relevance strong enough to motivate self-directed learning. Similar trends are noted elsewhere: teachers recognize benefits like faster calculation and improved student engagement, despite lack of formal institutional support (Kausik, 2022). Nonetheless, research warns that without pedagogical training, Vedic Mathematics risks being used as a procedural shortcut system rather than as a conceptual empowerment tool (Lee, 2024; Samuelsson, 2010).

Implications of the Study

The findings of this study, which revealed overwhelmingly positive teacher perceptions of Vedic Mathematics across demographic groups, carry several significant implications for curriculum planning, policy reform, teacher education, and classroom practice. These implications are particularly timely in the context of the National Education Policy (NEP 2020) and recent educational reforms that emphasize competency-based learning, foundational numeracy, and integration of Indian Knowledge Systems (NCERT, 2023).

- **Integration of Vedic Mathematics into the School Curriculum**

Given the strong endorsement by teachers and their belief in its classroom utility, there is a clear need to consider structured integration of Vedic Mathematics into school curricula, particularly at the foundational and middle stages. Teachers in this study indicated that Vedic techniques could make mathematics more engaging, less intimidating, and more accessible for students. Similar findings from previous research suggest that Vedic approaches improve speed, confidence, and positive attitudes among learners (Chauhan & Ali, 2021; Yogeshwari & Indu, 2022). Introducing Vedic Mathematics as part of foundational numeracy can therefore support major national initiatives like NIPUN Bharat and competency-based assessment reforms.

- **Teacher Training and Professional Development**

Although most teachers lacked formal training, many still expressed interest in using or recommending Vedic Mathematics. This suggests a strong professional demand for capacity building. Studies have shown that untrained teachers may use Vedic Mathematics as procedural shortcuts rather than as tools for conceptual enrichment

(Lee, 2024; Samuelsson, 2010). Therefore, professional development programs should focus not only on sutra-based techniques, but also on pedagogy, conceptual connections, differentiation strategies, and classroom integration. Training modules can be incorporated into pre-service teacher education, in-service workshops, and school-based professional learning communities.

- **Pedagogical Innovation and Competency-Based Education**

Teachers' positive responses indicate that Vedic Mathematics is perceived as a valuable innovation capable of aligning with competency-based and learner-centred educational models. Research supports its potential to enhance problem-solving, logical thinking, and metacognition (Kakkar, 2016; Cresswell & Speelman, 2020). Integrating Vedic Mathematics within broader competency-based frameworks may help schools shift away from rote learning (Priyadarshini, 2024) toward more meaningful, flexible, and adaptive mathematical practices that support diverse learners.

- **Addressing Mathematical Anxiety and Low Achievement**

The findings suggest that teachers view Vedic Mathematics as an approach that can reduce fear, support low achievers, and build student confidence. This aligns with evidence that Vedic techniques reduce math anxiety and promote positive attitudes (Shastri et al., 2017; Shriki & Lavy, 2018). Schools, therefore, can use Vedic Mathematics as a targeted intervention for students struggling with numeracy, rather than treating it only as enrichment for high performers. Integrating short, low-stress calculation strategies within daily practice may help mitigate anxiety and improve overall achievement.

- **Equitable Implementation Across School Contexts**

The absence of significant difference in perception across gender, school type, subject area, and location indicates wide receptivity and feasibility of adoption. This suggests that Vedic Mathematics can be implemented in diverse school settings without facing systemic barriers arising from teacher belief systems. Policymakers should recognize that supportive teacher attitudes constitute a strong foundation for scaling innovations, especially in rural schools where mathematics learning gaps are widely reported (ASER, 2024; Gnawali, 2023).

- **Support for Indian Knowledge Systems (IKS)**

Teachers' positive attitudes also demonstrate readiness for the incorporation of indigenous knowledge traditions within mainstream

pedagogy. This aligns with NEP 2020's call for integrating Indian Knowledge Systems and culturally rooted learning approaches (Kaur, 2024; Sinha, 2025). Vedic Mathematics therefore holds potential not only as a mathematical tool but as a culturally relevant pedagogical practice that promotes identity, heritage, and interdisciplinary connections.

- **Need for Evidence-Based Frameworks and Research**

While teacher attitudes are favourable, large-scale implementation requires empirical support on effectiveness, learning outcomes, and instructional design. Future research should explore the impact of Vedic Mathematics on conceptual understanding, student motivation, mathematical reasoning, and long-term achievement. Studies should also investigate how teachers interpret and adapt Vedic methods in classroom settings, especially without formal training.

Conclusion

Vedic Mathematics, developed by H.H. Bharati Krishna Tirthaji, has historically remained under-recognized within mainstream Indian education, despite its cultural and mathematical significance. Recent policy directions, particularly NEP 2020 and the emphasis on Indian Knowledge Systems, have renewed interest in integrating indigenous knowledge into school curricula. Although the NCFSE 2023 includes elements of ancient mathematics, explicit references to Vedic Mathematics remain limited, leaving its curricular role largely undefined. The present study examined teachers' perceptions and found that a substantial majority hold favourable views toward Vedic Mathematics and advocate for its introduction at the elementary level to strengthen foundational numeracy. Teachers believe that its use can make mathematics more joyful, engaging, and less anxiety-ridden, thereby fostering creativity and proficiency in mathematical skills. The findings suggest strong teacher readiness and highlight the potential of Vedic Mathematics as a pedagogical tool to enrich mathematics learning in contemporary classrooms.

Acknowledgement

The authors acknowledge the financial support received from the Division of Educational Research (DER), National Council of Educational Research and Training (NCERT), New Delhi, for undertaking this research as part of the NCERT Doctoral Fellowship Programme. The authors also express sincere gratitude to the participating teachers for their cooperation.

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Effect of Using the Vedic Multiplication Technique Urdhva Tiryagbhyam Sutra (Vertical and Crosswise Method) in Enhancing Calculation Speed and Accuracy of Class V Students of Titabar Town School, Titabar, Jorhat

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Abstract

This research investigates the effectiveness of the Urdhva Tiryagbhyam Sutra, a Vedic mathematics technique, in enhancing multiplication skills among primary school students. Conducted over eight weeks at Titabar Town School in Jorhat District, Assam, the study involved 23 Class V students aged 10–11 years. A mixed-methods approach was adopted, utilising pre- and post-tests, weekly assessments, classroom observations, and semi-structured interviews with teachers and students to assess changes in speed, accuracy, and engagement.

Findings revealed statistically significant improvements in students' multiplication performance ($t(22) = -4.42, p < .001; d = 0.92$) and efficiency, with average problem-solving time decreasing by nearly 5 minutes post-intervention. Additionally, qualitative results highlighted increased student motivation, greater mathematical confidence, and active classroom participation. However, initial challenges were noted in student adaptation, particularly for those with weak foundational skills.

The study underscores the pedagogical value of integrating culturally rooted computational strategies like Vedic mathematics into elementary curricula. To ensure successful implementation, the research recommends structured teacher training, incorporation of age-appropriate visual aids, and sustained practice through curriculum-based activities. Future investigations should include a larger and more diverse student population across longer intervention periods to validate the scalability of these outcomes.

Keywords-*Vedic Mathematics, Urdhva Tiryagbhyam Sutra, Speed, Accuracy, Pedagogical Innovation, Primary Education.*

Introduction

Mathematics is a core discipline within the educational curriculum, playing a vital role in developing students' cognitive skills, logical reasoning, and problem-solving abilities. Among the basic arithmetic operations introduced in early education, multiplication is fundamental to achieving numerical fluency and building a foundation for higher-level mathematical concepts. Despite its importance, many primary school students find multiplication challenging, leading to decreased academic performance, reduced self-confidence, and negative attitudes toward mathematics (Brown & Quinn, 2006).

In response to these learning difficulties, educators are increasingly turning to alternative pedagogical strategies that enhance engagement and simplify complex concepts. One such approach is Vedic Mathematics, an ancient Indian system of mental computation that was reintroduced by Bharati Krishna Tirthaji in the early 20th century (Tirthaji, 1965). The system comprises sixteen Sutras, or mathematical formulae, each designed to provide simplified and intuitive methods for solving arithmetic problems. Among these, the Urdhva Tiryagbhyam Sutra, meaning "Vertically and Crosswise," offers a visual, pattern-based method for multiplication that allows for faster and more accurate computation (Sharma & Mehta, 2019). Its intuitive structure is particularly appealing for young learners and may improve both performance and confidence in mathematics.

The current action research explores the instructional value of the Urdhva Tiryagbhyam Sutra in the context of primary education. Specifically, the study investigates its effect on improving multiplication speed and accuracy among Class V students at Titabar Town School. It also examines students' perceptions of mathematics following instruction using this technique, along with the challenges teachers face during its implementation.

Objectives

1. To compare students' performance in multiplication accuracy before and after instruction using the Urdhva Tiryagbhyam Sutra.
2. To assess the impact of the technique on students' multiplication speed.
3. To identify challenges faced by teachers in implementing the method.

Hypotheses

- **H₀₁ (Accuracy):** There is no significant difference in the mean multiplication accuracy scores of students before and after instruction using the Urdhva Tiryagbhyam Sutra.
- **H₀₂ (Speed):** There is no significant difference in the mean multiplication problem-solving time of students before and after instruction.

Literature review

The Urdhva Tiryagbhyam Sutra, one of the most prominent techniques in Vedic mathematics, has garnered increasing attention in both educational and computational research for its effectiveness in simplifying multiplication and enhancing computational speed. Originating from the ancient system rediscovered by Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaj (Tirtha & Agrawala, 1992), the method introduces a vertical and crosswise approach that enables faster and more intuitive multiplication. Scholars such as Prasad (2016) and Patel (2015) have shown that integrating Vedic techniques into classroom instruction significantly improves students' arithmetic performance, particularly in terms of speed and accuracy. Akhtar (2023) further emphasises the method's suitability for early education, citing its alignment with the New Education Policy's push toward incorporating Indian Knowledge Systems

into mainstream curricula. Supporting these findings, Prasad (2016) conducted an empirical study involving competitive examination aspirants and demonstrated that the application of Vedic methods—including multiplication techniques—led to statistically significant improvements in the speed of performing basic mathematical operations, as measured through paired t-tests. From a computational standpoint, researchers like Kanhe et al. (2012) and Ramalatha et al. (2009) have validated the algorithmic efficiency of Vedic multipliers in digital hardware, demonstrating their superiority over conventional techniques in terms of processing time and energy consumption. These studies collectively highlight the versatility of the Urdhva Tiryagbhyam Sutra, which not only simplifies mental calculation for students but also serves as a high-performance algorithm for hardware implementation. However, despite this growing interest, limited research has been conducted on the practical application of Vedic multiplication in northeastern India, particularly within government schools. This gap highlights the need for localised investigations to explore how such traditional techniques can be integrated effectively into diverse classroom settings. The current study contributes to this effort by examining the impact of the Urdhva Tiryagbhyam Sutra on the multiplication skills of Class V students in Assam, thereby extending the discourse on culturally rooted, high-speed arithmetic strategies.

Methodology

Research Design

This study adopted an action research framework within a pre-experimental, single-group pre- test–post-test design. Action research is a reflective and iterative process in which practitioners investigate their own educational practices to bring about improvement (Kemmis & McTaggart, 1988). This approach was chosen as the researcher, also an educator, was directly involved in implementing an intervention (the Vedic multiplication technique) within a real classroom setting to solve a practical problem—students' difficulties with multiplication—while simultaneously contributing to pedagogical knowledge. The cyclical process of planning (designing the intervention), acting (teaching the sutra), observing (collecting data), and reflecting (analysing results) aligns with the action research paradigm.

This study evaluates the effectiveness of the Urdhva Tiryagbhyam Sutra—a Vedic multiplication technique—in enhancing multiplication skills among primary school students. The intervention was conducted over eight weeks at Titabar Town School in Jorhat District, Assam.

Participants

A total of 23 students from Class V, aged 10–11 years, participated in the study. Participants were selected using purposive sampling, based on teacher-identified challenges in mastering traditional multiplication methods. This ensured the intervention addressed the needs of learners who stood to benefit most from alternative instructional approaches. In addition to the student participants, the two mathematics teachers responsible for instructing Class V at Titabar Town School were included as

key informants for the qualitative component of the study. Their direct involvement in the classroom provided invaluable insights into the practical implementation and reception of the intervention. Semi-structured interviews were conducted with them to gather data on perceived benefits, student engagement, and instructional challenges.

Procedure

A mixed-methods approach was adopted to capture both quantitative and qualitative data on the intervention's effectiveness. Prior to data collection, the study received approval in accordance with institutional ethical standards. Informed consent was obtained from the students' parents or guardians, and assent was secured from all student participants. Participation was entirely voluntary, and all responses were handled with strict confidentiality.

Quantitative data were collected through structured pre-tests and post-tests that measured changes in multiplication accuracy and calculation speed. Weekly assessments were administered to reinforce the technique and track ongoing progress. Data were analysed using a paired sample t- test to evaluate statistically significant differences between pre- and post-test scores.

Qualitative data were gathered through classroom observations, which documented engagement levels, problem-solving behaviour, and instructional interaction. Additionally, semi-structured interviews with mathematics teachers provided insight into their experiences with the technique, including perceived benefits and instructional challenges.

By integrating both cognitive and affective measures, this triangulated approach offered a comprehensive evaluation of the Urdhva Tiryagbhyam Sutra's pedagogical value, while also acknowledging limitations related to sample size and study duration.

Results and Analysis

This study evaluated the impact of an educational intervention on both test performance and test-taking efficiency using pre-test and post-test data from 23 students.

1. Test Performance Improvement

A paired-samples t-test was conducted to evaluate the impact of an educational intervention on student performance by comparing pre-test and post-test scores. The mean pre-test score was 5.91 (SD = 4.15), and the mean post-test score was 8.17 (SD = 5.10), yielding an average improvement of 2.26 points.

Normality of the difference scores was verified using the Shapiro–Wilk test, $W = 0.94$, $p = 0.17$, confirming the appropriateness of parametric testing.

The paired t-test revealed that the increase in scores was statistically significant, $t(22) = -4.42$, $p < .001$. The effect size was large, $d = 0.92$ (Cohen, 1988), and the Pearson correlation between pre- and post-test scores was strong, $r = 0.88$, indicating consistency in performance improvement.

This suggests that the intervention had a strong positive impact on student learning outcomes.

2. Test-Taking Time Efficiency

To assess changes in test-taking efficiency, a Wilcoxon signed-rank test was applied due to non-normality in the difference scores ($W = 0.90$, $p = .024$). Students took an average of 39.43 minutes to complete the pre-test and 34.65 minutes for the post-test, resulting in a mean time savings of 4.78 minutes ($SD = 3.80$).

The test indicated a statistically significant reduction in time, $W = 0.00$, $p < .001$. This suggests that, in addition to improving their performance, students became more efficient and likely more confident in completing the assessment tasks after the intervention.

Table-1
Summary of Performance and Time Efficiency Results (N = 23)

Measure	Pre-Test	Post-Test	Difference	Test Statistic	p-value	Effect Size
Score (M ± SD)	5.91 ± 4.15	8.17 ± 5.10	2.26	$t(22) = -4.42$	< .001	$d = 0.92$
Time (M±SD, minutes)	39.43 ± 2.02	34.65 ± 4.91	-4.78	$W = 0.00$	< .001	—

Note- Effect size d based on Cohen's convention. Wilcoxon test used due to non-normal time difference distribution.

3. Teachers' Responses on the Vertical and Crosswise Method

The two Class V mathematics teachers, who were involved in the study, were interviewed regarding their observations. Both educators acknowledged the effectiveness of the Vedic Vertical and Crosswise method in enhancing students' speed and interest in multiplication tasks. They reported that the technique fostered greater enthusiasm, especially among average and high-performing students, and served as a motivational tool in math instruction. However, both educators also identified significant challenges. One teacher emphasised the abstract nature of the method, noting difficulties in conceptual understanding among younger learners. The other teacher expressed concern over its limited accessibility for students with weaker foundational skills and highlighted the need for appropriate teaching aids and training. Overall, both teachers supported its use as a supplementary method, rather than a primary instructional approach, in the Class V curriculum.

Discussion and Conclusion

The results of this study indicate that the implementation of the Urdhva Tiryagbhyam Sutra, a Vedic multiplication technique, had a significant impact on both the speed and accuracy of Class V students' multiplication performance. Quantitative

data revealed a marked improvement in post- test scores compared to pre-test scores, supported by a statistically significant t-value and p-value ($p < .001$). In terms of speed, the reduction in average completion time from 39.43 to 34.65 minutes further demonstrated the effectiveness of the technique in enhancing computational efficiency.

These findings align with earlier studies (Prasad, 2016; Patel, 2015) that have emphasised the benefits of Vedic mathematics in improving arithmetic performance. Moreover, qualitative feedback from teachers and classroom observations underscored increased student engagement, reduced anxiety, and heightened confidence in mathematics following exposure to the technique.

While the intervention showed promising outcomes, some students initially struggled to adapt to the new method, highlighting the need for structured teacher support and additional practice opportunities. The brief eight-week intervention period, while effective for this initial study, represents a limitation and prevented the exploration of other Vedic techniques or long-term retention.

In conclusion, the Urdhva Tiryagbhyam Sutra presents a culturally relevant, pedagogically effective alternative to traditional multiplication methods. Integrating such techniques into elementary curricula, along with targeted teacher training and continuous student practice, can play a critical role in improving foundational mathematical skills. Future research should investigate the long-term effects of Vedic methods and their applicability to other mathematical operations across diverse educational settings.

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A Study on Self Reflection by Teachers Through Teacher's Self-Assessment Rubric (Tsar) Framework in Mangaldoi, Darrang District

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Abstract

Self-reflection plays a crucial role in teachers' professional development, enabling assessment of instructional practices and enhancement of effectiveness. This paper evaluates self-reflection levels among teachers in Mangaldoi town using NCERT's Teacher's Self-Assessment Rubrics (TSAR) through descriptive survey methodology with 20 participants.

