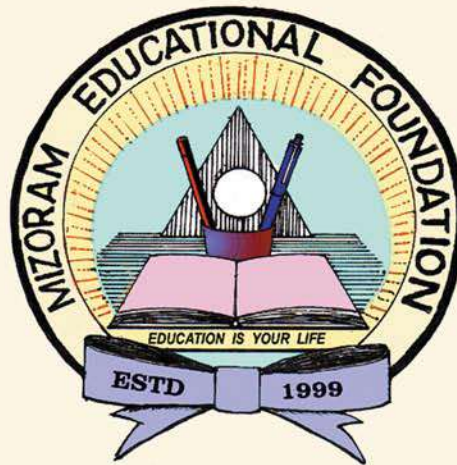


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From the Desk of the Chief Editor

It is with much pride that Mizoram Educational Journal has brought out its second issue for June 2026. The present issue boasts a total of 7 articles from various disciplines ranging from Education to Geography.

Each article is research based with interesting findings. These findings are expected to fill a good portion of research gaps in various disciplines. The authors are mostly researchers as well as Government officials that seek to provide reliable data for further research. Moreover, these articles shall also be a good read for anyone interested in educational progress across different areas of expertise.

Wishing all a happy and enlightening reading experience.

Lynda Zohmingliani

Awareness among Elementary School Teachers Towards the Nipun Bharat Scheme in Aizawl

Esther Hmangaihzuoli *
Dr. Prateek Chaurasia**

Abstract

This study examines the awareness of elementary school teachers in Aizawl, Mizoram, regarding the NIPUN Bharat Scheme, a national initiative aimed at achieving foundational literacy and numeracy by the end of Grade 3. Employing a descriptive survey design, the study sampled 100 teachers from 10 government and 10 private schools using a simple random sampling method. Data were collected through a questionnaire (QATNB). Findings revealed that 46% of teachers demonstrated low awareness, 22% had average awareness and 32% had high awareness of the scheme. Female teachers exhibited significantly higher awareness than male teachers, while teaching experience showed no significant impact. A significant difference was found between government and private school teachers, with private school teachers showing greater awareness. The results highlight the need for targeted professional development and awareness programs to ensure effective implementation of the NIPUN Bharat Scheme. The study underscores the importance of enhancing teacher knowledge to improve foundational learning outcomes in alignment with the objectives of the National Education Policy 2020.

Keywords: NIPUN Bharat, teacher awareness and elementary education

Introduction

Elementary education, generally covering children aged six to fourteen, represents the first stage of compulsory schooling in most parts of the world. It provides learners with foundational competencies in reading, writing, mathematics, and introductory knowledge of disciplines such as history, geography, science, art, and music (World Bank, 2012, p. 3). In the Indian context, the first eight years of the twelve-year schooling cycle correspond to elementary education, covering the compulsory education period from ages 6 to 14. Operationally, this stage is divided into two levels: five years of primary schooling (Grades 1–5) and three years of upper primary or middle school (Grades 6–8). While this general structure is applied nationwide, state governments retain autonomy over school organization, resulting in variations across states.

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In Mizoram, the structure of elementary education mirrors that of the national framework, yet teacher qualifications vary widely. For instance, in Aizawl district there were 2,774 teachers, with 43.51% holding graduate degrees, 22.17% completing secondary school, 18.20% higher secondary, 11.93% not completing secondary school, 3.89% postgraduates, and only 0.18% holding M.Phil. or Ph.D. degrees (Vanlalmangaihi et al., 2015, p. 112). These disparities in teacher qualifications have implications for the quality of foundational instruction and student learning outcomes.