Results demonstrate that teachers consistently perform at the "Approached Expected Standard" level across all six performance domains, with notable variations in specific areas. Interpersonal Relationships and School Development emerged as strength areas, while Professional Development showed the greatest need for improvement. Teacher's confidence levels varied significantly across different competency areas, revealing specific patterns in self-assessment perceptions.

Findings advocate the need for integration of self-assessment strategies for teachers. It also emphasizes for targeted professional development interventions, enhanced institutional support, and systematic integration of self-reflection practices to optimize teaching effectiveness and student learning outcomes in Mangaldoi town's educational landscape.

Key Words-*Self Reflection, Teaching Staff, Mangaldoi Town.*

Introduction

Teachers are the cornerstone of education, influencing the intellectual and personal development of their students while directly impacting the quality of education imparted. Their multifaceted role extends beyond merely delivering subject matter; they are tasked with fostering positive relationships, cultivating conducive learning environments, conducting assessments, collaborating with peers, and upholding professional standards. Consequently, the assessment of teachers, aimed at evaluating their performance and fostering continuous improvement, is paramount to ensuring accountability and enhancing educational outcomes.

Recognizing the significance of self-assessment in empowering teachers to reflect on their practice, the National Council of Educational Research and Training (NCERT) has developed comprehensive guidelines and tools for self-assessment, such as the Teacher's Self-Assessment Rubrics (TSAR). These resources facilitate teachers' introspection into various facets of their teaching, encompassing personal, organizational, and institutional dimensions.

By employing this rubric, the paper delves into the depth of teachers' self-awareness, understanding its importance and evaluating its manifestation within the school's teaching staff.

This paper holds particular significance within the context of teachers in Mangaldoi town of Darrang district, where understanding and enhancing the self-awareness of teachers can potentially catalyze positive transformations in teaching practices, student engagement, and overall school culture. Through rigorous inquiry and analysis, the paper has shed light on the dynamics of self-reflection among teachers, contributing to the discourse on teacher professional development and educational enhancement.

Subsequent sections of this paper will delineate the methodology, findings and analysis, and offer insights into implications for practice and future research directions. This paper endeavours to ignite conversations, inspire actions, and foster a culture of continuous improvement within the educational landscape of teachers in Mangaldoi.

Literature survey

Self-assessment plays a pivotal role in shaping teachers' beliefs and efficacy in fostering student learning, influencing educational outcomes. This section explores the literature on the relationship between self-assessment, teacher efficacy, and its application through tools like the Teacher's Self-Assessment Rubrics (Teacher's Self-Assessment: Guidelines and Rubrics 2019).

The concept of teacher efficacy, rooted in Bandura's social cognitive theory (Bandura, 1997), encompasses teachers' beliefs in their ability to influence student learning outcomes. Self-assessment serves as a mechanism through which teachers reflect on their instructional practices, identify areas of strength and weakness, and adapt their approaches to improve student outcomes. By engaging in self-assessment, teachers gain insights into their instructional effectiveness, which in turn influences their sense of efficacy.

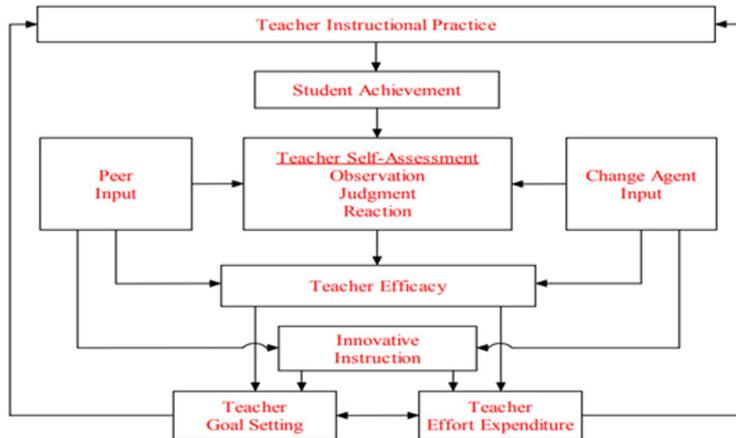
Research has consistently shown a positive correlation between teacher efficacy and student achievement (Goddard, 2001; Hoy & Hoy, 2004; Herman et al., 2000; Mascall, 2003; Muijs & Reynolds, 2001; Ross, 1992; Ross & Cousins, 1993). High efficacy teachers tend to set ambitious goals for themselves and their students, invest greater effort in instructional planning and delivery, and employ effective classroom management strategies. As a result, they create supportive learning environments that promote student engagement and success.

The Teacher's Self-Assessment Rubrics (TSAR), developed by the National Council of Educational Research and Training (NCERT), provide a structured framework for teachers to assess their instructional practices and professional growth. These rubrics encompass various dimensions of teaching, including pedagogical strategies, classroom management, assessment practices, and professional collaboration. By utilizing the TSAR, teachers can systematically evaluate their performance against predefined criteria, identify areas for improvement, and set goals for professional development.

Empirical studies have demonstrated the efficacy of self-assessment tools like the TSAR in enhancing teacher effectiveness and student learning outcomes. Moreover, the TSAR facilitates collaborative discussions among teachers and administrators, enabling them to align instructional practices with institutional goals and priorities. By promoting a shared understanding of effective teaching practices, the TSAR contributes to a culture of professional learning and collective responsibility for student success.

Figure-1

Ross, J. A., & Bruce, C. D. (2007). Teacher self-assessment: A mechanism for facilitating professional growth. *Teaching and teacher Education*, 23(2), 146-159.



Rationale of the study

Self-reflection is an indispensable tool for fostering continuous growth and development, particularly within the realm of education. By engaging in self-reflection, teachers can gain valuable insights into their instructional practices, identify areas for improvement, and enhance their effectiveness in facilitating student learning. Moreover, self-reflection empowers teachers to set ambitious goals for themselves and their students, contributing to higher levels of achievement and success.

Assessment plays a key role in schools' improvement and teachers' development. A teacher, who does not reflect on and introspect his/her methods and actions in the classroom/school, would tend to be repetitive in the future. He/she may teach a concept in the same way and may use the same examples and activities repeatedly in the class irrespective of the performance of the students. Once the teacher starts looking at himself/herself and analyses what has yielded results and what has gone wrong in the teaching-learning process and other school activities, he/she will be able to identify the areas which require further improvement. This process will help the teachers to identify their strengths and weaknesses, and thereby, motivating them to improve their performance which will help to achieve the objectives, such as school's improvement and accountability of teachers.

The TSAR is an assessment tool which serves as a guide for teachers to self-assess themselves and reflect on their daily teaching practices as well as on their role

as a teacher. TSAR is based on six performance standards mentioned below. These Performance Standards reflect the expected roles and responsibilities of a teacher.

- (1) Designing Learning Experiences
- (2) Knowledge and Understanding of the Subject Matter
- (3) Strategies for Facilitating Learning
- (4) Interpersonal Relationship
- (5) Professional Development
- (6) School Development

Each performance standard includes performance indicators, which directly indicate the expected roles and responsibilities of teachers. A teacher's performance is assessed on a continuum ranging from 'Much effort is needed to reach the expected standard' to 'Beyond the expected standard.' The subdivisions in this continuum are based on the actual performance of teachers as per different indicators specified under each performance standard.

Performance Standards (PS)

Performance standards are areas in which teachers perform their tasks and responsibilities. They refer to statements describing what is expected of a teacher's knowledge and performance in his/her day-to-day teaching and other related activities inside and outside the classroom. The following performance standards have been identified:

Performance Standard 1: Designing Learning Experiences:

The teacher designs the classroom activities, appropriate pedagogical strategies, resources, learning outcomes, assessment procedures to meet the needs of all students.

Performance Standard 2: Knowledge and Understanding of Subject Matter:

The teacher demonstrates an understanding of the curriculum, subject content, and developmental needs of students by providing relevant learning experiences.

Performance Standard 3: Strategies for Facilitating Learning:

The teacher uses resources and procedures to provide a respectful, positive, safe, and student-centered environment that is conducive to learning.

- communicates clearly with learners.
- collects, analyses, and uses all relevant information to assess learners' academic progress, and provides timely feedback to both-learners and parents throughout the school year.

Performance Standard 4: Interpersonal Relationship

The teacher collaborates and works with colleagues, students, parents and communities to develop and sustain a positive school climate that supports students' learning.

Performance Standard 5: Professional Development

The teacher maintains a commitment to professional ethics, engages in

innovation and classroom (action) research, takes responsibility, and participates in professional growth that results in enhanced students' learning.

Performance Standard 6: School Development

The teacher takes initiative and contributes to the activities which lead to the school's development.

Rating used in TSAR : Each performance indicator is rated on a four-point scale ranging from 1 to 4 indicating the levels of performance. The rating points are:

Table-1
Performance Descriptor for various levels of TSAR

Performance level	Name of the Level	Yes	Level Point
L1	Much effort is needed to reach the expected standard	Below Satisfactory Performance: Teacher's performance does not meet the expectations, roles and responsibilities of a teacher. Needs more effort to achieve proficiency to become an effective teacher. Requires continuous professional support to achieve proficiency	1
L2	Approaching the expected standard	Satisfactory performance: Making efforts to achieve the required proficiency to become an effective teacher. Requires professional support to achieve proficiency. Needs improvement in his/her performance	2
L3	Approached the expected standard	Effective performance: Meets the requirements of teaching job. Demonstrates a willingness to learn and applies new teaching skills. Sustains high performance over a period. Exhibits behaviour that has a positive impact on students' learning	3
L4	Beyond the expected standard	Exceptional performance: Consistently exhibits behaviours that have a strong positive impact on learners and school's climate. Serves as a role model to others. Innovatively performs tasks and makes extra efforts for improving students' performance	4

Objectives

1. To aware teachers on the benefits of self-assessment on professional upliftment.
2. To study the level of self-reflection on the teachers of Mangaldoi town.
3. To make a descriptive feedback and improvement plan based on the self-reflection by individual teachers under study of Mangaldoi town.

Methodology and design of the study

The descriptive research has been used to conduct the research (Koul. L.,2002). TSAR Rubric and observation tools are used to collect data. The sample population of teachers (PRT, TGT, PGT) under research is twenty. Data has been collected through probability sampling technique of simple random sampling, from the teachers at different schools of Mangaldoi town. Data collection has been done through Questionnaire provided in the TSAR NCERT.

Analysis and interpretation of data

Appropriate statistical techniques and calculations have been applied to analyse and interpret the data. Google Workspace has been used for reporting, writing and analysis along with Microsoft Excel and Origin software. Data has been represented in the form of Data table, Frequency distribution curve, and Bar Graphs.

Figure-2

Figures show histogram for rating points for all the six indicators in TSAR rubrics.

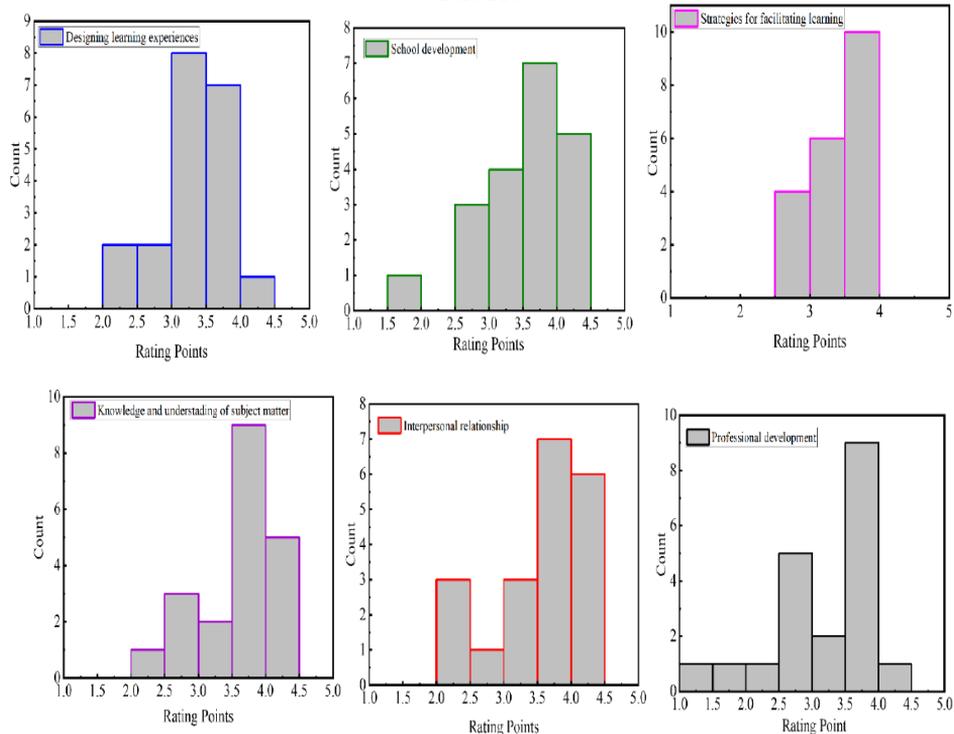


Figure-3

Shows histogram for mean rating points obtained by teachers on all the indicators in TSAR rubrics.

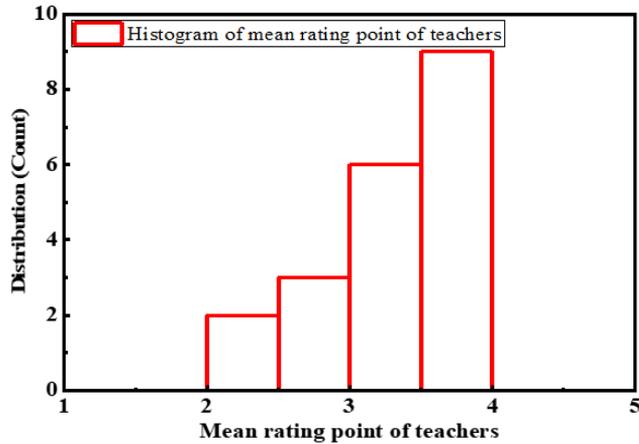


Fig. 3 shows the distribution of mean rating points of teachers show a measure of self-assessment. Mean value of rating points averaged over all indicator is 3.31, implying that they have approached the expected standard (L3), and average value rating point is mentioned in below table. From the rubrics it is apparent that teachers believe that their performance has approached the expected standard.

Table-2

Mean value of rating point of teachers for six different indicators.

Designing learning experiences	Knowledge and understanding of subject matter	Strategies for facilitating learning	Interpersonal relationship	Professional development	School development
3.26 ± 0.11 (L3)	3.35 ± 0.13 (L3)	3.39 ± 0.09 (L3)	3.44 ± 0.14 (L3)	3.04 ± 0.17 (L3)	3.41 ± 0.13 (L3)

Descriptive feedback of TSAR

Table-3

Descriptive Feedback

Performance Standards	Strengths	Challenges	Improvement Plan
Designing Learning Experiences	80 percent teachers have confidence in designing learning experiences more and equal to L3	Teachers faced the lack of time for designing learning experiences for students	To work more effectively on time management

Knowledge and Understanding of Subject Matter	60 percent teachers felt comfortable designing knowledge and understanding of subject matter	Constant upgradation of information and content with the concerned subject	To engage in more content building through reading, Courses offered by SWAYAM, DIKSHA, etc.
Strategies for Facilitating Learning	85 percent teachers can prepare strategies for facilitating learning	Lack of resources, Time constrains and lack of student's attention	To plan with alternative resources, Counselling of the students
Interpersonal Relationship	Only 55 percent teachers felt that their interpersonal relationship is meeting expectation.	Pressure of work and time limit, Lack of coordination	Through more workshops of relation building and effective communication
Professional Development	60 percent teachers can focus on their professional development	Family engagements and Lack of time due to work pressure	To start sorting up of priorities and work accordingly
School Development	60 percent teachers felt positive for contribution to school development	Acknowledgement from the authorities, Socials and mental engagements	To effectively communicate and work on self-reflection.

TSAR rubrics response indicates that there is awareness for the benefits of self-assessment on professional upliftment of teachers.

Descriptive feedback indicates that there has been critical analysis-based improvement plan on the self-reflection by individual teachers.

Results

The TSAR based research conducted in Mangaldoi town, Darrang district, examined teacher self-reflection among 20 teachers using the NCERT Teacher's Self-Assessment Rubrics framework. The comprehensive analysis revealed an overall mean rating of 3.31, indicating that teachers have approached the expected standard (L3) across all performance indicators. Performance varied across six key domains: Interpersonal Relationships scored highest (3.44 ± 0.14), followed by School Development (3.41 ± 0.13), Strategies for Facilitating Learning (3.39 ± 0.09), Knowledge and Understanding of Subject Matter (3.35 ± 0.13), and Designing Learning Experiences (3.26 ± 0.11), while Professional Development scored lowest (3.04 ± 0.17). The paper demonstrated

that 80% of teachers showed confidence in designing learning experiences, 85% were proficient in learning facilitation strategies, and 60% felt comfortable with subject matter knowledge. However, only 55% of teachers felt their interpersonal relationships met expectations, highlighting a key area for improvement.

The statistical distribution followed a normal pattern centred around the L3 level, with Professional Development showing the highest variance (± 0.17), suggesting this domain requires targeted intervention. These quantitative findings provide empirical evidence that teachers in Mangaldoi town demonstrate effective performance levels across TSAR standards, achieving 82.75% of the maximum possible score, while identifying specific areas for professional development enhancement.