Determined challenges including low learning levels, weak language and numeracy skills, and increasing dropout rates prompted the Government of India to launch the National Initiative for Proficiency in Reading with Understanding and Numeracy (Nipun Bharat) in 2021 under the Samagra Shiksha Scheme (Ministry of Education [MoE], 2020b, p. 45). The mission aims to ensure that all children attain foundational literacy and numeracy (FLN) by the end of Grade 3 by 2026–2027. FLN encompasses reading, writing, speaking, listening, and basic mathematical operations, reasoning, and problem-solving. Foundational literacy focuses on language proficiency, whereas foundational numeracy emphasizes mathematical reasoning and number sense (Ball et al., 2014, p. 401; Organisation for Economic Co-operation and Development [OECD], 2013, p. 29). These competencies are widely recognised as essential prerequisites for further academic learning.

The Nipun Bharat mission adopts an inclusive, child-centered, and competency-based approach, emphasizing play-based and experiential learning (MoE, 2020b, p. 47). Implementation follows a five-tier structure National, State, District, Block, and School levels supported by NCERT's curriculum development and the NISHTHA teacher training program. The initiative seeks to improve early learning outcomes, reduce dropout rates, facilitate smoother educational transitions, and enhance learning opportunities for socio-economically disadvantaged children (Ghosh, 2021, p. 7).

Teachers are essential to the success of Nipun Bharat. Their awareness, understanding, and classroom practices directly affect the scheme's implementation. In contexts such as Mizoram, where cultural and linguistic diversity intersects with varying levels of educational infrastructure, teacher preparedness becomes even more crucial. Without adequate awareness and training, even well-designed initiatives may fall short of their unintentional impact.

Against this backdrop, the present study examines the awareness of elementary school teachers in Aizawl regarding the Nipun Bharat scheme. It also investigates whether levels of awareness differ by gender, teaching experience, or type of school (government or private). The findings aim to contribute to a deeper understanding of teacher readiness for FLN implementation in Mizoram, informing strategies for strengthening teacher training, optimizing resource allocation, and enhancing program execution to ultimately improve learning outcomes for children in the region.

Review of Literature

Chandra (2024), in the article “Shaping Foundational Learning Skills: A Harbinger to the Future of Work”, highlights the importance of early childhood acquisition of fundamental skills for future learning and holistic development. The study evaluates Indian initiatives on foundational learning using a mixed-methods approach, combining policy and instructional material reviews with analysis of 2021–2022 educational data. It focuses on enrolment, learning outcomes, and the impact of interventions for children aged three to eight in line with the Sustainable Development Goals. Findings show India's progress in strengthening basic education but also point to challenges such as inequities in preschool access and reliance on rote learning, emphasizing the need for curriculum reform, teacher training, and family involvement.

Khandpur, (2024), wrote an article titled, 'Towards Universal Foundational Literacy and Numeracy', In his work, according to the National Education Policy (NEP) 2020, "achieving universal foundational literacy and numeracy in primary schools by 2025 will be the highest priority of the education system." As stated in Paragraph 2.2 of NEP 2020, "The remaining portions of this Policy will only be applicable to the students after they have met this fundamental learning requirement, which is reading, writing, and basic math." Nothing says the importance of foundational literacy and numeracy (FLN) and its role in ensuring students can reap the rewards of their education more clearly than this. Their participation in society as productive, contributing members is thus made possible by this education.

Singh and Agarwal (2023) edited a book titled called 'Creating an Equitable Space for Teaching and Learning'. In their work, they make an effort to consider the fundamentals of holistic education, learning, and assessment—a topic that is covered in great detail in India's upcoming National Education Policy 2020. Referencing the NIPUN Bharat Guidelines issued by the Department of School Education and Literacy at the Ministry of Education, the chapter is built on the primary and secondary data collected through policy document analysis, desk review, stakeholder deliberations, and focus group discussions to design a Holistic Progress Card for grades 1, 2, and 3 under the National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN) Bharat Mission for holistic assessment.

Menon (2023), in "Keeping it Complex: Resisting Simplistic Framings of Educational Discourse and Practice", discusses how the National Education Policy (2020) and NIPUN Bharat (2021) emphasize foundational literacy and numeracy (FLN) for ages 3–8, aiming for all children to achieve FLN by Grade 3 by 2026–27. These policy mandates have spurred a rapid expansion of NGO-led FLN interventions across India, highlighting both opportunities and challenges in their implementation.