Conclusion

This research in Mangaldoi town provides credible evidence of teachers' alignment with expected professional standards, as reflected by the overall mean rating of 3.31. The data indicates that educators demonstrate commendable strengths in areas such as Strategies for Facilitating Learning, school development, and instructional strategies. However, the relatively lower score and higher variability in the domain of Interpersonal Relationship and professional development highlight a clear need for structured and sustained capacity-building initiatives. These insights underscore the value of self-assessment tools like the NCERT TSAR framework in promoting reflective teaching practices and informing data-driven professional development planning.

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Teachers' Training Programmes Of UGC- Malaviya Mission Teacher Training Centre (MMTTC), Gauhati University: An Appraisal

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Abstract

Today, improving quality of teacher education is central to India's strategic goal for enhancing the overall quality of education benefiting both educators and students. The study focused on the role of UGC-Malaviya Mission Teacher Training Centre- Gauhati University in the professional development of teachers. The main objectives of the paper are to study the trend of programmes and trend of teacher participations over the past ten years and it also aims to study about the transactional methodologies used by the resource persons in various programmes. The study adopted descriptive survey method with the involvement of 105 teacher participants from different college and universities by using random sampling method. Frequency and simple percentage were used to analysed the data. The findings indicated that the growth trend of the both programmes and teacher participants are positive and satisfactory over the years. The result also revealed a satisfactory picture from the participants regarding the transactional contents and methodologies of resource persons. The study demonstrates the significant positive impact of teacher training for college teachers and suggest the need of inculcation of new training strategies with proper technological advancement.

Keywords-*Teacher training, Trend of Programmes, Trend of Participation, Transactional Methodologies.*

Introduction

Since independence, the Indian higher education system has expanded significantly over the past sixty years. A tremendous growth in the number of higher educational institutions in all the fields has been witnessed in recent years, but most people believe that this quantitative growth has not been sufficient to address the burning issue of India's educational standards. (Ameta, 2016). In order to support the rapidly expanding economy, the higher education system is supposed to produce adequate skilled human resources with the necessary technical knowledge and capabilities. India, being the country with the youngest population would be able to produce a larger and expanding labour force which is expected to result in higher growth and wealth. The central government has been implementing suitable policy measures to take advantage of this situation and to provide

eligible youth from all socio-economic levels with access to the education they require in a variety of subjects.

Teaching is an art and skill without which a teacher can't transfer knowledge to the students in an efficient and effective way. We must acknowledge that, in comparison to previous generations, the environment, technology and current generation have undergone significant change. Therefore, to get better teaching results in this evolving environment, it is required that the teachers must be updated. Teaching and learning are always like two parallel lines that are bound to go with each other. It is seen that students of a well-informed and skilled teacher are always better than the other students. Therefore, teachers must receive training on a regular basis for updated knowledge regarding the ever-changing world(ED,Monger,2021).Teacher Educator plays a vital role in improving students quality by training instructors to handle everyday classroom situations and adjust their teaching strategies to specific groups of learners(Strakova,2015). A cursory job analysis of a teacher educator indicates that he is required to teach theory, monitor student teaching, facilitate exposure and adjustment to school situations, provide individual guidance, and counsel in personal and professional matters when applying to or considering institutions of higher learning through various learning programs/ courses in India and Abroad. To develop the skills of university and college teachers in teaching strategies and other key professional training criteria, short- term training courses for new entrants as well as inservice teachers are always required. Traditionally the University and College teachers in India took up their job without any knowledge of pedagogy and psychology etc. One may be expert in his subject but benefits obtained by the students will be limited due to lack of the teaching and communication skill on his part. It is therefore the National Policy on Education (NPE) 1986 has emphasized the need for professional training of teachers in higher education in India. In order to fulfil the tasks and obligations of teachers within the educational system, the NPE acknowledge the need to improve their status and proposed to provide opportunities for professional and career development. The motivation of teachers could be increased by providing them systematic orientation in particular subjects, techniques and methodologies and this will inculcate the proper values in them, which will then motivate them to take initiative for innovation.

Background of Malaviya Mission Teacher Training Centre, Gauhati University

The Malaviya Mission Teacher Training Centre (MMTTC) at Gauhati University in Guwahati, Assam, is part of the Malaviya Mission Teacher Training Programme (MMTTP) initiated by the University Grants Commission (UGC). This program aims to enhance the quality of education by providing comprehensive training to educators, aligning with the objectives of the National Education Policy (NEP) 2020.

While specific details about the establishment date of the MMTTC at Gauhati University are not readily available, the UGC-Human Resource Development Centre (HRDC) at the university, formerly known as the Academic Staff College, was established in 1987-88. This center has been dedicated to the professional development of university and college teachers, principals, academic administrators, non-teaching staff, and Ph.D. scholars for over three decades.

The MMTTC encompasses various themes, including the Indian Knowledge System, holistic and multidisciplinary education, academic leadership, and research and development. These themes are designed to nurture future leadership and align with the NEP 2020's vision for transforming higher education in India.

Literature Review

Goswami (2010) found that the majority of teacher participants of UGC-ACS, Gauhati University are satisfied with college's programmes, however a small percentage have expressed some disagreement because of some shortcoming, such as adequate physical space, interactive teaching and sound strategy etc. Kalaiselvan & Naachimuthu (2011) developed a model for training and development of teachers including four learning domain- Accretion, Transmission, Acquisition and Emergence. Jyoti (2012) intended to explore the attitudes of the secondary school teachers and the resource persons towards in-service teacher training and found a positive attitude for the change after attending the programme and also they became capable to take initiation in implementing the learned content. While attending such programmes, the enhancement of their personality development, interaction among other experts, motivation to employ new strategies, increase in subject knowledge and also increase of their communication abilities (Satsangi, 2012). Van & Berry (2012) focusing on pedagogical content knowledge(PCK) and found that PCK extends beyond the acquisition of instructional methodologies and strategies, in their own right, to encompasses a grasp of how students acquire a deeper understanding of a certain subject. The importance of human resource development practices like performance appraisal of faculties and recognition of excellent work through rewards for the moral development of faculties (Mathrani, 2015). Kant (2016), in his evaluation, found that programmes organized by ACS are beneficial and effective in strengthening the research and teaching skills of higher education teachers. Lack of interest among participants is reported as major problem by resource persons in ACS, Rajasthan (Amita, 2016). Zacharias (2017) revealed some problems related with physical facilities, professional growth, resource persons, teaching & research activities, attainment of the objectives, management system etc in ACSs of North East Region of

India. Training and development programmes that are implemented in higher education institutions are effective in achieving their goals such as increasing knowledge, skills, career development, perception, job satisfaction motivation and attitudes of teachers (Rani,2018). Efficiency of a professional development course may be achieved by the enthusiastic faculty members about learning digital badges than they had initially anticipated (Borup & Enmenova, 2019). Kamyak (2021), found in a comparative study between online and offline instructional method that there is no discernible distinction in students' academic performance between these two modes and both strategies were determined to be equally successful. But regarding Koay (2021), online education is not successful, as students struggle to adapt to the online format and offline education still remained the preferred method. Rajput (2022) experienced problems related to infrastructure with lack of basic facilities and reported that before organizing such programmes, authorities must ensure the availability of infrastructure facility within the training venues. Rija & Hilda (2024) suggested that the teacher training programmes might have contributed to the students achievement in performance tasks, but not as significantly in written works or examinations.

Relevance of the study

Our belief is that teacher is central to the higher education system, and that the structure's success is dependent on their motivation and abilities. The idea that a successful teacher learns on the job or depends by resembling senior colleague is out of date. To be good educators, teachers must improve skills sets suitable for the various tasks they must play. Give the importance of the communication and knowledge revolution, they must constantly update their knowledge while also handling and grasping the various types of database available. Teachers must also be trained in pedagogy, or the science of teaching, because teaching is all about communication and being an effective communicator is not easy. Teachers working for the cause of higher education must constantly endeavour to improve their professional abilities in order to give their students the best possible education.

Gauhati University Malaviya Mission Teacher Training Centre is the only MMTTC in Assam for the professional development of teachers in higher education. Before 2010, few studies were conducted in Assam about Academic Staff College Gauhati University, but there is no study regarding Human Resource Development Centre (HRDC) and MMTTC. Keeping these considerations, the investigator felt the need to undertake the present study which could study the various programmes, methodologies and effectiveness of UGC-MMTTC Gauhati University. The study can contribute better

teacher education and for further policy implications, resources selected in this area topic to carry out the research work for the larger benefit of the teachers, parents, learners and policy makers of this country and region too, this study is vital.

Objectives of the Study

1. To study the trends in various programmes organised by UGC–MMTTC, Gauhati University (formerly UGC–HRDC), over the past ten years.
2. To study the trends in teacher participation in the programmes organised by UGC–MMTTC, Gauhati University (formerly UGC–HRDC), over the past ten years.
3. To study the transactional methodologies adopted by resource persons in the programmes conducted at UGC–MMTTC, Gauhati University.

Methods and Materials

Method adopted for the study: The present study is an effort to study the Teachers' Training Programme of UGC- Malaviya Mission Teacher Training Centre (MMTTC), Gauhati University. Therefore, descriptive survey method is deemed the most suitable method for the present study.

Population of the study: Population of the present study consists of all the teacher participants participated in various Refresher Courses and Orientation/ Faculty Induction Programmes at the MMTTC, Gauhati University in the past ten years i.e. from 2015-16 to 2024-25.

Sample of the study: To accomplish the objectives of the study, a sample of 105 college and university teachers was selected using the judgemental sampling technique. Due care was taken by the researcher to ensure that the sample adequately represented participants from various Refresher Courses and Orientation/Faculty Induction Programmes conducted by the UGC–MMTTC, Gauhati University during the period under study. Accordingly, a total of 105 teacher participants were purposively selected for the study.

Tools for data collection

The following tools have been selected for the study-

1. **Information Schedule:** An information schedule was constructed by the investigator for the HRDC Gauhati University to get the official data maintained in the office.
2. **Self-Structured scale for teacher participants:** A scale was constructed by the investigator consulting with experts in the field to collect responses from teacher

participants. The scale includes both closed and open-ended questions with positive and negative statements. The items are in the form of self-statement with three and five-point Likert Scale, constructed in English Language.

Validity of the scale: The scale was checked for content validity by consulting ten subject experts from different universities and colleges in the concerned area.

Reliability of the scale: The internal consistency of the scale for teacher participants was established by using Cronbach's alpha reliability test, and a reliability of .84 was obtained for 50 sample teacher participants.

Results and Discussion

The results of the study are presented in tabular and graphical forms in accordance with the stated objectives.

Trend of various programmes

Malaviya Mission Teacher Training Centre, Gauhati University has organized a huge number of orientation or faculty induction programmes for newly appointed College and University teachers, refresher courses for in-service teachers and also short-term courses, workshop and webinars for principals and educational administrators, to address the evolving needs of educators. The trend of various programmes for the last ten years are presented in the following tables and figures.

Table-1

Trend of various programmes organised by UGC-MMTTC, Gauhati University (2015-2025)

Year	Orientation Programme/ Faculty Induction Programme	Subject-Based Refresher Course	Inter-disciplinary Refresher Course	Short Term Course	Workshop	Webinar	Total
2015-16	3	1	3	4	0	0	11
2016-17	4	3	5	4	0	0	16
2017-18	4	2	4	2	0	0	12
2018-19	4	4	4	8	0	0	20
2019-20	4	6	6	5	0	0	21
2020-21	3	5	5	4	1	3	21
2021-22	2	3	7	7	1	1	21

2022-23	4	3	6	14	4	2	33
2023-24	11	2	2	7	1	2	25
2024-25	16	2	2	4	1	1	26
Total	55	31	44	59	8	9	206

The data presented in the Table 1(a) revealed that the maximum number of programmes conducted in UGC-MMTTC, GU in the session 2022-23, which was 33 followed by the session 2024-25 with 26 programmes including Orientation/ Faculty induction programmes, Subject Based Refresher Course, interdisciplinary Refresher Course, Short Term Course, Workshop & Webinar. The session 2015-16 turned out with minimum number of programmes i.e. only 11 programmes.

Similarly, the table reveals that a total of 206 programmes were organised by MMTTC–GU over the past ten years. These included 55 orientation and faculty induction programmes for newly appointed faculty members to familiarise them with the academic environment and teaching methodologies; 31 subject-based refresher courses and 44 interdisciplinary refresher courses for in-service teachers to update their knowledge in specific or interdisciplinary areas; 59 short-term courses; and 17 webinars/ workshops focusing on professional development areas such as research ethics, e-content development, and MOOCs. A graphical representation of the total number of programmes conducted over the last ten years is presented in the figure below.

Figure-1

**Trend of various programmes organised by UGC-MMTTC, Gauhati University
(2015-2025)**

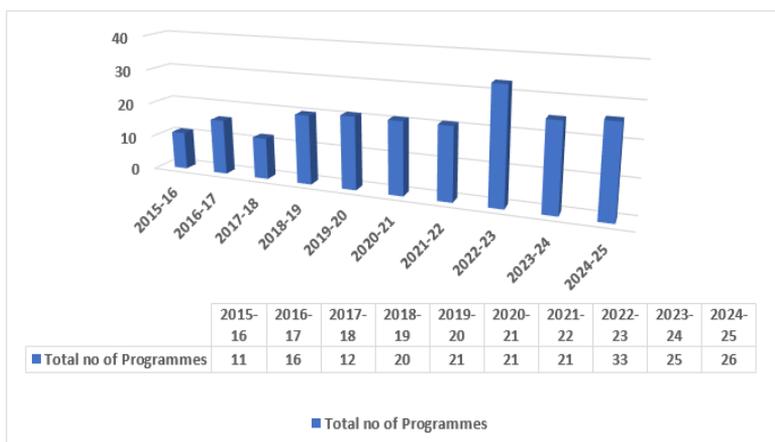


Table-2

**Trend of Teachers Participants in various programmes organised by UGC-
MMTTC, Gauhati University (2015-2025)**

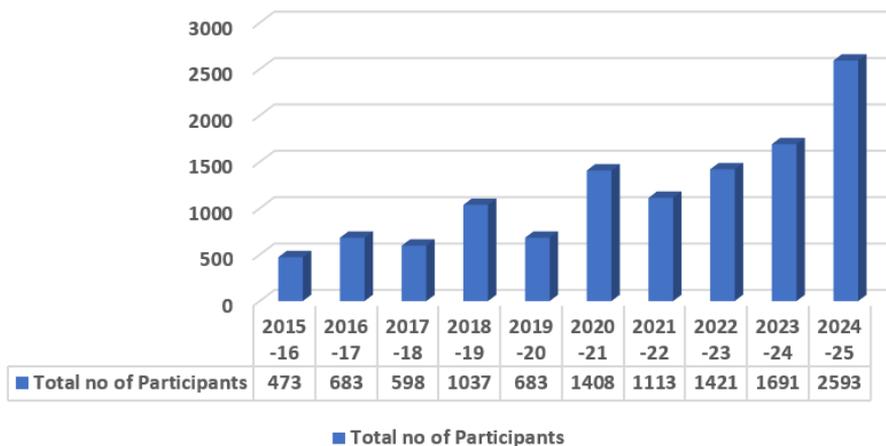
Year	No of participants						
	Orientation Programme/ Faculty Induction Programme	Subject-Based Refresher Course	Inter-disciplinary Refresher Course	Short Term Course	Webinars	Workshops	Grand Total
2015-16	124	51	119	179	0	0	473
2016-17	182	126	191	184	0	0	683
2017-18	190	93	178	137	0	0	598
2018-19	190	191	192	464	0	0	1037
2019-20	130	187	213	153	0	0	683
2020-21	123	313	162	234	554	22	1408
2021-22	69	160	274	299	257	54	1113
2022-23	125	103	196	498	246	253	1421
2023-24	1092	47	58	261	206	27	1691
2024-25 (7th February 2025)	1918	93	150	200	210	22	2593
Grand Total	4143	1364	1733	2609	1473	378	11700

The above table shows the trend of teacher participants in various courses organized by UGC-MMTTC, GU and it revealed that, in the past ten years a total of 11700 teacher participants from various colleges and universities across the country participated in these programmes. In the last session 2024- February,25, the maximum number of participants i.e. 2593 participants participated in various programmes of MMTTC, GU followed by its previous session with 1691 participants. In the session 2015-16, there were minimum number of participants i.e. only 473. Over the years, the MMTTC, GU shows a positive growth with increasing numbers of programmes as well as it's participants.

The table also revealed that a total of 11700 participants participated in the programmes organised by MMTTC-GU in the last ten years. There were 4143 participants

participated in orientation/ faculty induction programmes, 1364 participated in Subject-based refresher courses, 1733 participated in interdisciplinary refresher courses, 2609 participated in short term courses, 1473 participated in webinars and 378 participants participated in workshops. The year wise participants trend is also represents in the figure below-

Figure-2
Trend of teacher participants organised by UGC-MMTTC, Gauhati University (2015-2025)



Transactional Methodologies of the Resource Persons in Various Programmes

To fulfil this objective, the investigator collected data from teacher participants based on their perceptions of the enrichment of their content understanding, the transactional methods used by resource persons during in-service training programmes, and the usefulness of these methodologies in enhancing interaction. The analysis is presented in the following tables -

Table-3.1

Perception of participants regarding the enrichment of their understanding of the content transacted in the classroom.

Sr. No.	Enrichment of participant's understanding	Frequency	Percentage
1	To a large extent	43	40.95
2	To some Extent	58	55.24
3	Not at all	4	3.81
	Total	105	100

It is observed from Table 3.1 that, out of 105 participants, 43 (40.95%) found the transactional method of resource person was helpful to a large extent in enriching their understanding of the course content in the classroom. Whereas, a significant number of participants, 58 (55.24%) opined that it helped them to understand the classroom content to some extent. Only, 4 (3.81%) of the respondents opined that the transactional methodologies were not beneficial for them to enrich their understanding of the content.