Arora, (2023) conducted a study titled "A study of teacher awareness of new education policy". The New Education Policy (NEP) of 2020 has had a significant impact on the Indian educational system. The study aims to determine teachers' understanding of the NEP and how it relates to their demographic factors. The teachers completed a sample questionnaire, and the results were analysed using both descriptive and inferential statistics. According to the survey, instructors were generally aware of the NEP, although a sizable portion of them had little to no knowledge of it. According to this study, efforts should be made to enhance teachers' understanding of the NEP and its impact on the educational system, particularly for those who are less knowledgeable.

Objectives of the Study

1. To find out the awareness among Elementary School Teachers towards the Nipun Bharat scheme in Aizawl.
2. To compare the awareness among Elementary School Teachers towards the Nipun Bharat scheme with respect to their gender.
3. To compare the awareness level among Elementary School Teachers towards the Nipun Bharat scheme with respect to their teaching experience.
4. To compare the awareness level among Elementary School Teachers towards the Nipun Bharat scheme with respect to the administration of the school i.e., Government and Private Schools

Hypothesis of the Study

1. There is no significant difference between the awareness of elementary school teachers towards the Nipun Bharat scheme with respect to their gender.

2. There is no significant difference between the awareness of elementary school teachers towards the Nipun Bharat scheme with respect to their teaching experience.
3. There is no significant difference between the awareness of elementary school teachers towards the Nipun Bharat scheme with respect to Government Schools and Private Schools.

Delimitation of the Study

The study has the following delimitation

1. The study focuses on the awareness of elementary school teachers only.
2. The study is conducted in the Aizawl District only.
3. Awareness towards the Nipun Bharat Scheme has been done only.

Design of the Study

The present research is purely quantitative. A descriptive survey method was used to study awareness among Elementary School Teachers towards the Nipun Bharat Scheme in Aizawl.

Population

The population of the study comprises of all the elementary school teachers in Aizawl.

Sample

The sample of the present study consists of 10 Government schools and 10 Private schools, respectively. Out of which 5 teachers are randomly selected from each school. Therefore, the total sample for the study comprises 100 elementary school teachers. In the present study, Simple random sampling techniques is employed.

Sample Distribution

Types of school	No. of schools	No. of teachers	Total no. of teachers
Government school	10	5 from each school	$5 \times 10 = 50$
Private school	10	5 from each school	$5 \times 10 = 50$

Tools used in the Study

For the present study, the researcher has developed a questionnaire for studying the awareness towards the Nipun Bharat Scheme.

A questionnaire developed by the researcher on awareness towards the Nipun Bharat Scheme (QATNB) was used for collecting data from elementary school teachers.

Development of a Questionnaire for the Awareness Towards Nipun Bharat Scheme

The researcher designed an awareness questionnaire towards the Nipun Bharat Scheme. The questionnaire item was created on the basis to know whether elementary school teachers are aware of the Nipun Bharat scheme or not. It contains 15 questions, which are objective in nature. For one single question, four options were given, for which four options were given with one correct response. The tool was finalized with the help of experts. After the experts' comments, some items were modified. Three categories were used to classify the level of awareness among elementary school teachers towards Nipun Bharat Scheme in Aizawl: "High awareness," "Low awareness," and "Average awareness". Scores between 0-5 percentage were classified as less awareness, scores 6-10 percent were classified as average awareness, and scores between 11-15 percent were classified as

high awareness. The tool was validated with the 5 experts in the field of education. Along with the content validation, language ambiguity was also removed after consultation with experts.

Score Distribution Table

SCORE	LEVELS OF AWARENESS
0-5	Low Awareness
6-10	Average Awareness
11-15	High Awareness

Data Collection

In the present study, the data was collected with the help of questionnaire for awareness among elementary school teachers towards Nipun Bharat Scheme. The questionnaire was used in order to explore the teachers' awareness about the Nipun Bharat Scheme.