Table-3.2
Transactional Methods used by the resource persons during In-service Training Programmes.

Sr. No.	Transactional Method	Level of Usefulness		
		Frequently	Sometimes	Rarely
1	Lecture	84 (80%)	21 (20%)	0 (0%)
2	Demonstrations	34 (32.38%)	71 (67.62%)	0 (0%)
3	Practical Work	33 (31.43%)	63 (60%)	9 (8.57%)
4	Discussion	69 (65.71%)	30 (28.57%)	6 (5.71%)
5	Project work	20 (19.05%)	70 (66.67%)	12 (11.43%)
6	Group work	18 (17.14%)	66 (62.86%)	21 (20%)
7	Additional Activity	0 (0%)	2 (1.9%)	103 (98.1%)

Table 3.2 depicts that the most frequent method used by resource persons to transact the training content was the lecture method. 80% of respondents reported that resource persons used this method frequently and 20% reported that it was used sometimes during in-service training programmes.

Whereas, regarding demonstration, 32.38% of participants reported that it was used frequently and the majority of participants i.e. 67.62% opined that this method was used sometimes during training.

Similarly, according to the majority of participants i.e. 60%, reported that the practical work was used sometimes, 31.43% felt that it was used frequently and only 8.57% found that it was used rarely in the training.

Regarding discussion, the majority of participants, 65.71% viewed that this method was used frequently, 28.57% of participants found that it was used sometimes and only 5.7% of participants reported that it was rarely used during training.

On the other hand, only (17-19%) of participants reported that project work and group work were used frequently whereas (62-67%) opined that these were used sometimes and only (11-20%) of participants found that these were rarely used during in-service training.

Lastly, the table shows that regarding additional activities, only 1.9% of participants reported that it was used sometimes whereas the highest number of participants, 98% reported that it was used rarely by the resource person in training programmes.

Table-3.3

The usefulness of Transactional Methodologies for improving the interaction

Sr. No.	Item	Level of Usefulness		
		Least useful	Useful to some extent	Most useful
1	Improving Communication & Engagement	9 (8.57%)	54 (51.43)	42 (40%)
2	Fostering a Collaborative Learning Environment	11 (10.48%)	65 (61.9%)	29 (27.62%)
3	To align with Modern Educational Practice	8 (7.62%)	77 (73.33%)	20 (19.05%)
4	Improving Instructional Techniques	21 (20%)	53 (50.48%)	31 (29.52%)
5	Preparing for Diversified Classroom	24 (22.86%)	62 (59.05%)	19 (18.1%)

Table 3.3 reveals that 40% of participants found that they could improve communication and engagement in the interaction due to transactional methodologies used by the resource person. Similarly, 51.43% of participants reported that the methodologies were useful to some extent whereas only 8.57% of participants reported it was 'least useful' in improving their communication and engagement.

The majority of participants i.e. 61.9% reported that the transactional methodologies were useful for fostering a collaborative learning environment to some extent. And, 27.62% of participants viewed that it was most useful whereas a few participants i.e. 10.48% found it 'least useful'.

According to the majority of the participants i.e. 73.33%, the transactional methodologies were useful to align with modern educational practices to some extent. 19.05% found it 'most useful' and only 7.62% said that it was 'least useful'.

Transactional methodologies were useful to some extent for improving instructional techniques of teaching as perceived by majority of participants i.e. 50.48%, 29.52% of participants found it 'most useful' whereas 20% were of the view that these were 'least useful'.

A large number of participants i.e. 59.05% reported that methodologies were useful to some extent for preparing the participants for diversified classrooms. 22.86% were of the view that it was 'least useful' and only 18.1% of participants reported it 'most useful'.

Overall finding of the usefulness of transactional methodologies for improving the interaction reveals that methodologies were useful in improving Communication & Engagement, fostering a Collaborative Learning Environment, to align with Modern Educational Practice, improving Instructional Techniques and preparing for Diversified Classroom.

Qualitative Analysis of Open-ended Responses

The qualitative analysis of open-ended responses revealed major insights into the transactional approaches employed in the programmes organised by UGC-MMTTC, Gauhati University. The analysis of the participants' feedback revealed that the programmes were mostly regarded as useful, well-organised, and professionally beneficial, underscoring the centre's effective contribution to teacher development. Many respondents valued the clarity of the content presentation, the subject matter expertise of the resource persons, and overall scholarly environment of the training programmes. However, besides to these favourable perceptions, several aspects requiring enhancement were recognised. A prominent theme that emerged was the excessive dependence on the lecture method, which, although effective for conceptual understanding, was viewed as limiting opportunities for active participation and collaborative learning. Consequently, participants demonstrated a strong preference for more interactive teaching methods, such as group discussions, brainstorming exercises, peer learning, reflective activities, which they believed would significantly improve professional learning outcomes.

Suggestions for Improvement

The following suggestions have been forwarded by the researcher for further improvement of the programme, which may be useful for the policymakers and administrators.

1. Training programmes should reduce reliance on traditional lecture-based methods and implement a balanced combination of instructional modalities to foster active engagement.
2. Increased focus should be directed towards group discussions, brainstorming sessions, and collaborative tasks to foster participant involvement and collective learning experiences.
3. Incorporate structured peer-learning activities, including peer presentation, collaborative problem solving, experience sharing sessions, that enhance professional interchange among participants.
4. Reflective activities, such as reflective journals, self-assessment assignments, and guided reflection sessions, must be regularly incorporated to promote critical thinking and professional self-awareness.
5. Training modules must be restructured to prioritize participant engagement, facilitating flexibility, dialogue, and experiential learning, thus enhancing the overall efficacy and pertinence of professional development results.

Conclusion

The role of UGC-MMTTC, Gauhati University is vital in enhancing the quality of teacher education and professional development. The result of the present study revealed a satisfactory picture in terms of trends of programmes and participants of the training centre. The study also shows that the majority of the teacher participants are satisfied with the transacted content of the programmes and transactional methods. However, few of them expressed some amount of dissatisfaction due to some causes like majority of resource person used lecture method as common of interaction, a very few provisions for project work and group work etc. The real success of a course shall be realised when the intellectual and attitudinal gaining of the teachers are passed onto the students in their day to day classroom interaction (Bhagabati, 2018). Therefore, the centre should give more emphasis on interactive, brainstorming and exercise session rather than lecture method. It also can make a discussion with the participants about their choice and needs which should be properly considered. Further attention may be needed for inculcation of new training strategies with proper technological advancement for the all-round development of teachers.

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Emerging Concerns of Quality Education in Assam: A Study on the Issues and Challenges Faced by the School Heads in Sonitpur District

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Abstract

Quality education is a multidimensional construct encompassing student performance, teacher competence and pedagogy, school culture and environment, infrastructural adequacy, community engagement, and effective leadership. Achieving these dimensions, however, becomes challenging when schools encounter various hindrances ranging from student absenteeism to systemic and structural deficiencies. The nature and intensity of these issues vary across localities, shaped largely by demographic and socio-cultural contexts. Persistent challenges have constrained the state education system in attaining the desired learning outcomes, as reflected in national assessments such as NAS, Gunotsav, and ASER. Despite repeated emphasis on educational quality in successive National Education Policies, the expected outcomes remain elusive. It is therefore imperative to acknowledge that unresolved issues—whether minor or major—undermine the broader goal of ensuring quality education. A coordinated effort among all stakeholders is essential for diagnosing the key obstacles and developing effective, evidence-based interventions that strengthen school education at every level.

This study identifies emerging issues and challenges affecting school education and proposes strategic measures to address them. The findings offer pathways for systemic improvement, with the ultimate aim of enhancing the overall quality of education in schools.

Keywords-*Quality education, issues and challenges, school education, learning outcomes.*

Introduction

Overview

Concerns surrounding the achievement of universal quality education in India have persisted since the introduction of the first National Education Policy in 1968. Although significant progress has been made in expanding access to schooling, a wide range of systemic issues continue to hinder the realization of meaningful and equitable educational outcomes. Initially, challenges emerged around the universalization of elementary education; over time, these have evolved into deeper concerns regarding

the quality and effectiveness of schooling. Numerous research studies confirm that unresolved issues – whether administrative, infrastructural, pedagogical, or socio-cultural-directly undermine learning outcomes and the overall functioning of the education system.

Goswami (2020) emphasizes that educational development rests on three pillars: access, equity, and quality. While India has substantially improved access to schooling across levels, quality indicators remain weak. Persistent problems such as high dropout rates, insufficient infrastructure, inadequate teacher availability, low attendance, and suboptimal learning achievements are still widely prevalent. The urgency of addressing these concerns is heightened by India's demographic advantage. According to Gautam et al. (2016), India's youthful population – averaging 29 years of age in 2020, positions the country to reap a demographic dividend, with one-fourth of the world's workforce projected to be Indian by 2040. However, leveraging this potential effectively depends on the strength and inclusiveness of the education system.

At the state level, particularly in regions such as Assam, disparities in educational quality remain pronounced. Despite significant central government support for school infrastructure development, Konwar (2017) notes that Assam lags behind other states on several performance parameters. Although primary-level enrolment statistics such as the GER (98.8) and NER (92.2) appear encouraging, these numbers mask deeper issues related to quality of teaching, inadequate facilities, and insufficient preparation of learners for higher grades.

Globally, quality education is understood as a holistic process encompassing social, emotional, mental, physical, and cognitive development. Morrison et al. (2022) highlight that true educational quality must be inclusive of learners' diverse backgrounds and needs. Yet, several structural challenges persist in India: limited emphasis on physical education and sports, inadequate sex education, insufficient focus on ethics and character development, and overcrowded classrooms that hinder individualized attention. Prameela further observes that teacher shortages, affordability barriers, outdated pedagogical methods, infrastructural gaps, excessive theoretical content, and a bulky curriculum continue to weaken the education system.

Secondary education, as highlighted by Parbin (2022), plays a crucial role in shaping the foundation for higher education and future capabilities. Despite government initiatives, secondary education in many regions remains weak due to inadequate infrastructure, poor classroom conditions, absence of well-equipped laboratories, insufficient furniture, and limited opportunities for holistic development. Students often lack proper guidance and counseling, further widening the gap between curriculum expectations and actual learning levels. Rohman (2012) similarly notes that secondary education in Assam fails to meet national objectives because it does not

adequately address students' interests or societal needs, nor does it prepare them for higher education or the demands of modernization.

Suhrid (2022) acknowledges India's progress in expanding literacy and primary education attendance rates. However, persistent concerns remain across all levels of schooling, such as learning gaps, teacher absenteeism, peer-influenced misconduct among students, inadequate infrastructural support, high student-teacher ratios, and absence of career counselling. Sinha (2022) further stresses that preparing the younger generation for emerging social and economic challenges requires deep attention to every dimension of educational provision—administration, curriculum, teaching, and community involvement.

At the national level, the Indian education sector—comprising nearly 1.5 million schools, more than 265 million students, and over 11 million teachers—plays a pivotal role in the country's socio-economic transformation. Reports from UDISE+ indicate improvements in basic school facilities, yet persistent challenges such as high dropout rates, uneven GER across stages, and poor foundational literacy and numeracy (FLN) continue to impede progress. These shortcomings highlight the urgent need for systemic reforms aimed at strengthening school governance, teacher preparedness, infrastructural adequacy, and community engagement.

Overall, the introduction underscores a critical reality: India's long-standing aspiration for universal quality education remains a work in progress. Structural gaps, socio-economic disparities, administrative weaknesses, and pedagogical limitations continue to challenge the nation's educational goals. Addressing these issues comprehensively is essential for building an education system capable of supporting India's developmental aspirations and preparing its youth for future challenges.

Statement of the Problem

The quality of school education, particularly student learning outcomes in schools of Sonitpur District, is unsatisfactory. This is evident from the findings of the National Achievement Survey (NAS) 2021, now known as PARAKH Rashtriya Sarvekshan.

Objectives of the Research

1. To identify the key factors influencing the teaching-learning process in schools, with a focus on understanding how these factors shape classroom practices and student learning outcomes.
2. To examine the issues and challenges encountered by schools that hinder their smooth and effective functioning, particularly those affecting academic performance, administrative efficiency, and the overall educational environment.

3. To propose evidence-based measures and leadership strategies aimed at addressing the identified problems, strengthening school functioning, and enhancing the educational outcomes of students.

Rationale

The basic premise or the base of conducting this study is the report of National Achievement Survey 2021 wherein the performances of the students in Sonitpur District are very poor in the key-grades (VIII and X) and across the key-subjects (MIL, Mathematics, Science, Social Science and English).

Theoretical Frameworks

Cognitive Learning Theory: Cognitive Learning Theory posits that a student's learning is shaped by a dynamic interaction between internal and external factors. Initially conceptualized by thinkers such as Plato and Descartes and later systematically developed by Jean Piaget in the 1930s, the theory emphasizes that learning is an active, mental process influenced by prior knowledge, perception, and cognitive development. Over time, it has become widely recognized that internal cognitive factors are significantly affected by external conditions within a learner's environment.

These external influences include physical, emotional, and behavioural elements arising from interactions with peers, teachers, school leaders, parents, and the broader community. Consequently, the functioning of a school-its climate, resources, practices, and relationships-directly and indirectly impacts students' learning experiences and outcomes.

In this context, the present study seeks to identify the internal and external factors, along with the emerging issues and challenges within schools, that either facilitate or hinder the teaching-learning process. Understanding these factors is essential for improving educational practices and enhancing student achievement.

Research Methodology

Research Method

This research employs an exploratory approach to identify and examine the underlying issues and challenges prevalent in the school education system of Sonitpur district, which contribute to the poor academic performance of students and schools. To obtain a comprehensive understanding of these concerns, the study incorporates both quantitative and qualitative data, which were systematically collected and analysed throughout the research process.

Population of the study

This study covers a total of 78 secondary and senior secondary schools from Sonitpur District, and considered the Head Teachers/ Principals as respondents.

Research Tools

This study utilizes questionnaire, interview schedules and focus group discussion for collecting the required data.

Data Collection

The data – both qualitative and quantitative, have been collected by field visits, google forms, focus group discussions and observations.

Emerging issues and challenges faced by the Schools**Administrative**

Most of the reasons identified by school heads are related to administrative aspects, which have emerged as alarming issues and challenges for their schools. These causes hindering the growth and development of schools in various academic endeavours.

School heads identified a wide range of administrative issues that significantly hinder the growth, development, and academic functioning of their institutions. These challenges limit effective governance, obstruct smooth operations, and adversely impact the quality of education. The major administrative concerns include:

- Lack of adequate financial support
- Shortage of teachers
- Poor or non-existent infrastructure
- Need for immediate repair and maintenance work
- Unavailability of sufficient desk–benches
- Absence of boundary walls
- Lack of kitchen facilities for mid-day meals
- High levels of student absenteeism
- Outstanding electricity bills
- Inadequate annual grants
- Absence of ICT teachers
- Student indiscipline
- Vacant Assistant Head Teacher/Vice Principal posts
- Shortage of non-teaching/support staff
- Insufficient number of classrooms
- Lack of administrative or financial (DDO) powers at the school level
- Poor maintenance of science and ICT laboratories
- Absence of an auditorium or activity hall

- Teacher irregularity
- Teachers taking leave without proper permission or prior information
- Lack of parental involvement in students' education
- Irregular release of funds or inadequate time for fund utilisation
- Need for training on record-keeping and financial management

Academic/ Teaching Learning

Several academic issues – both direct and indirect, are hindering students' learning processes and achievement levels. Many of these issues overlap with administrative challenges, amplifying their negative impact on classroom transactions and overall student outcomes. The key academic and teaching-learning challenges include:

- Majority of students being first-generation learners
- Significant learning gaps due to irregular attendance
- Shortage of teachers adversely affecting learning outcomes
- Infrastructural deficiencies obstructing effective classroom teaching
- Teachers requiring more training in modern teaching methods
- Low awareness among parents and communities regarding the value of education
- Need for subject-specific teachers
- Unavailability of need based vocational courses despite demand
- Compulsory celebration of multiple events reducing instructional time
- Lack of internet connectivity
- Non-implementation or non-sharing of training learnings by teachers
- Overcrowded classrooms
- High student dropout rates
- Poor socio-economic backgrounds of students, affecting learning continuity
- Language barriers and issues related to medium of instruction

Major Findings of Issues and Challenges in School Education

This study reveals a complex and interlinked set of challenges confronting school education in the district, cutting across teacher management, leadership, pedagogy, governance, infrastructure, parental engagement, and socio-linguistic contexts. These issues collectively impede the smooth functioning of schools and undermine students' academic outcomes. The findings, organized thematically, are presented below.

Teacher Shortage and Ineffective Teacher Management

One of the most critical problems affecting school education is the shortage and unequal distribution of teachers. Many schools operate with an extremely high Pupil-Teacher Ratio (PTR), sometimes reaching 1:80, while other schools have an excess of staff, with more than 70 teachers serving around 1000 students. Such disparities lead to inefficiencies and unequal learning opportunities for students.

Schools also face an acute shortage of subject-specific teachers, particularly in Mathematics, Science, English, and Hindi. Because these subjects require specialized pedagogical knowledge, assigning them to general teachers results in compromised learning outcomes. ICT-related teaching becomes dysfunctional when ICT teachers take leave, as schools rarely assign alternative staffing arrangements to manage ICT classes. Additionally, teacher attachments are often done without considering subject backgrounds, leading to mismatches between teacher expertise and classroom needs. At the foundational stage, the absence of ayahs or caretakers poses serious challenges in managing young children safely and effectively.

Ineffective Implementation of Vocational Education

Vocational education, though introduced to align schooling with livelihood-oriented skills, remains largely ineffective. Course transaction is weak, and the curriculum does not provide a meaningful pathway to higher studies or employment. The absence of regular vocational teachers in many schools leads to student disinterest and high dropout rates from vocational streams. As a result, the programme is unable to fulfil its intended purpose of equipping learners with practical competencies.

Issues Related to Training and Professional Development

The professional development landscape also suffers from several structural challenges. The absence of a comprehensive training calendar leads to overlapping training schedules, causing disruption in teaching-learning processes. Training venues often lack basic infrastructure, including adequate seating, sanitation, and functional training halls, reducing the quality and effectiveness of training programmes.

Moreover, many teachers show reluctance to attend trainings. This reluctance stems from repeated deputation of the same teachers, lack of motivation, and limited perceived relevance of training content. Without proper participation, the impact of capacity-building initiatives becomes restricted.

Leadership and School Governance Gaps

Effective leadership is central to school improvement, yet many schools lack a clear institutional vision and direction. Several schools do not have a School

Development Plan (SDP), and where SDPs exist, implementation is weak due to limited understanding of their purpose. Knowledge-sharing practices are also absent; teachers rarely disseminate insights from training programmes, resulting in stagnation of collective professional growth.

Resource mobilization is another weak area. School heads and teachers seldom engage with alumni, NGOs, community leaders, or other stakeholders to generate resources for institutional development. This reluctance limits the schools' ability to enhance infrastructure, student support systems, or co-curricular resources.

Teaching-Learning Challenges

The quality of classroom processes is hampered by multiple issues. ICT integration is minimal, and teachers rarely employ ICT-based pedagogy despite infrastructural investments. Library resources are underutilized, reflecting low reading motivation among students and a poor reading culture.

A significant challenge is the poor foundational learning of students, particularly in foundational literacy and numeracy. Socio-economic disadvantages faced by families further widen learning gaps, which persist as students move to higher grades. Teachers often fail to share students' academic progress with parents, even during Parent-Teacher Meetings, resulting in limited parental support for learning.

Chronic absenteeism is prevalent in tea garden and minority-dominated areas. Such absenteeism leads to cumulative learning deficits that negatively affect learning continuity and academic performance.

Governance and Administrative Issues

Several governance-related issues further weaken the school ecosystem. Many high schools were upgraded to higher secondary levels without appointing Post Graduate Teachers or providing necessary laboratory facilities. Such partial upgrades compromise the quality of higher secondary education.

Schools also experience misuse of school property, including vandalism, substance abuse on campuses during holidays, and theft. Electricity bills often exceed annual grants, creating financial pressure on schools. Moreover, governing bodies like SMCs/SMDCs sometimes become autocratic when members remain in positions for extended periods, creating conflict with head teachers and hindering school functioning.

Low student enrolment, partly due to unregulated mushrooming of private schools, has led to the amalgamation of schools. Student indiscipline, including consumption of tobacco and alcohol and use of foul language, is widespread, affecting school climate and moral development.

Teacher workload distribution is also problematic; responsible teachers are repeatedly burdened with additional duties, while others evade responsibilities, creating an imbalance and workplace dissatisfaction.

Issues Related to the Siksha Setu App

Although the Siksha Setu App aims to streamline administrative processes, its implementation faces several obstacles. Teachers apply for leave online without informing school heads, and higher authorities approve such leaves without local verification, disrupting school management. Many teachers lack orientation in using the app, and technical issues – particularly with face recognition and poor internet connectivity – further hamper attendance recording.

Infrastructural Inadequacies

Infrastructure remains a persistent concern across many schools. Persistent issues include shortages of classrooms and furniture, inadequate sanitation facilities, lack of separate toilets for boys and girls, and absence of disabled-friendly toilets. Several science stream schools function without laboratories, and many lack boundary walls, making them vulnerable to vandalism.

Menstrual hygiene management systems are either absent or improperly maintained due to prevailing social taboos. These infrastructural deficiencies significantly constrain quality learning environments and impede the functioning of schools.

Challenges in Higher Secondary Education

Higher secondary schools face acute shortages of teachers. Despite possessing postgraduate qualifications, many graduate teachers refuse to conduct higher secondary classes because such engagements increase workload without additional compensation. Vacancies for higher secondary teachers remain unfilled for years, affecting curriculum coverage and academic outcomes.

Higher secondary schools also lack adequate support staff, even though administrative responsibilities increase at this level. Furthermore, schools do not receive timely reimbursement of fees for free admissions, unlike colleges, creating financial strain. Funds are often released at the last minute, making judicious utilization difficult.

Gunotsav, the major school evaluation initiative, remains largely outcome-centric and does not include teacher assessment or systematic intervention mechanisms, limiting its potential to drive school improvement.

Challenges in Tea Garden Schools

Schools in tea garden areas face some of the most acute challenges. Due to lack of qualified teachers, tea garden management often appoints office workers as makeshift teachers, resulting in severe learning gaps. Parental awareness is extremely low, with many parents disengaged from children's education and affected by alcoholism and difficult home environments. Students frequently remain absent or drop out. The acute shortage of teachers and negligible government support exacerbate the crisis.

Challenges of Multilingualism

Language barriers are prominent in tea garden areas, char-chapori regions, and Bodo-medium schools. Many students understand only their home languages, and teachers posted from other districts often lack proficiency in local languages. This hinders classroom communication, reduces student confidence, and limits participation. DIKSHA content also lacks adequate resources in local languages, restricting digital learning opportunities.

Issues of Parental Awareness and Community Support

Low parental awareness is a recurring theme across schools. Many parents do not monitor their children's attendance, academic progress, or behavioural issues. Adolescents often face emotional instability, early marriages, substance abuse, or violent behaviour without adequate parental guidance. Community involvement is also minimal unless their own children are enrolled in the school. As a result, communities show little concern for school property, environment, or functioning, leading to deterioration of school ambience and learning conditions.

Summary of Suggestions and Policy Recommendations

Improving the quality of school education requires a multi-pronged, systemic approach addressing teacher management, vocational education, training systems, leadership, parental engagement, classroom processes, governance, technology integration, infrastructure, and community participation. The following summary synthesizes the policy recommendations into a coherent framework, highlighting their intent, underlying rationale, and expected impact.

Teacher Management and Deployment

A central concern is the irrational distribution and ineffective deployment of teachers across schools. To resolve this, the recommendations emphasize teacher rationalization, ensuring equitable allocation, particularly transferring surplus teachers from advantaged schools to those facing shortages.

A critical strategy is the appointment of subject-specific teachers, especially in Mathematics, Science, English, and other key subjects where learning deficits are severe. Maintaining PTR alone is insufficient; schools must ensure subject-wise teacher availability, and any temporary attachments must align with the institution's academic needs.

To incentivize teacher participation in higher classes, the government should introduce additional allowances for teachers with advanced qualifications who take senior secondary classes. Moreover, expeditious recruitment of Post Graduate Teachers (PGTs) through special drives is essential to fill long-standing vacancies.

The policy also recommends posting teachers closer to their home districts, reducing psychological stress and improving their engagement and productivity in school activities.

Strengthening Vocational Education

There is a strong recommendation to streamline vocational education, which currently suffers from poor implementation and uncertain career pathways. Schools must appoint full-time vocational instructors and ensure job stability to encourage quality teaching.

To strengthen continuity, vocational courses should be offered seamlessly from the secondary to the higher education level, adopting interdisciplinary pathways. Introducing a vocational stream in every school can expand livelihood opportunities for students, especially in rural and marginalized communities.

Improving Training Systems and Professional Development

Teacher professional development is a major lever for improving classroom instruction and learning outcomes. A comprehensive annual training calendar – developed collaboratively and released at the start of the academic year, is essential to avoid overlap and disruption of teaching time. The schedule should avoid examination periods and incorporate stakeholder input.

Residential training programmes are encouraged to allow teachers to fully focus on learning without external obligations. The calendar must prioritize critical areas such as pedagogy, inclusive education, ICT integration, life skills, ECCE, FLN, school health, and TLM development.

To strengthen the effectiveness of training, there must be an outcome-based assessment system, including assignments or examinations, instead of relying solely on pre- and post-tests. Training venues should meet basic infrastructural standards to ensure participant comfort and engagement.

Further, teachers should be able to enrol in choice-based professional development courses that enhance their skills without affecting classroom teaching time.

Strengthening Vision, Mission, and School Development Plans

Every school must develop a clear Vision Statement and School Development Plan (SDP) that guide institutional goals, resource planning, and performance monitoring. These should be publicly displayed, collectively created, and implemented in alignment with the School Leadership Development Programme (SLDP).

To reinforce accountability, these components should also be integrated into Gunotsav indicators, ensuring regular monitoring and adherence.

Enhancing Parental and Community Awareness

Since parents and communities significantly influence student attendance and behaviour, there must be dedicated awareness drives focusing on the importance of regular attendance, long-term benefits of education, prevention of substance abuse, and parental support for learning.

Such campaigns should be led by DIETs, CTEs, Normal Schools, and BTCs in collaboration with local leaders, with special emphasis on tea-garden communities where educational awareness is comparatively lower.

Improving Classroom Processes and Teaching-Learning Practices

Effective pedagogical practices are crucial for raising learning outcomes. Schools should adopt mandatory teaching aids, monitored by educational officials, and integrate them into Gunotsav. Classrooms may be converted into chair-free learning spaces, enhancing teacher mobility and student engagement.

Teachers require continuous training in modern pedagogy, ICT-integrated teaching, and multilingual classroom strategies. SSA's ongoing pilot projects on multilingual education – especially in tea-garden regions, should guide scalable implementation.

Enhancing Teacher Motivation

Teacher motivation is indispensable for improved performance. Schools should collect anonymous student feedback on teacher performance and operationalize mentor-mentee systems.

Preference should be given to deploying local teachers, as they tend to demonstrate stronger commitment and community rapport.

Minimizing Non-Academic Burden on Teachers

Teachers should be shielded from excessive non-academic responsibilities, enabling them to focus on classroom instruction. Administrative and clerical burdens must be redistributed or minimized.

School Safety and Security

Schools must adopt stronger safety measures, including installing CCTV cameras, connecting alarms to local police stations, and activating Village Defence Parties for night surveillance. These steps are crucial to prevent vandalism, theft, and drug-related incidents.

Focus on Tea Garden Schools

Tea garden communities face multiple barriers including low parental awareness, poor infrastructure, and acute teacher shortages. To address these issues:

- A separate teacher cadre for Tea Garden Model Schools should be created.
- Government should consider taking over tea-garden managed schools.
- Norms and minimum standards must be enforced rigorously.
- Awareness drives must address alcoholism, education, and student welfare.
- All government schooling benefits should extend to tea garden schools.

Ensuring Regular Student Attendance

Schools must implement creative and engaging strategies to make learning joyful, while a policy-level intervention is needed to ensure consistent attendance. Parents must be sensitized with support from local administration, NGOs, alumni, and education institutions.

Student Guidance and Counselling

Schools or school complexes should establish Career Guidance and Counselling Cells staffed with experts to support students academically, emotionally, and psychologically. Programs promoting adolescent empowerment must be conducted regularly.

ICT Integration in Teaching and Administration

All teachers, not only ICT instructors, must be trained to use digital tools and ICT-integrated pedagogy. Computer literacy should be promoted among students.

Collaborative Learning Among Teachers

Teachers must be required to share training outcomes with colleagues, fostering a culture of collective learning and capacity-building.

Addressing Electricity-Related Constraints

To reduce financial burden, the government should offer electricity bill subsidies and implement solar energy systems across schools.

Strengthening School Management Committees (SMC/SMDC)

Periodic rotation of committee leadership is necessary to prevent autocracy. SMCs/SMDCs must be held accountable for ensuring effective school functioning and learning outcomes.

Promoting Library Use

Schools should adopt innovative initiatives such as library walks, regular library periods, and recognition schemes like Best Reader Awards. The government should appoint librarians—at least at the higher secondary level or cluster level.

Strengthening the Foundational Stage

Primary and foundational learning must be bolstered through:

- supervision by nearby secondary school principals
- competency-based teaching
- joyful learning methodologies
- ensuring class-wise teacher availability
- creation of a dedicated foundational-stage teacher cadre
- appointing caretakers/ayahs

These interventions are essential to improve foundational literacy and numeracy.

Improving Student Discipline and Conduct

Schools must establish mechanisms such as anonymous reporting systems through complaint boxes to monitor harmful behaviours and promote accountability.

Enforcing Minimum Standards for Private Schools

A strong regulatory framework, aligned with NEP 2020 and SARTHAQ recommendations, must be implemented through a state-level authority (SSSA) to ensure that private schools maintain minimum standards and contribute positively to educational outcomes.

Strengthening the Siksha Setu App

To improve digital administration:

- Leave approval must be restored to school heads.
- The app needs technical upgrades for reliability, accuracy, and offline functionality.
- Provision for group photo attendance should be introduced.
- Orientation programs should be conducted for teachers.

Ensuring Internet Connectivity

Areas beyond network coverage must receive enhanced connectivity, as data collected through Gunotsav can inform precise interventions.

Identifying and Addressing Student Behaviour Issues

Action research and case studies should be encouraged to analyze behavioural concerns and develop responsive strategies.

Infrastructure Development

Schools must receive adequate classrooms, desk-benches, boundary walls, science laboratories, and clear guidelines on receiving community donations. Infrastructure deficiencies must be addressed systematically to support quality teaching-learning.

Ensuring Tobacco- and Alcohol-Free School Environments

Stricter enforcement, supported by local bodies and NGOs, is needed to eliminate the sale and use of tobacco, alcohol, and drugs around school premises. Awareness programmes should reinforce these efforts.

Strengthening Financial Management

Government must ensure timely release of funds, proper utilization mechanisms, and prompt reimbursement of free admission fees. School heads and office assistants require hands-on training in financial management.

Enhancing Gunotsav Effectiveness

Gunotsav should evolve from an evaluation-only exercise into an intervention-oriented initiative. Academic experts should accompany evaluation teams to provide real-time support. The evaluation must consider school context, include teacher assessment, and refine indicators through expert consultation.

Conclusion

The quality of school education is intricately linked to how effectively systemic challenges are addressed. Small issues, if ignored, escalate into major barriers to achieving meaningful educational outcomes. Therefore, continuous, collaborative, and innovative leadership is essential at all levels – school, community, and government. Sustainable improvement demands active participation of all stakeholders, including teachers, students, parents, community members, and administrative bodies. Empowering these groups through structured interventions, shared responsibilities, and strong policy support is critical for building a resilient, efficient, and equitable school ecosystem.

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Leadership Orientations of Secondary School Principals in Assam: A Comparative Study

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Abstract

Effective school leadership is fundamental to institutional performance, organizational climate, and professional collaboration. The leadership orientations adopted by school principals significantly shapes decision-making processes, staff motivation, and overall school effectiveness. The present study investigates the leadership orientations of secondary school principals in the Greater Guwahati region of Assam, India. It further examines whether leadership practices differ with respect to school management type, gender, and institutional location. A quantitative descriptive design was employed. The sample comprised 30 principals drawn through disproportionate stratified sampling from provincialized and private secondary schools affiliated with the Assam State Board of Secondary Education. The sample ensured representation from urban and rural schools and included both male and female principals. Leadership orientations was assessed using the Multifactor Leadership Questionnaire (MLQ-5X), administered on a five-point scale. Data were analyzed using descriptive statistics and independent samples t-tests. Results indicate that principals generally demonstrate moderate levels across leadership dimensions. Significant differences were observed between principals of provincialized and private institutions as well as between urban and rural schools. However, leadership orientations did not vary significantly by gender. The findings highlight the influence of institutional context on leadership practices in secondary education and provide implications for leadership development initiatives in Assam.

Keywords-*Leadership Orientations, Secondary Education, Provincialized and Private schools, Urban and Rural schools, Assam*

Introduction

Education is a continuous developmental process in which schools function as primary agents of social and intellectual transformation. Within this institutional framework, the leadership exercised by school principals plays a decisive role in shaping organizational climate, professional collaboration and academic outcomes. Effective leadership fosters shared vision, trust and coordinated action, thereby enhancing

institutional performance (Klein et al., 2013; Mbua, 2023). Leadership is broadly understood as the capacity to influence and guide individuals toward collective goals while sustaining motivation and commitment (Okeke et al., 2023; Azubuike, 2024; Ajmi, 2024). In educational settings, this influence extends beyond administrative control to the creation of environments that promote teacher engagement, student achievement and sustained school improvement.

Theoretical perspectives on leadership have evolved from traditional models such as trait, behavioural and contingency theories to contemporary approaches emphasizing transformational, transactional and participatory orientations (Northouse, 2007; Bass, 1995). In schools, these orientations manifest in distinct leadership patterns. Transformational leadership emphasizes inspirational motivation, intellectual stimulation, individualized consideration and idealized influence (Bass, 1995; Munir & Khalil, 2016). Transactional leadership relies on structured supervision, contingent rewards, and performance monitoring (Avolio & Bass, 1995). Democratic leadership encourages shared decision-making, whereas authoritarian and laissez-faire approaches reflect varying degrees of control and delegation (Achimugu & Obaka, 2019; Oguche, 2024). Each orientation carries specific implications for teacher morale, accountability, and institutional culture.

Empirical studies consistently affirm the relationship between leadership orientation and school effectiveness. Administrative competence, supervisory skills, and participatory practices have been positively associated with institutional performance (Akomolafe, 2012; Babatunde, 2014; Ogundele et al., 2015). Research employing the MLQ framework highlights the importance of incorporating teacher perceptions when evaluating leadership effectiveness (Munir & Khalil, 2016). Comparative investigations across contexts report that transformational and democratic orientations are frequently linked to improved school climate, teacher commitment and student outcomes (Ibrahim et al., 2020; Rasheed et al., 2021; Mbua, 2023; Osagie, 2024). Conversely, laissez-faire leadership is often found to have limited impact, while transactional or even authoritarian approaches may yield context-dependent results (Parveen et al., 2022; Ekpemogu et al., 2023; Almonawer et al., 2023). Recent evidence further suggests that transformational leadership remains prominent among contemporary school leaders and contributes to innovation and collaborative growth (Saima et al., 2025).