Findings on Objectives I

To find out the awareness level among Elementary School Teacher towards Nipun Bharat Scheme in Aizawl.

The level of awareness of the Nipun Bharat Scheme among elementary school teachers in Aizawl was measured, and the results were tabulated. The three levels of awareness of the Nipun Bharat Scheme among primary school teachers were determined by analyzing their responses: "high awareness," "average awareness," and "low awareness." The scores falling between 0 and 6 percentages were classified as "low awareness," the scores between 11 and 15 percentages were classified as "high awareness," and the scores between 6 and 10 percentage were classified as "average awareness." The category for level of awareness is represented by the table below.

Classification of awareness level of the teachers towards the Nipun Bharat Scheme

Table 1

Classification	Range of Score	No. of Teachers	Percentage
High Awareness	11-15	32	32%
Average Awareness	6-10	22	22%
Low Awareness	0-5	46	46%
Total		100	100%

The present study was conducted among 100 elementary school teachers' awareness level towards the Nipun Bharat Scheme in Aizawl, among which 32 respondents were considered to have high awareness of the Nipun Bharat Scheme, 22 respondents were considered to have average awareness, and 46 respondents were considered to have a low level of awareness. The overall responses of the respondents were also calculated and converted into percentages. Therefore, the majority of the elementary school teachers in the Aizawl district have a low level of awareness of the

Nipun Bharat Scheme. Thus, it can be concluded that the awareness level of elementary school teachers in Aizawl was unsatisfactory and can be classified under “low awareness level” towards the Nipun Bharat Scheme

Findings on Objective II

To compare the awareness among Elementary School Teachers towards the Nipun Bharat Scheme with respect to their gender

Hypothesis no 1 states, “There is no significant difference between the awareness of elementary school teachers towards the Nipun Bharat scheme with respect to their gender.

Comparison of the awareness among elementary school teachers towards the Nipun Bharat Scheme with respect to their gender.

Table 2

Gender	Number	Mean	SD	t- Value	Sig Level
Male	30	4.86	3.27	4.60	* Significant at 0.01 level
Female	70	8.94	4.29		

*significant at 0.01 level

As shown in Table 2, the mean scores of male and female teachers of elementary school are 4.86 and 8.94. The obtained value of ‘t’ is 4.60. The calculated value of ‘t’ is more than the critical value of ‘t’ at the 0.01 level. Hence, the Null hypothesis is rejected, and the difference was found in favour of the female teachers. Therefore, it can be concluded that the female teachers of elementary school in Aizawl were more aware than the male teachers with regard to the Nipun Bharat scheme.

Findings of objective III

To compare the awareness level among Elementary School Teachers towards the Nipun Bharat Scheme with respect to their teaching experience

Hypothesis no 2 states, “There is no significant difference between the awareness of elementary school teachers towards the Nipun Bharat scheme with respect to their teaching experience.

Table 3

Comparison the awareness level among Elementary School Teachers towards the Nipun Bharat Scheme with respect to their teaching experience.

Teaching Experience	Number	Mean	SD	t- Value	Sig Level
5yrs and Above	47	7.23	4.59	1.02	*NS
Up to 5yrs	53	8.15	4.23		

*Not significant at at 0.01 level.

Table 3 shows that the mean scores of elementary school teachers having an experience of 5 years and Above and up to 5 years in school are 7.23 and 8.15. The obtained value of 't' is 1.02. The calculated value of 't' is less than the critical value of 't' at the 0.01 level. Hence, it can be concluded that there was no significant difference in the awareness level of elementary school teachers towards the Nipun Bharat Scheme with regard to their experience.

Findings of objective IV

To compare the awareness level among elementary school teachers towards Nipun Bharat Scheme with respect to the administration of the school i.e, Government and Private Schools.

Hypothesis no 3 states, 'There is no significant difference between the awareness of elementary school teachers towards the Nipun Bharat scheme with respect to the administration of the school, Government Schools and Private Schools.