Although international scholarship on school leadership is extensive, localized comparative studies within the Indian secondary education context remain limited. In Assam, secondary schools operate under diverse management structures and function across urban and rural settings, potentially shaping principals' leadership orientations. Understanding how leadership patterns vary across these contextual dimensions is essential for informed policy and professional development. Against this backdrop, the present study examines the leadership orientations of secondary school principals in Assam and explores differences across management type, gender and school location. By situating leadership within its institutional and socio-geographical context, the

study seeks to contribute to the evolving discourse on educational leadership and its role in strengthening secondary education.

Statement of the Problem

The present study seeks to examine the leadership orientations of secondary school principals in Assam and to determine whether significant differences exist based on selected organizational and demographic variables. By adopting a comparative perspective, the study aims to generate context-specific insights into leadership practices in secondary education.

Accordingly, the study is titled “*Leadership Orientation of Secondary School Principals in Assam: A Comparative Study*”.

Significance of the Study

Secondary education constitutes a critical phase in the educational continuum, preparing learners for higher studies, employment and responsible citizenship. The effectiveness of this stage depends not only on curriculum and infrastructure but also on the quality of school leadership. Principals, as institutional heads, play a decisive role in shaping organizational climate, strengthening instructional processes and fostering collaborative professional cultures. Their leadership orientations influence teacher commitment, student engagement and overall school performance.

In Assam, secondary schools operate under diverse management structures and socio-geographical contexts. Recent trends indicate a steady growth of private secondary institutions, particularly in the Greater Guwahati region, accompanied by public perceptions regarding differences in administrative efficiency and leadership effectiveness. Such developments make it essential to examine leadership orientations across management types and contextual settings. By comparatively analyzing leadership orientations of principals in provincialized and private secondary schools and examining variations across gender and locality, the present study contributes empirical evidence to the discourse on educational leadership in Assam. The findings are expected to inform policy formulation, leadership preparation programs and professional development initiatives aimed at strengthening secondary school administration.

Objectives of the Study

The present study was designed to achieve the following objectives:

- To examine the leadership orientations of principals working in secondary schools in the Greater Guwahati region of Assam.
- To compare the leadership orientations of principals serving in provincialized and private secondary schools.
- To determine whether leadership orientations differ significantly with respect to the gender of principals.
- To analyze differences in principals’ leadership orientations based on the locality of the school (urban and rural).

Hypotheses of the Study

The study was guided by the following null hypotheses:

- **H₀₁:** There is no significant difference in leadership orientations between principals of provincialized and private secondary schools.
- **H₀₂:** There is no significant difference in leadership orientations of secondary school principals with respect to gender.
- **H₀₃:** There is no significant difference in leadership orientations of secondary school principals based on school locality

Research Method

The study employed a descriptive survey design to obtain data consistent with the stated objectives.

Population and Sample

The population comprised principals of provincialized and private secondary schools affiliated with the Board of Secondary Education, Assam (SEBA) within the Greater Guwahati region. Using disproportionate stratified random sampling, 30 principals were selected to ensure representation across key variables. The sample included 15 principals from provincialized schools and 15 from private schools. In terms of gender, 17 respondents were male and 13 were female. With respect to locality, 15 schools were urban and 15 were rural. A disproportionate stratified random sampling technique was employed to ensure meaningful comparison across key subgroups. The population of provincialized and private secondary schools in the Greater Guwahati area is unequal; therefore, proportional sampling would have resulted in underrepresentation of one group. To address this limitation and enhance comparative validity, an equal number of principals (15 provincialized and 15 private) were deliberately selected. Similar stratification was applied for gender and school location to ensure balanced representation. This approach improved analytical clarity and strengthened the internal validity of the study.

Tools Used

The study employed the Multifactor Leadership Questionnaire (MLQ-5X) developed by Bass and Avolio (1995). The instrument consists of 45 items designed to measure transformational, transactional, and non-transformational (*laissez-faire*) leadership orientations. Responses were recorded on a five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5). The MLQ is widely used in educational leadership research and has demonstrated high reliability and construct validity. A pilot study was conducted to ensure clarity and suitability of the instrument in the local context.

Administration of the Instrument

Data were collected through direct administration of the questionnaire. The investigator

personally contacted each principal, explained the purpose of the study, and provided instructions for completing the instrument. Respondents were given adequate time to respond, and confidentiality was assured.

Statistical Techniques

Data were analyzed using both descriptive and inferential statistics, including:

- Percentage (%)
- Mean (M)
- Standard Deviation (SD)
- Independent samples t-test

Results

Data analysis was conducted in accordance with the objectives of the study. The responses were organized, classified, and statistically analyzed to obtain meaningful insights into the leadership orientations of secondary school principals.

Table-1
Descriptive Statistics of Principals' Leadership Orientations as perceived by Leader

Sr. No.	Principals' Leadership Orientations	N	Min.	Max.	Mean	S.D.
1.	Leadership Orientations (Composite Score)	30	84	131	108.2	12.45
2.	Transformational Leadership	30	57	79	69.54	8.63
3.	Transactional Leadership	30	32	49	42.31	5.43
4.	Non-Transformational Leadership	30	0	8	2.7	2.6

Interpretation

Table 1 presents the descriptive statistics of principals' leadership orientations based on composite and dimensional scores. The mean composite leadership score of 108.2 (SD = 12.45) indicates that, overall, principals demonstrated a moderate level of leadership effectiveness. Among the leadership dimensions, transformational leadership recorded the highest mean score (M = 69.54, SD = 8.63), suggesting that principals more frequently practiced behaviours such as inspirational motivation, individualized consideration, and intellectual stimulation. Transactional leadership showed a comparatively lower mean score (M = 42.31, SD = 5.43), indicating moderate reliance on contingent rewards and supervisory mechanisms. Non-transformational

(laissez-faire) leadership recorded the lowest mean ($M = 2.7$, $SD = 2.6$), reflecting minimal use of passive or avoidant leadership practices. Overall, the results suggest a stronger inclination toward transformational leadership than transactional or non-transformational orientations.

Table-2
Percentage Distribution of Principals' Leadership Orientations from Leader perspective

Range of Scores	Level	Frequency	Percentage (%)
P80 and above	Excellent	2	6.7%
P66 – P79	Good	8	26.7%
P35 – P65	Average	12	40%
P21 – P34	Poor	4	13.3%
P20 and below	Very Poor	4	13.3%

Interpretation

Table 2 presents the percentage distribution of principals' leadership orientations across five performance categories based on composite scores. The analysis reveals that a small proportion of principals (6.7%) demonstrated an excellent level of leadership orientation, while 26.7% were categorized as good. The largest segment (40%) fell within the average category, indicating a moderate level of leadership effectiveness among most respondents. Additionally, 13.3% of principals were classified as poor and an equal proportion (13.3%) as very poor in their leadership orientation. Overall, the distribution suggests that although a minority of principals exhibit high leadership effectiveness, the majority function at a moderate level, with a notable proportion requiring improvement in leadership practices and professional development to achieve higher effectiveness.

Table-3
Percentage Distribution of Different Dimensions of Principals' Leadership Orientations from Leader Perspective

Range of Scores	Level	Frequency	Percentage (%)
Transformational	Excellent	3	10%
	Good	6	20%
	Average	14	46.6%
	Poor	4	13.4%
	Very Poor	3	10%

Transactional	Excellent	-	0%
	Good	5	16.7%
	Average	13	43.3%
	Poor	8	26.7%
	Very Poor	4	13.3%
Non-Transactional	Excellent	-	0%
	Good	3	10%
	Average	9	30%
	Poor	13	43.3%
	Very Poor	5	16.7%

Interpretation

Table 3 shows the percentage distribution of principals leadership orientations across levels of performance for each leadership dimension. For transformational leadership, 10% of principals were rated excellent, 20% good, and nearly half (46.6%) average. Smaller proportions fell into the poor (13.4%) and very poor (10%) categories. This indicates that transformational practices are present but are demonstrated at a moderate level by most principals. In the case of transactional leadership, none of the principals reached the excellent category. While 16.7% were rated good and 43.3% average, a substantial proportion were categorized as poor (26.7%) and very poor (13.3%). This suggests moderate reliance on structured supervision and reward-based management, though effectiveness varies. For non-transactional (passive/avoidant) leadership, no principal achieved an excellent rating. Only 10% were classified as good and 30% as average, whereas the majority were rated poor (43.3%) and a substantial portion were categorised as very poor (16.7%). This pattern indicates that passive leadership behaviours are generally minimal. Overall, the distribution across dimensions suggests a predominance of transformational orientations at a moderate level, limited strength in transactional practices, and minimal presence of passive leadership tendencies.

Table-4
Comparison of Leadership Orientations Between Provincialized and Private School Principals

Sample Group	Sample Size (N)	Mean	SD	t-value
Provincialized	15	109.45	11.41	2.23 (S)
Private	15	115.88	8.69	

Interpretation

Table 4 presents a comparison of leadership orientations between principals of provincialized and private secondary schools. The mean leadership orientations score for private school principals ($M = 115.88$, $SD = 8.69$) was higher than that of provincialized school principals ($M = 109.45$, $SD = 11.41$). The obtained t-value (2.23) exceeds the critical value at the 0.05 level of significance ($df = 28$), indicating a statistically significant difference between the two groups. This result suggests that principals of private secondary schools demonstrate comparatively stronger or more effective leadership orientations than those serving in provincialized schools.

Table-5
Comparison of Leadership Orientations by Gender

Sample Group	Sample Size (N)	Mean	SD	t-value
Male	17	109.66	12.33	1.92 (NS)
Female	13	117.45	8.26	

Interpretation

Table 5 compares leadership orientations of secondary school principals based on gender. Female principals obtained a higher mean score ($M = 117.45$, $SD = 8.26$) than their male counterparts ($M = 109.66$, $SD = 12.33$). However, the calculated t-value (1.92) does not exceed the critical value at the 0.05 level of significance ($df = 28$) indicating that the difference is not statistically significant. This finding suggests that leadership orientations do not differ meaningfully between male and female principals implying that gender is not a determining factor in leadership orientation within the study context.

Table-6
Comparison of Leadership Orientations by Location

Sample Group	Sample Size (N)	Mean	SD	t-value
Urban	15	111.00	12.24	2.47 (S)
Rural	15	114.20	8.25	

Interpretation

Table 6 presents the comparison of leadership orientations of principals based on school location. Principals serving in rural schools recorded a higher mean score ($M = 114.20$, $SD = 8.25$) than those in urban schools ($M = 111.00$, $SD = 12.24$). The calculated t-value (2.47) exceeds the critical value at the 0.05 level of significance ($df = 28$) indicating a statistically significant difference between the two groups. This finding suggests that leadership orientations vary by geographical context with rural school principals demonstrating comparatively stronger leadership orientation than their urban counterparts.

Discussion

The findings of the present study indicate that principals demonstrated a moderate overall level of leadership orientations with transformational leadership emerging as the most prominent dimension. This predominance aligns with research highlighting transformational practices as key drivers of school improvement, teacher commitment, and positive institutional climate (Ibrahim et al., 2020; Rasheed et al., 2021; Mbua, 2023; Osagie, 2024; Saima et al., 2025). The comparatively lower presence of transactional leadership suggests moderate reliance on supervisory and reward-based mechanisms, while the minimal expression of non-transformational (*laissez-faire*) behaviours indicates that passive leadership tendencies are not characteristic of the principals studied. This pattern supports earlier findings that *laissez-faire* leadership has limited effectiveness in educational settings (Ekpemogu et al., 2023).

The distribution of leadership levels further shows that most principals function within an average effectiveness range with relatively few demonstrating highly effective leadership. This supports the view that leadership effectiveness is closely tied to administrative competence, supervisory skills, and participatory practices (Akomolafe, 2012; Babatunde, 2014; Ogundele et al., 2015). It also underscores the need for professional development initiatives that strengthen leadership capacity. Significant differences were observed between provincialized and private school principals with private school leaders demonstrating stronger leadership orientation. This may reflect differences in institutional autonomy, accountability structures and performance expectations. Similar context-dependent leadership variations have been noted in comparative studies of educational institutions (Almonawer et al., 2023; Parveen et al., 2022). In contrast, gender did not significantly influence leadership orientations indicating that leadership orientation is not determined by gender but by professional competence and contextual engagement. A significant difference was also found based on school location, with rural principals demonstrating comparatively stronger leadership orientation than urban counterparts. This may reflect contextual demands that require rural school leaders to adopt more adaptive and participatory leadership approaches to address resource constraints and community expectations.

Conclusion

Leadership orientation is a critical determinant of school effectiveness which helps in shaping school climate, strengthening teacher commitment and improving student outcomes. The findings indicate that secondary school principals in the Greater Guwahati region demonstrate a moderate overall level of leadership orientation, with transformational leadership emerging as the dominant and most effective approach. Transactional practices were applied at a moderate level, while non-transformational tendencies were minimal. Although a small proportion of principals exhibited high leadership effectiveness, a considerable number functioned

within average to lower performance ranges, particularly in transactional and passive dimensions. A significant difference was observed between school management types with private school principals demonstrating stronger leadership orientations than their provincialized counterparts, possibly reflecting differences in accountability structures and organizational expectations. Gender did not significantly influence leadership orientations suggesting that leadership effectiveness is independent of sex. However, school location emerged as a significant factor with rural principals displaying comparatively stronger leadership characteristics, potentially due to closer community interaction and greater contextual responsiveness. Overall, the study underscores the need for context-sensitive leadership development initiatives that strengthen transformational competencies. Coordinated efforts among policymakers, educational authorities, and professional training institutions are essential to build leadership capacity and sustain school improvement across diverse institutional settings. Emphasizing transformational and participatory practices in leadership development programmes can enhance both academic and administrative effectiveness in secondary schools.

Recommendations

In light of the findings, several measures are suggested to strengthen leadership orientations among secondary school principals in the Greater Guwahati area. The selection and appointment process should give priority to candidates with formal leadership training, administrative competence and relevant professional experience. Emphasis should be placed on ethical conduct, professional integrity and the development of constructive relationships with teaching and non-teaching staff. Principals should promote systematic planning, effective organization of academic and co-curricular activities and participatory decision-making practices to enhance institutional functioning.

Continuous professional development is essential for strengthening leadership capacity. Regular in-service training, leadership workshops, seminars, and refresher courses should be institutionalized to foster transformational leadership competencies. Mechanisms for recognizing and rewarding exemplary leadership practices may further motivate principals to sustain high standards of performance. Future research may extend this work by examining principals' administrative and managerial functions across different educational levels including supervision, financial management and organizational climate.

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A Study on Scientific Interest Among Secondary School Students in Darrang District of Assam.

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Abstract

The present study aims to investigate scientific interest among secondary students in the Darrang district of Assam. Scientific Interest, more specifically, is the interest in conducting scientific activities and experiments for seeking new knowledge and implementing new ideas. It is the predisposition of an individual to engage with the domain of science driven by curiosity and a desire for understanding. However, scientific interest is more than liking the subject of science; it is a complex trait that combines curiosity, observation, logical reasoning, experimentation, and the ability to apply knowledge to real-life problems. There are some studies done on scientific interest among secondary students at the national level. But no research has been conducted for the state of Assam. That is why the investigator intends to investigate scientific interest among the secondary school students of Darrang District of Assam. For this study, a sample of 504 students (266 males and 238 females) was selected from various Government and Private secondary schools, consisting of both Assamese medium schools and English medium schools of Darrang district, by using a stratified random sampling technique. The tool used in the present study was Scientific Interest Scale, developed and standardized by K.S. Misra. The investigator found that the majority of students showed a low level of scientific interest. There was no significant difference in the scientific interest of secondary school students based on gender, type of management or the medium of instruction.

Keywords - Science, Interest, Scientific Interest, Secondary Students

Introduction

The present study is an investigation of Scientific Interest among Secondary school students of Darrang District. Interest is a powerful motivator in learning. In a general psychological sense, it is a disposition that directs behaviour and causes an individual to seek out particular objects, activities, or experiences. Scientific interest, more specifically, is "concerned with interest in conducting scientific activities for

seeking accurate knowledge to conduct experiments to implement new ideas". It is an individual's predisposition to engage with the domain of science, driven by curiosity and a desire for understanding.

Scientific interest can be defined as a person's curiosity to understand things logically and systematically. It is not limited to studying science as a subject in school. Rather, it is the habit of asking questions, observing carefully, and trying to find reasons behind everyday events (Hidi & Renninger, 2006; Schiefele, 1991).

From an educational point of view, scientific interest is very important for meaningful learning. A student who has scientific interest does not study only to pass examinations. Instead, the student tries to connect classroom learning with real situations. This connection between theory and real life makes learning more practical and deeper (Schiefele, 1991). A student with scientific interest does not stop only at memorising facts, but seeks to understand why something happens. They generally demonstrate qualities like curiosity, creativity, problem-solving and logical thinking.

Scientific interest is closely related to research orientation. Research begins with simple curiosity. When a learner notices that some classmates perform better in the morning than in the afternoon and starts thinking about possible reasons, it shows the beginning of research thinking (Kumar 2015). Asking questions, collecting small pieces of information, and trying to analyse them are early signs of research aptitude. Thus, scientific interest forms the base for developing a research mindset.

The role of teachers is very important in developing scientific interest. When teachers encourage students to ask questions rather than remain silent, students feel confident thinking independently. Simple classroom activities can make students more engaged.

Scientific interest also helps in developing rational thinking. In today's world, people often receive many messages through social media, including health tips or miracle remedies. A student with scientific interest does not accept such information blindly but tries to verify it through reliable sources. This habit of checking facts before believing them reflects scientific temper and responsible behaviour (Hidi & Renninger, 2006).