Table 4

Comparison of the awareness level among elementary school teachers towards Nipun Bharat Scheme with respect to the administration of the school i.e., Government and Private Schools.

Type of school	Number	Mean	SD	t- Value	Sig Level
Government School	50	4.46	2.30	10.47	<i>* Significante at 0.01 level</i>
Private School	50	10.98	3.56		

Table 4. shows that the mean scores of Government and Private School teachers at are 4.46 and 10.98, respectively. The obtained value of 't' is 10.74. The calculated value of 't' is more than the critical value of 't' at 0.01 level. Therefore, it was founded a significant difference exists in the awareness level between Government School and Private school teachers towards the Nipun Bharat Scheme.

Summary

This study investigates the awareness of elementary school teachers in Aizawl regarding the Nipun Bharat Scheme, a national initiative under the Samagra Shiksha programme aimed at achieving universal foundational literacy and numeracy (FLN) by Grade 3 by 2026–2027. Using a descriptive survey method, the research sampled 100 teachers from 10 government and 10 private schools through simple random sampling. Data were collected using a researcher-developed questionnaire (QATNB) and analysed using mean, median, and t-tests.

Findings revealed that 46% of teachers had low awareness, 22% had average awareness, and only 32% had high awareness of the scheme. Female teachers demonstrated significantly higher awareness than male teachers, while teaching experience showed no significant difference in awareness levels. However, private school teachers had significantly higher awareness than government school teachers.

Discussion on the Findings

The findings of this study reveal that awareness of the NIPUN Bharat Scheme among elementary school teachers in Aizawl is relatively low, with nearly half (46%) of the respondents demonstrating limited awareness. This suggests that despite the national importance of foundational literacy and numeracy (FLN), dissemination of information and professional engagement with the scheme remains inadequate at the grassroots level.

The gender-based analysis highlights that female teachers possess significantly higher awareness compared to their male counterparts. This could be attributed to factors such as greater participation of women in primary education roles, stronger engagement with professional development activities, or heightened sensitivity toward early childhood learning needs.

Interestingly, teaching experience was not found to have any significant influence on awareness levels. This implies that both novice and experienced teachers face similar challenges in accessing or engaging with the scheme. The result underscores that awareness gaps are systemic rather than individual, and cannot be bridged solely through experience.

A significant difference was observed between government and private school teachers, with private school teachers showing considerably greater awareness of the scheme. This disparity may reflect variations in institutional support, exposure to training opportunities, or communication of policy directives. Government school teachers, despite being at the forefront of implementing central and state initiatives, appear to be less informed, which could hinder the effectiveness of the mission in public education settings.

Taken together, these findings indicate a need for structured awareness and capacity-building initiatives targeted especially at government school teachers. Without adequate teacher preparedness, the ambitious goals of NIPUN Bharat to achieve universal foundational literacy and numeracy by 2026–2027 may remain unattainable. Therefore, interventions should focus on strengthening professional development, ensuring systematic information dissemination, and fostering collaborative engagement between schools, administrators, and policymakers.

The study revealed that overall awareness of the NIPUN Bharat Scheme among elementary school teachers in Aizawl is relatively low, with 46% of teachers showing limited awareness, 22% having average awareness, and only 32% demonstrating high awareness. This lack of widespread understanding reflects a gap between national policy initiatives and their grassroots-level dissemination. As Chandra (2024) emphasized, foundational skills in early childhood form the basis for holistic learning and future development, yet inequities in implementation often hinder progress. The findings of the present study align with this concern, suggesting that inadequate teacher awareness could obstruct the effective realization of FLN goals.

A significant gender-based difference was identified, with female teachers demonstrating higher awareness compared to their male counterparts. This result resonates with Arora (2023), who also noted uneven levels of policy awareness among teachers depending on demographic factors. The heightened awareness among female teachers may indicate their stronger involvement in early-grade teaching and greater engagement with child-centred pedagogies.