Moreover, scientific interest makes learning enjoyable. When students discover something on their own, they feel excited and confident. This excitement reduces fear of difficult subjects and increases motivation. Learning becomes a process of discovery rather than pressure. In the present age of rapid technological development, scientific interest is necessary for every individual, regardless of academic background. It prepares students to think logically, solve problems, and make informed decisions in daily life. Therefore, developing scientific interest should be an important objective of education.

Scientific interest is not only beneficial at the individual level but also at the societal level. A society that encourages scientific interest among its citizens is more likely to progress in areas such as health, technology, agriculture, and environmental protection. Innovations and discoveries are the result of curious minds who question existing methods and try to improve them. For example, advancements made by scientists were rooted in deep scientific curiosity and research orientation. When young learners develop scientific interest, they are better prepared to contribute creatively to national development. Thus, promoting scientific interest is essential not only for academic success but also for building a progressive and innovative society.

In conclusion, scientific interest is not just about science experiments or laboratory work. It is a way of thinking that encourages curiosity, observation, evidence-based reasoning, and independent inquiry. By nurturing scientific interest, education can help learners become thoughtful, analytical, and responsible members of society (Hidi & Renninger, 2006; Schiefele, 1991).

Review of Related Literature

Saini (2023) conducted a study on 600 secondary students, and it showed that those with high aspirations scored much higher in scientific interest compared to low- aspiration students. Similarly, students with strong study habits scored well above those with average habits. In urban areas, girls outperformed boys, while rural gender differences were minimal. Government school students also showed slightly higher scientific interest than private school students. Overall, aspiration, study habits, gender in urban settings, and school type were key predictors of scientific interest.

Gundeep Kaur (2019) conducted a study on science interest of secondary school students in Ludhiana District with respect to demographic variables. Findings showed: (i) Urban students scored higher in science interest compared to rural students, though both groups were above average; (ii) Boys scored higher in science interest compared to girls, but again, both groups were above average.

Chakradhara Singh (2017) studied the science interest of 110 secondary school students. Findings indicated an average level of science interest among students. Gender and residence (urban vs rural) did not significantly affect science interest, suggesting equal parental expectations across groups. However, the medium of instruction and type of school influenced science interest, with urban and English- medium students showing higher levels.

Meena Laad (2011) investigated declining interest in physics at higher levels. Reported that poor middle school preparation leads to weak performance at the higher secondary level, discouraging students from pursuing physics further. Poor teaching practices and inadequate teacher training were also identified as factors reducing

student interest. The study recommended improved teacher preparation and stronger foundational teaching to revive physics interest.

Vasillia Christidou (2011) studied student interest, attitude, and images of science and scientists. Using comparative approaches, she found that gender, culture, and socio-economic status significantly influenced interest. These differences not only shaped achievement but also affected science-related career aspirations. She recommended designing curricula that account for student voices and cultural context.

Rationale of The Study

The need to cultivate scientific talents is a matter of national importance. Economic growth, technological development, and the psychological and social well-being of our country depend on the ability to identify, develop and utilise the scientific potential of its people.

The significance of this study is manifold. First and foremost, the study aims to bring to light the level of scientific interest among secondary school students of Darrang District of Assam. The performance of Assam in the latest National Achievement Survey (NAS) for science at the middle stage (Class 9) has been below the national average, which is significantly behind states like Punjab, Kerala, and New Delhi. Moreover, subsequent new reports (Guwahati Plus, 2024; Times of India, 2022) have highlighted to a steep decline in the number of students opting for science at the higher secondary level in Assam, reflecting a worrying lack of interest and confidence in pursuing science as a career. Thus, there is an urgent need to evaluate the level of scientific interest among secondary school students of Assam.

Also, the study is regionally significant. While national data is helpful, sometimes it can mask local and regional variations. There are some studies done on scientific interest among secondary students at the national level or in other states. But no research as such has been conducted for the state of Assam. In essence, this study seeks to provide baseline data for Assam so that necessary steps can be taken to amplify scientific interest among students and enhance the quality of science education at the grassroots level, thereby contributing to the larger national goal of building a scientifically literate and innovative society. and adjustment.

Operational Definition

Scientific Interest

Scientific interest can be defined as a person's curiosity to understand things logically and systematically. It is not limited to only the subject science, but it is a complex trait that combines curiosity, observation, logical reasoning, experimentation, and the ability to apply knowledge to real-life problems.

Secondary Students

The adolescent students studying in Classes IX and X are the secondary students.

Objective of the Study

- To assess the overall level of Scientific Interest of Class X students.
- To compare the Scientific Interest of Male and Female Class X students.
- To compare the Scientific Interest of Class X students of Government and Private secondary schools.
- To compare the Scientific Interest of Class X students of Assamese and English medium secondary schools.

Hypotheses of the Study

- **H₀₁:** There is no significant difference in the Scientific Interest of males and female Class X students.
- **H₀₂:** There is no significant difference in the Scientific Interest of Class X students of Government and Private secondary schools.
- **H₀₃:** There is no significant difference in the Scientific Interest of Class X students of Assamese and English medium secondary schools.

Delimitation

Only Class X students of secondary school are selected as samples.

Sample and Sampling Technique

Descriptive survey method is used to study the present problem. The sample consists of 504 secondary school students from Darrang District. Details of the samples taken for the study are given below.

Table-1
Sample selected for the study

Sl.No	Sample	Number
1	Entire sample	504
2	Male Students	266
3	Female Students	238
4	Government School Students	319
5	Private School Students	185
6	English Medium School Students	178
7	Assamese Medium School Students	326

Tools

The tool used for the study was Scientific Interest Scale, developed and standardized by K.S. Misra

Statistical Techniques

- Basic statistical techniques such as mean, median and standard deviation
- Significance of difference between means

Data Analysis

Objective 1. To assess the level of Scientific Interest of Class X students.

Table -2
Descriptive Statistics (Norm vs Observed)

	N	Mean	Standard Deviation	Skewness	Kurtosis
Norm	100	184.36	23.00	-0.215	-0.01
Observed	504	171.20	24.84	+0.157	+0.127

Interpretation: The analysis reveals that the mean score of Scientific Interest in the dataset ($M = 171.05$) is lower than the norm mean ($M = 184.36$), indicating that students in this sample have comparatively lower scientific interest. The standard deviation of the dataset ($SD = 24.74$) is slightly higher than that of the norm ($SD = 23.00$), showing that the dataset scores are more dispersed. In terms of distribution, the skewness for the dataset (0.157) is positive, while the norm skewness (-0.215) is negative, which means the dataset distribution is slightly right-skewed, whereas the norm shows a mild left skew. Similarly, the kurtosis for the dataset (0.127) is higher than the norm value (-0.01), suggesting the dataset is somewhat more peaked

Table-3
Level of Scientific Interest

Level	N	Percentage (%)
High	108	21.43
Average	62	12.3
Low	334	66.27

Interpretation: A majority of students (66.27%) fall in the Low level, indicating comparatively weak scientific interest among most of the sample. Only 21.43% of students are in the High Level, while a small group, 12.3%, falls within the average range. The results suggest that, overall, Class X students demonstrate lower levels of Scientific Interest, with only a limited proportion showing high engagement in science.

Objective 2. To compare the Scientific Interest of male and female Class X students.

Table-4

Variation of Scientific Interest with respect to Gender (Male vs Female)

Gender	N	M	SD	CR (t)	p value	Significance at 0.05 level	Cohen's d
Male	266	169.48	26.22	-1.51	0.131 ($p > 0.05$)	Not significant	-0.13
Female	238	172.79	22.90				

Interpretation: There is no statistically significant difference in the Scientific Interest of male and female Class X students at the 0.05 level. Although females scored slightly higher, the difference is very small in magnitude (Cohen's $d \approx 0.13$) and not statistically meaningful. Therefore, the null hypothesis in this case is accepted.

Objective 3. To compare the Scientific Interest of Class X students of Government and Private secondary schools.

Table-5

Variation of Scientific Interest with respect to Type of School (Govt. vs Private)

Type of Schools	N	M	SD	CR (t)	p value	Significance at 0.05 level	Cohen's d
Govt.	319	169.69	25.43	-1.65	0.100 ($p > 0.05$)	Not significant	-0.15
Private	185	173.38	23.39				

Interpretation: There is no statistically significant difference in the Scientific Interest of Government and Private secondary school students at the 0.05 level. Private students scored slightly higher, but the difference is small in magnitude (Cohen's $d = -0.15$) and not statistically meaningful. Therefore, the null hypothesis is accepted.

Objective 4. To compare the Scientific Interest of Class X students of Government and Private secondary schools.

Table-6
Variation of Scientific Interest with respect to Medium (English vs Assamese)

Medium	N	M	SD	CR (t)	p value	Significance at 0.05 level	Cohen's d
Assamese	326	170.71	24.75	-0.41	0.685 ($p > 0.05$)	Not significant	-0.04
English	178	171.65	24.78				

Interpretation: There is no statistically significant difference in the Scientific Interest of Assamese and English medium secondary school students at the 0.05 level. English medium students scored slightly higher, but the difference is negligible (Cohen's $d = -0.04$) and not meaningful. Hence, the null hypothesis is accepted.

Major Findings

- A majority of students showed a low level of scientific interest.
- There is no significant difference in the Scientific Interest of male and female Class X students.
- There is no significant difference in the Scientific Interest of Government and Private secondary school students.
- There is no significant difference in the Scientific Interest of Assamese and English medium secondary school students

Conclusion

The study was designed in order to investigate the scientific interest among the secondary school students in Darrang district of Assam. Based on the analysis of the study, it can be concluded that the level of scientific interest among secondary school students is significantly low. Based on the t-test results, there is no significant difference in the scientific interest of students with respect to gender, type of school management, or medium of instruction.

Educational Implication

The Educational Implications that emerge from the findings of the Study are discussed.

1. Implications for Curriculum Developers

Science textbooks should go beyond heavy text and focus on what, why and how aspects of concepts. Adequate practical works, experiments and activities should

support each topic, which will increase interest in science among students.

2.Implications for schools

Schools should work towards building a science-supportive institutional climate with functional laboratories, conducting regular science-related activities, science clubs and exposure visits. Strengthening the library and ICT resources will help nurture scientific interest among students.

3.Implications for teachers

Teachers can enhance scientific interest among students by adopting an activity-based and inquiry-driven approach to teaching, linking scientific concepts with real life. Using experimentation, projects, and ICT tools and continuous assessment based on understanding rather than rote learning will stimulate students' curiosity and engagement in science.

4.Implication for students

Students can improve their scientific interest by going beyond rote memorization and actively engaging in experiments, projects, and science activities, and by asking questions and exploring concepts beyond textbooks.

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Managing Academic Affairs in Higher Education : A Comparative Study of Public and Private Universities in Assam

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Abstract

The present paper seeks to identify the institutional strategies adopted for the management of academic affairs in public and private universities in Assam. Universities are essential components of societal development across all sectors. The emergence of public and private universities has brought about significant changes in the educational landscape of Assam. As Assam occupies a distinctive position in the field of higher education, its universities have contributed to meeting the growing demand for higher education. In this regard, the study also examines the contributions of public and private universities in Assam towards improving the academic environment, as well as the challenges they face in competing in the global education and labour markets.

The study is based on primary sources of data and seeks to contribute to the existing body of knowledge in the field of higher education. It highlights key suggestions to address the challenges faced by public and private universities in Assam with respect to improving the academic environment in higher education institutions. The findings are expected to assist educational stakeholders in focusing on the identified areas. The study adopts a mixed-method design, with data collected through both quantitative and qualitative approaches. A structured questionnaire containing both closed-ended and open-ended items was used as the primary tool for data collection. The findings show that both public and private universities in Assam adopt structured strategies for managing academic affairs, although the scope and flexibility vary by type of management. Private universities place greater emphasis on stakeholder engagement, student feedback mechanisms, and diversified academic collaborations at regional and global levels, whereas public universities focus more on regulatory frameworks, inclusion, and affordability. Both types of institutions play a complementary role in strengthening the higher education ecosystem in Assam. A balanced integration of quality initiatives, resource management, sustainability, and support mechanisms is essential for effective academic management.

Keywords-*Management of Academic environment, Public Universities, Private Universities, Assam, Higher education.*

Introduction

Education plays a multidimensional role in today's rapidly changing, challenging and competitive world. The magnitude of the importance of education in life is huge as well as multifold. Education is the driving force of today's modern, developed, and industrialised world. Among the various levels of education—primary, secondary, and higher, the importance of higher education is considerable, as it is regarded as a powerful force in shaping contemporary society. Therefore, it is the responsibility of educational stakeholders and society to promote and strengthen higher education in a competitive global environment. It also plays a crucial role in the development and reconstruction of a nation by creating skilled and knowledgeable human resources in order to meet the challenges. Higher education is imparted through different institutions such as- colleges, technical institutions, university etc. In India, after independence the scenario of higher education has witnessed a tremendous expansion and changes. But the institutions of higher education must be ready to meet the challenges to stay relevant. Along with the government sector institutions of higher education, the expansion of the private sector institutions brings a new hope towards access of education. It has been observed within the north-eastern states; Assam has occupied a distinct place in the field of higher education. In order to expand higher education within the region, the Government of Assam framed the Private University Act and related rules for the establishment of private universities. In this paper, the investigator tries to make an attempt to give an overview on the role of public and private universities in higher education of Assam by highlighting its potentialities and challenges.

Higher Education in Assam

Prior to independence the status of higher education in Assam was not very wealthy. During the last decade there has been a phenomenal growth in this sector. With the increasing number of students completing secondary education, the demand for higher education in Assam has risen. Although publicly funded higher education institutions attempt to meet this demand, their capacity is constrained by the state's growing population. Through the introduction of various educational policies and the establishment of higher education institutions, the Government of Assam has sought to address the needs of aspiring students across the state. The establishment of two Central Universities, seven Institutes of National Importance, two Deemed Universities, eighteen State Universities, and nine Medical Colleges, along with polytechnic institutions, engineering colleges, teacher training colleges, law colleges, research institutes, architecture institutes, hotel management institutes, arts, science and commerce colleges, and other reputed professional institutions, has enabled Assam to

develop a widespread network of high-standard institutions offering education across diverse professional fields. Despite this development, higher education in Assam is facing a big challenge while competing with the global educational market. Along with the government universities, private universities also played a significant role over the last decades in the higher education sector of Assam. Some of them are exclusively projecting themselves as universities for high quality research and innovation. Thus, the status of higher education in Assam is improving gradually.

Emergence of Private Universities in Assam

With the enactment of Assam Private University Act 2007, the state had moved towards a complete shift to privatization of higher education by reflecting the move of the government to open up the sector for private investment. The Private university sector has since grown rapidly to become one of the most prominent features of higher education in Assam. Educational policymakers and stakeholders are finally getting the opportunity for creating a framework and investing in the private sector of higher education in Assam. Assam Government had also framed the private University rules for opening up universities in the Private sector. It leads to the establishment of different private Universities in Assam. At present there are six private universities established under this act namely-Assam Don Bosco University, Azara (2008), Assam Down Town University, Panikhaiti (2010), Kaziranga University, Karaikhowa, Jorhat (2012), Mahapurusha Srimanta Sankaradeva Vishwavidyalaya (2013), Royal Global University (2013) and Krishna Guru Adhyatmik Vishwavidyalaya (2017). Therefore establishment of private universities for higher education in Assam has expanded tremendously which has contributed towards increase the Gross Enrolment Ratio. Because of the gap between demand and supply on availability of number of seats in government universities, the number of private universities are rapidly increasing in Assam. At the same time, private universities contribute several attributes that differ from the traditional public higher education system. The establishment of private universities by educational entrepreneurs has expanded the scope of higher education in Assam; however, there is an urgent need to assess their quality dimensions. If these institutions produce unemployed graduates, merely increasing the number of universities will have little value. Therefore, innovative approaches and ideas must be implemented to enhance competitiveness in the global education market. Nevertheless, the contribution of private universities in Assam remains largely unexplored and insufficiently understood.

Review of Literature

1. Institutional Strategies for Management of Academic Affairs

- Altbach (2005), Salmi (2009), and Marginson (2011) conducted a study on Higher Education Governance and strategic Management that emphasized on institutional strategies in higher education are shaped by autonomy, governance structures, and regulatory environments. Findings reveals that public universities follow rigid, hierarchical structures governed by state or central regulations, limiting their strategic flexibility.
- Studies conducted by Agarwal, (2009) & (2011), on Public vs. Private Universities in India found that, private universities tend to adopt corporate-style governance and strategic planning often focusing on market responsiveness and efficiency whereas, private universities enjoy more autonomy, enabling quicker decision-making and innovative strategies. Furthermore, public universities focus on inclusive access but struggle with capacity and quality. Private universities expand access but often at a higher cost, raising concerns of social equity.
- Studies done by Naik (2012) and Kumar (2017), on Academic Planning and Quality Assurance highlighted that, public universities in India prioritize inclusiveness and research orientation, while private universities emphasize teaching quality and employability. Quality assurance bodies also influence institutional strategies in both sectors.

2. Contribution to the Academic Environment

- Studies conducted by Bhushan (2006) and Mishra (2014) on Infrastructure and learning resources indicate that private universities often invest heavily in physical infrastructure and ICT tools to create an attractive academic environment. Private universities tend to invest in digital infrastructure and data-driven decision-making tools for managing academic affairs. In contrast, public universities often struggle with outdated facilities due to budget constraints, which often reflected in their issue of lack of resources for such systems. However, they have better-qualified faculty.
- Gupta and Gupta (2019) conducted a study on innovation in teaching and curriculum and found that private universities are noted for curriculum flexibility and industry-aligned programmes. They emphasise employability, market trends, and student satisfaction in shaping curriculum design and delivery. In contrast, public institutions often focus on long-term academic goals, including research output and academic excellence. Private universities also revise their syllabi more frequently and collaborate with industry partners to align education with employment demands.