Interestingly, teaching experience did not influence awareness levels. Both novice and experienced teachers exhibited similar gaps, suggesting that awareness of NIPUN Bharat is not a matter of classroom experience but rather of systemic communication and professional development. Singh and Agarwal (2023) also highlighted that effective implementation of FLN frameworks requires structured teacher training and assessment mechanisms rather than reliance on experience alone. The most significant disparity was found between government and private school teachers, with private school teachers showing higher levels of awareness. This is particularly concerning given that government schools are the primary sites for implementing NIPUN Bharat. Menon (2023) cautioned that the rapid expansion of FLN interventions, particularly through NGOs and private actors, risks

creating uneven implementation if not systematically supported at the state level. The present study confirms this imbalance, as government teachers—who play a central role in national initiatives—are less prepared than their private school counterparts.

Khandpur (2024) stressed that achieving universal foundational literacy and numeracy is the highest priority of the Indian education system under NEP 2020. However, the present findings suggest that without targeted interventions to raise awareness and preparedness among teachers, especially in government schools, these ambitious goals may not be met within the proposed timeline of 2026–2027. Overall, the study demonstrates that while NIPUN Bharat provides a comprehensive framework for improving foundational skills, its success depends heavily on teacher readiness. Bridging awareness gaps through capacity-building, systematic dissemination of information, and sustained training programs is crucial. Only then can teachers effectively translate policy into practice, ensuring that the vision of universal FLN is achieved in line with national and global educational goals.

Conclusion of the Study

The study concludes that awareness of the Nipun Bharat Scheme among elementary school teachers in Aizawl is generally low. While female teachers showed significantly higher awareness than their male counterparts, teaching experience did not influence awareness levels. However, a significant difference was observed between government and private school teachers, with private school teachers displaying greater awareness. These findings suggest that insufficient awareness could hinder the effective implementation of the scheme's objectives for foundational literacy and numeracy (FLN). Therefore, there is a pressing need for targeted awareness programmes, teacher training, and systematic dissemination of information to enhance teacher readiness and support the successful realization of Nipun Bharat goals.

Educational Implications of the Study

The present study facilitates some of the following educational implications:

- 1) The findings of the study can be utilised by the Government of Mizoram to focus on early education, implementing and strengthening foundational skills, i.e., numeracy and literacy skills, under the Nipun Bharat Scheme and also give age-appropriate pedagogy.
- 2) The findings of the study can be utilised by elementary school teachers in Aizawl for their professional development towards the Nipun Bharat Scheme.
- 4) The findings of the study can be utilised by both government and private elementary school teachers for their awareness about the importance of foundational literacy and numeracy.
- 5) The elementary school teachers can utilise the findings of the study for the improvement of learning outcomes and enhance prospects through the Nipun Bharat Scheme.

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Awareness level of RPwD Act, 2016 among Mizoram University Students and Teachers: An Analytical Study

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Prof. Lalbiakdiki Hnamte***

Abstract

The Rights of Persons with Disabilities Act, 2016 (RPwD Act 2016) represents a landmark legislation in India's commitment to protecting the rights and dignity of persons with disabilities. This study assesses and compares the awareness level of the RPwD Act, 2016 among students (N=250) and teachers (N=110) at Mizoram University, a central university in Northeast India. Using a descriptive survey design with stratified random sampling, data were collected through self-administered questionnaires. Findings reveal that 60% of students and 73.6% of teachers are aware of the RPwD Act, 2016. However, deeper understanding of specific provisions remains limited: only 38.7% of aware students could name three or more key provisions, compared to 55.6% of aware teachers. Critical gaps exist in knowledge about university-specific policies (known by only 18% of students and 31% of teachers), assistive technologies (used by 32% of students, 38% of teachers), and exam accommodations (understood by 45% of students, 62% of teachers). The study concludes that while basic awareness is moderate, targeted interventions are urgently needed to deepen understanding and translate awareness into inclusive practices on campus.

Keywords: Rights of Persons with Disabilities, Mizoram University, infrastructure, curriculum adaptation, support services

Introduction:

The Rights of Persons with Disabilities Act, 2016 (RPwD Act, 2016), passed by the Indian Parliament, is a significant step forward in the country's efforts to protect the rights and dignity of people with disabilities. This legislation connects India with the principles of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), fostering an inclusive society where people with disabilities have equal opportunity. Among its several provisions, the RPwD Act, 2016 heavily focuses on inclusive education, recognizing it as a basic right of those with disabilities.

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The RPwD Act of, 2016 places a great focus on inclusive education, which is one of its main concerns. The Act requires inclusive education for children with disabilities in all government-funded or recognised educational institutions, acknowledging education as a basic right for people with disabilities. This clause is based on the idea that inclusive education improves learning for all children by creating a varied and welcoming atmosphere, in addition to promoting equality.

According to the Act, educational institutions have to make sure that students with disabilities are admitted without facing any prejudice and that they receive the support they need to participate fully and effectively in the classroom. This covers providing suitable instructional strategies, accessible learning resources, and reasonable accommodations. The Act seeks to accomplish this by removing the obstacles that have traditionally kept children with disabilities out of regular education.

The RPwD Act, 2016 also addresses higher education, requiring universities and colleges to reserve a set percentage of places for students with disabilities. This reservation is designed to increase the representation of people with disabilities in higher education institutions and give them equal chances to pursue further degrees and professions. Furthermore, the Act establishes scholarships, financial aid, and other support services to help students with disabilities pursue their educational goals. In addition to its emphasis on education, the RPwD Act, 2016 has several other measures to improve the general well-being of people with disabilities. It broadens the concept of disability to include a larger variety of impairments, such as intellectual disabilities, mental illnesses, and multiple disabilities. This wide definition guarantees that more individuals are protected under the law and can access the rights and services guaranteed by the Act.

Overall, the Rights of Persons with Disabilities Act of 2016 takes a comprehensive and progressive approach to disability rights in India. By conforming with UNCRPD principles, the Act seeks to build a more inclusive and fair society in which people with disabilities may exercise their rights and fully participate in all parts of life. Its emphasis on inclusive education, accessibility, employment, and social security demonstrates the varied character of disability rights and the necessity for a comprehensive approach to addressing the obstacles that people with disabilities confront. With the implementation of the RPwD Act, 2016, India is making tremendous progress towards realising the goal of an inclusive society in which people with disabilities' rights, and dignity are safeguarded and promoted.

Significance of Promoting Inclusive Education:

Inclusive education is a crucial component of the RPwD Act 2016, which seeks to integrate students with disabilities into mainstream educational institutions. The Act requires educational institutions to provide reasonable accommodations, barrier-free access, and supportive learning environments that meet the different needs of all students. By doing so, it hopes to break down the obstacles that have historically kept students with disabilities from accessing equal educational opportunities. The RPwD Act, 2016 emphasizes the need for both public and private institutions to create an inclusive educational environment that supports fairness, non-discrimination, and accessibility.

Definition and Importance of Inclusive Education:

Inclusive education is an educational system in which students with disabilities study alongside their non-disabled peers in normal classes. This paradigm encourages full engagement of all students, regardless of ability, in the general education curriculum and school community. Inclusive education is based on the premise that every student has the right to a decent education and that diversity enhances the learning experience for everyone.

Specific focus on Mizoram University:

Mizoram, a state in north-eastern India, provides inclusive education through initiatives like elevators, ramps, and assistive devices to support students with disabilities. However, many students are unaware of the Rights of Persons with Disabilities (RPwD) Act, 2016 and its resources. Inclusive education benefits all students, including those with temporary injuries or parents with strollers. To ensure full inclusivity, Mizoram University should raise awareness among students through orientation programs, workshops, informational campaigns, and curriculum incorporation. By educating the entire student body, the university can create a more informed, empathetic, and supportive campus culture, enhancing the educational experience for everyone.