- Findings of the research conducted by Altbach, (2009) reveals that, public universities often uphold academic rigor and research-based teaching, contributing significantly to knowledge generation. Despite having funding and administrative constraints, public universities contribute significantly to academic research, journal publications, and societal outreach.
- Studies such as Mishra, (2014) & Rani (2018) on Student Support and Faculty Development: highlight that private institutions often offer better student services and faculty incentives whereas, public universities contribute more to long-term academic capacity-building through extensive research programs, government-funded fellowships, and collaborations. Moreover, studies indicate that private universities provide modern classrooms, hostels, libraries, and counselling services to create a conducive academic environment.

3. Challenges in Managing Academic Affairs

- Research conducted by Pandey, (2016) on Administrative and Bureaucratic Challenges revealed that, public universities often face bureaucratic delays, rigid administrative structures, and funding shortages, hindering innovation in academic affairs. Frequent administrative delays, Budgetary cuts, irregular disbursement of government funds and over-regulation in public universities hamper innovation and responsiveness in academic management that limit the ability of public institutions to maintain or expand academic programs. In contrast, some studies conducted by Jain & Mukherjee, (2017). criticize private universities for prioritizing revenue over academic values, leading to concerns about quality and ethics. Private universities encounter issues related to commercialization and maintaining academic credibility.
- As studied by Sharma (2015), on Faculty Recruitment and Retention: A critical challenge for both sectors is the shortage of qualified faculty. Private universities face high attrition rates, while public institutions often face recruitment freezes and procedural delays. Both public and private universities face a serious lack of qualified faculty. Public institutions struggle due to procedural delays in recruitment, while private institutions face high turnover due to job insecurity.
- According to Tilak (2014), on Regulatory and Accreditation Constraints highlighted that, accreditation pressures also influence strategic decisions and quality benchmarks. Public institutions support students from marginalized communities through quotas, scholarships, and low fees, thereby promoting inclusive academic development. In India, the University Grants Commission (UGC) and state higher education councils influence academic strategies,

with differences between public and private institutions.

- K. M. Anwarul Islam and Umme Salma (2016) conducted a study on *The Role of Private Universities in Higher Education of Bangladesh*. The paper examines that private universities have contributed to social demand for higher education by absorbing a good number of students who otherwise could not have received university degrees. Study shows that role of private universities for the task of nation-building and reforming the education sector. The study suggested that policies must be taken in order to move forward by adapting corrective measures that lead to quality education in a vibrant environment.
- Paras Jain (2017) examines *Role of Private Universities in Higher Education in India*. The study stated that private sector is playing a significant role in addressing access to higher education. Private universities not only help the students but also help to boost our economy by adopting modern and market driven programmes.
- Rajesh, Bimal and Ashok (2013) studied *Role of Private Sector in Indian Higher Education*. The study investigated the need and challenges of privatization of higher education in India. Findings of the study revealed that, private sector has contributed significantly in gross enrollment ratio but they are not able to attract high ranking students.
- Sawsan, Mohammed, Osama, Alia (2022) researched on the role private universities play in achieving academic, research, political and economic sustainability in light of national strategy. The study shows that there is an urgent need to carefully deal with for more sustainable services to accommodate graduates.
- H. Mugabi (2012) conducted a study on the role of private universities in the provision of higher education in Uganda: *Growth and challenges*. Data reveals that excess demand for higher education was not responsible for the growth of the private universities at the same time it creates opportunities for individuals and organisations. Their diverse backgrounds and the policy environment in which they exist, undertake various roles in the provision of higher education.
- Kazi, Arman & Maquesurat (2020) examined *Facilitating the Role of Private Universities Through Entrepreneurship Development Program*. The study reveals that although very few of these universities are adopting the modern notions of tertiary education, still traditionalism prevails there as the private university culture is highly influenced by that of public university. The study concluded that every university must prepare the spirit of entrepreneurship among the graduating

students and for this, an entrepreneurship friendly curriculum is required for all programmes irrespective of science, arts, and commerce.

Significance of the study

Comparative analysis of public and private universities would elucidate the similarities and differences in their administrative as well as academic frameworks and which is crucial for actionable recommendations for educational policymakers as well as for the stakeholders. To strengthen the framework of academic management in both type of universities and to improve their academic governance present study is relevant. The study will provide a better understanding about comparative insights of public and private universities and their unique strength and areas that need to be addressed with respect to management of academic affairs, which can be utilized to enhance the management practices of these institutions. Further, the study can serve as a base for future educational research.

Research Question

1. How do private and public universities in Assam differ in terms of their institutional strategies for management of academic environment?
2. How do private and public universities in Assam contribute to the improvement of academic environment of higher education?
3. What are the major challenges faced by the private and public universities of Assam in terms of management of academic realm?

Objectives of the Study

1. To explore the differences in institutional strategies for the management of academic affairs in public and private universities of Assam.
2. To study the contribution of public and private universities of Assam in improving the academic environment of higher education.
3. To identify the challenges faced by the public and private universities of Assam and to put some recommendations to overcome such issues in the realm of managing academic affairs.

Methodology of the Study

The present study is based on mixed method design. The study is based on both quantitative and qualitative data to gain insights into the problem statement. Qualitative data has been analyzed through reflexive thematic analysis and quantitative data has been analyzed through descriptive statistics.

Sample

Study based on primary source of data. Data has been collected from the faculty members of both public and private universities of Assam. A total of 50 faculty members (25 from public and 25 from private) both from public and private university participated in the study. Through a stratified random sampling techniques from five common departments comes under the school of humanities and social science, which are commonly available across both type of universities. To understand the background of the respondents a brief profile on designation, academic qualification and teaching experience was added in the preliminary section of the tool. Only full-time teaching staff (assistant professor, associate professor and professor) were considered for the present study.

Tools

For the present study structured questionnaire consist of both qualitative and quantitative data on management of academic affairs has been used for the faculty members. The questionnaire consists of closed ended items in part -A (dichotomous responses) to collect quantitative data to deal with objective no 1 and part -B consist of open -ended items to gather qualitative insights from respondents to deal with objective no 2 and 3.

Standardization of the tool

Content validity has been used for validation of the tool. For this purpose, the questionnaire was initially distributed to three subject experts to refine the clarity and relevance of the items. In this phase of expert's review of the initial item pool by using I-CVI and S-CVI content validity was established. All items received agreement from all experts. Therefore, the I-CVI for each item was 1.00. The S-CVI of the scale (all items) was 1.00, indicated excellent content validity.

After finalizing the valid item's, the draft questionnaire was distributed to ten (10) faculty members to measure reliability of the tool. The internal consistency of the tool was assessed by using the KR-20 formula as the items were dichotomous in nature. The K20 reliability coefficient was found to be 0.89, indicating good internal consistency of the tool.

Results and Discussion

Objective 1: To explore the differences in institutional strategies for the management of academic affairs in public and private universities of Assam.

In order to know the prevailing strategies for the management of academic affairs in public and private universities of Assam, a descriptive research method was adopted. This method was considered appropriate as the objective was to identify, compare and analyze prevailing institutional multidimensional strategies with respect to management of academic affairs. Faculty members were considered as sampling unit as they are directly involved in matters of academic affairs. The use of stratified

random sampling ensured adequate representation from both type of universities.

The study employed a quantitative survey method to collect the data through questionnaire, which consist of multiple items that allows the respondents to select one or more applicable answer to enable a broader insight which is relevant to the study. The respondent included faculty members from five common department comes under the school of humanities and social science of selected public and private universities of assam through stratified random sampling techniques. The responses collected through the questionnaire have been analyzed quantitatively using statistical technique such as percentage to identify different strategies for the management of academic affairs and significant differences among the public and private universities of assam with respect to this.

Analysis: Management of academic affairs: Respondent were asked to indicate the appropriate answer associated with multidimensional strategies for management of academic affairs.

Table-1

Strategies for management of academic affairs in public and private universities

Sl No.	Strategies	Public University	Private University
		%	%
1	Stakeholders' (Academic administrators, faculty members, students, parents, alumni, Industry experts, etc.) engagement during curriculum planning	100%	100%
2	University has collaboration (academic partnership) with regional university	70%	90%
3	Provision of student feedback on academic affairs	50%	100%
4	Availability of need based multidisciplinary courses	50%	40%
5	University have collaboration with foreign university	20%	60%
6	University have linkage with centers of excellence through web-based programme	30%	50%
7	Provision of career development services	80%	90%
8	University have collaboration with research institute	50%	80%
9	Regular review of academic policies	70%	60%
10	Effective utilization of ICT tools for academic support	70%	90%

Source: Field Study (Multiple choice Table)

Analysis: From the table 1, it is revealed that an overwhelming 100% of respondent from both public and private universities marked Stakeholders' engagements during curriculum planning as key strategies of academic management system. Along with this, private universities consistently emphasized on strategies such as - collaboration with regional university (90%), collection of student feedback on academic affairs (100%), collaboration with foreign university (60%), linkage with centers of excellence through web-based programme (50%), career development services (90%), collaboration with research institute (80%), effective utilization of ICT tools for academic support (90%) which is reported by high percentage of respondents from private universities. Whereas, respondents from public universities appears to acknowledging less in terms of percentage on incorporating these aspects for management of academic affairs. However, high percentage of respondents (50%) from public universities reported the availability of need based multidisciplinary courses associated with designing of academic programmes, compared to 40% in private universities. Moreover, Regular review of academic policies was recognized by high percentage (70%) of respondents from public universities, as compared to (60%) private universities.

Interpretation: The above data indicate that the strategies adopted by public and private universities in Assam for managing academic affairs are aligned with institutional growth. The findings also suggest that private universities demonstrate greater strategic orientation in managing academic affairs compared to public universities.

Objective 2: To study the contribution of public and private universities of Assam in improving the academic environment of higher education.

To deal with the objective no 2 & 3 (Part -B & C) a structured questionnaire with open ended items was developed with key dimensions such as- access to academic growth and support, research culture, and governance mechanism. The purpose of this qualitative study was to explore the contribution and challenges of public and private universities of assam in improving the academic environment of higher education. By using open-ended questions, data has been collected from the faculty members of selected public and private universities who are directly involved with academic matters (research participants). The structured questionnaire was validated through experts review to ensure content and face validity. Necessary modification was made based on their suggestions. As the items were qualitative in nature, statistical validity were not applied. But a pilot try out was conducted with ten respondents to check its clarity and feasibility of the questions. The data analysis was conducted using Braun & Clarke's

reflexive thematic analysis (RTA) for qualitative research which consisted of six phases. This analysis of the data revealed several key themes.

When it comes to the matter of education, public and private both type of institutions should be operated on the theme of expansion, development and quality context of education. As a developing state with high percentage of population, Assam occupies a distinctive place in the field of higher education among northeastern states. Along with the government universities newly emerged private universities of Assam has taken many innovative approaches to compete with the global educational market. In this regard some of the contributions can be summarized under the following themes-

- **A new window for higher education:** Public and private sector universities of Assam is currently witnessing employer oriented higher education system towards labour market. This universities emerged as a ray of hope for the students to pursue higher education across different disciplines.
- **Increase of Gross Enrollment Ratio:** Currently public and private sector universities of Assam are playing a significant role in addressing access to higher education. As per the data collected from all India survey on higher education report, 2020-2021 gross enrollment ratio of Assam in the year 2020-2021 in higher education (18-23 years age group) is 17.5 percent. Which is very less as compared to other states but it is expected to increase in the upcoming days.
- **Diversified discipline:** A shift has been observed in public and private universities of Assam from conventional courses to market driven disciplines. Most of the universities are adopting multidimensional courses by keeping employment generation in view. Several interdisciplinary and integrated courses have been introduced in these universities. A number of short-term certificate and diploma courses are also included to enhance employability of graduates.
- **Academic autonomy:** Autonomy in private universities permits them to offer a range of choices and opportunities to improve the quality of their services and hence to reach excellence globally. Autonomy in terms of academics, research, technology-based innovations, collaboration and expansion etc. made better chance to reach excellence as compared to public universities.
- **Scope of extra-curricular activities for the students:** By creating different scope for personality development, public and private universities has contributed development of students' knowledge and skills in different

contexts. This provides a platform for student's holistic development and assists them in developing critical skills and abilities to be successful in this competitive world.

- **Technology oriented digital classroom:** Availability of digitally empowered classroom has made the university education system quite easy as well as interesting. It provides an opportunity to create a platform to establish global network of higher education. A shift has been observed from traditional classroom setting to using of artificial intelligence and virtual reality. Most of the private universities of Assam are well equipped with modern technologies for classroom transaction as compared to public universities.
- **Follow-up services:** Several initiatives have been taken by these universities to keep in touch with their alumni in order to know that passed out students are rightly placed or not. It comes under the programme of guidance and follow up services to ascertain the progress and status of students even after she or he leaves the university campus.
- **Scope of research:** Public and private universities of Assam has started research activities in their institution by collaborating with other private and public universities. Some of them are likely to make major gains in research output. Some of them have made serious efforts in promotion of good quality research.
- **Placement Opportunities:** By providing placement opportunities to their students in both public and private sectors, these institutions play an important role in employment generation. Through a practical curriculum, industry-oriented education, and the application of innovative teaching methods, they promote outcome-based and productive education.
- **Efficient management practices:** Strict management practices of both type of universities ensure the best possible educational outcomes through integration of different resources. The emergence of strategic planning and strategic implementation system of management helps in improving organizational performances.
- **Networking with global innovators:** Some of the public and private universities of Assam have taken initiatives to create a platform of work with global innovators and industries in terms of research, exchange programmes, workshop, conferences, projects etc.
- **Reducing the Financial Burden on the Government:** Among the North-Eastern states, Assam has faced challenges arising from population growth, which have placed financial pressure on the higher education sector. In this

context, the expansion of private universities has provided support for the development of higher education by reducing the financial burden on the government.

Objective 3 : To identify the challenges faced by the public and private universities of Assam and to put some recommendations to overcome such issues in the realm of managing academic affairs.

Challenges were identified basically through structured questionnaire (Part-C) consist of open-ended items where responses were collected from key academic stakeholders- faculty members of selected public and private universities of Assam. The key dimensions include- accreditation and quality issues, resource and financial constraints, issues related to human resource management and challenges with respect to research support.

Despite the increasing demand for higher education and contributions made by both types of universities, public and private universities of Assam still face several challenges. Some of them are -

- **Accreditation status:** Most of the public and private universities of Assam not accredited by the concern accredited agencies. Initiative must be taken to invite accreditation agency for assessing the performance of the university education system. To measure the quality of university education and to identify strength, weakness and areas that needed to be improved, accreditation is must. Currently both public and private universities are suffered from this backlog.
- **“Differences in Fee Structure:** The high course and admission fees charged by private universities, along with the fees for self-financed courses in public universities, constitute a major barrier to access to university education in Assam. Fee structures should be reasonable and aligned with the actual cost of running the programmes, so that students can afford higher education at lower cost. Clear norms should therefore be established to regulate the fee structures of both public and private universities.
- **Quality Issues:** Public and private universities of assam have to increase attention towards the matter of quality. Because qualification without quality will create unemployment problems among the young generation. Steps must be taken to motivate educational stakeholders to uplift the quality of university education.
- **Financial management:** Some of the private universities have received

financial support from the government. But most of the time they have to depend on tuition fees, bank loans and donations etc. all of which poorly match their capital needs. Insufficient funding sometimes leads to underfunding for essential educational inputs and facilities.

- **Problem of retaining teaching staff:** The faculty structures, their stability, job satisfaction always seems to be not satisfactory in the private universities of Assam. Most of the qualified faculties are not attracted towards these institutions due to its low amount of salary. After working for a few years, they are trying to shift to the institutions where they can draw high amount of salary. Most of the faculty members are facing challenges in terms of financial insecurity, promotion, wages and benefits etc. This has a greater impact on the entire education system.
- **Research output:** Research opportunities are limited in both public and private universities because of insufficient research guide to conduct quality research. Considerable increase in the number of research during the past few years could not be considered as attempts to satisfy the inquisitive and scientific thirst for knowledge.

Suggestions to overcome the challenges

- Inclusion of variety of interdisciplinary courses to attract high ranking students.
- Focus on quality research.
- Invite accrediting agencies to measure quality aspects of university education.
- Affordable fee's structure to establish equality of educational opportunity.
- Hire qualified and experienced faculties.
- Setting up of quality management parameters.
- Transform the curriculum into something dynamic and relevant.
- Academic tie up with world class universities.
- Provision of experiential learning.
- Skill based courses should be introduced.
- Universities should have a quality control mechanism

Conclusion

The growing demand for higher education continues to exceed the capacity of public universities. By addressing the above-mentioned challenges, the sector can expand and strengthen its contribution to the provision of higher education. Strategic initiatives are required to ensure sustainable development and improved service delivery. Owing to limitations in systematic educational planning, the quality of higher education at the university level remains inadequate. Measures should be adopted to

promote modern, market-driven programmes that can contribute to economic growth. Efforts should also be made to encourage capable private universities to contribute to the development of a highly skilled and professional workforce able to compete in the global market. An analysis of the private university sector in Assam reveals differences in missions, backgrounds, and approaches to delivering quality higher education. To enhance their contribution, the government should strengthen funding and regulatory frameworks, while private universities must ensure greater accountability to their stakeholders.

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EDUCATIONAL RESEARCH JOURNAL

ISSN 2454-4949

**DEPARTMENT OF RESEARCH AND EVALUATION
STATE COUNCIL OF EDUCATIONAL RESEARCH
AND TRAINING (SCERT), ASSAM**