Review of related literature:

Rani, (2018) *'The rights of persons with disabilities act, 2016 promoting inclusive education'* found that despite numerous shortcomings, the RPwD Act of 2016 remains the most effective legislation for advancing and elevating those with disabilities. It enables inclusive education to achieve its goals more effectively and quickly. Further research is needed to assess the impact of the RPwD Act, 2016 on social and national contexts.

Dheesha, (2020) *'Awareness on Disability and Inclusive Education among the Prospective Teachers'* Inclusive education aims to bring all students together in one classroom, ensuring appropriate educational needs and participation without discrimination. The Rights of Persons with Disabilities Act 2016 lists 21 types of disabilities, including blindness, low vision, leprosy, cerebral palsy, specific learning disabilities, speech, and language disabilities, hearing impairments, and more. However, 66% of prospective teachers were not aware of the Act, and 34% were only aware of certain types of disabilities.

Lalmuankimi, (2023) *'Perceptions of Students on Implementation of Rights of Persons with Disabilities Act 2016 in Secondary School Students of Mizoram'* This study found that most students with disabilities had average perceptions of the Rights of Persons with Disabilities Act 2016. Only a small percentage had above-average perceptions, and no students had poor perceptions. Additionally, both genders are expected to have similar attitudes of the Rights of Persons with Disabilities Act 2016. There were no significant differences between the two groups. A comparison of mean scores revealed a substantial disparity between rural and urban students with disabilities.

Lalnunpuia, Shree, (2024) *'Rights of persons with disabilities Act 2016: A case study of secondary schools in Aizawl, Mizoram, India'* The study found that to assess the implementation status of the RPwD Act, 2016 in secondary schools of Aizawl using an observational checklist and field notes. Principals provided their viewpoints on infrastructural and instructional facilities for children with disabilities through face-to-face interviews. The research found that no study has been conducted related to the RPwD Act, 2016 in their schools, but all teachers were aware of the Act.

Research questions:

1. What is the level of awareness of the RPwD Act, 2016 among students at Mizoram University?
2. What is the level of awareness of the RPwD Act, 2016 among teachers at Mizoram University?
3. How does awareness of the RPwD Act, 2016 compare between students and teachers?

Objectives of the study:

1. To assess the awareness level of the RPwD Act, 2016 among the students at Mizoram University.
2. To assess the awareness level of RPwD Act, 2016 among teachers at Mizoram University.
3. To compare the awareness levels and understanding of key provisions between students and teachers.

Methodology of the study:

Method of the study:

Two self-administered questionnaires were developed specifically for this study to assess awareness and understanding of the RPwD Act, 2016.

Source of data:

The findings and analysis presented in the study are based on primary data, specifically sourced for this research. The researcher personally engaged with students to gather the necessary information for this paper.

Sample design:

The study employed a descriptive survey design to assess the awareness level and understanding of the RPwD Act, 2016 among students and teachers of Mizoram University.

Sample Size:

A total of 250 students and 110 teachers were randomly selected from various departments of Mizoram University. The sample size was determined based on feasibility and the need for adequate representation across different academic disciplines.

Sampling Technique:

A stratified random sampling technique was used. The strata were formed based on:

1. Academic departments
2. Year of study
3. Gender

For teachers, strata were formed based on department.

From each stratum, participants were selected randomly to ensure proportional representation.

Distribution of sample:

1. Undergraduate students: 150 (60%)
2. Postgraduate students: 100 (40%)
3. Male students: 110 (44%)
4. Female students: 140 (56%)
5. Students with reported disabilities who answered the questionnaire: 18 (7.2%)
6. Student without disabilities: 232 (92.8%)

Tools for Data Collection:

Two questionnaires were developed:

1. Student questionnaire: 15 items measuring awareness and understanding of RPwD Act, 2016 provisions.
2. Teachers' questionnaire: 15 items.

Ethical Considerations:

Prior to data collection, permission was obtained from the students and teachers. All participants were informed about the purpose of the study, and their consent was obtained.

Findings related to objective one:

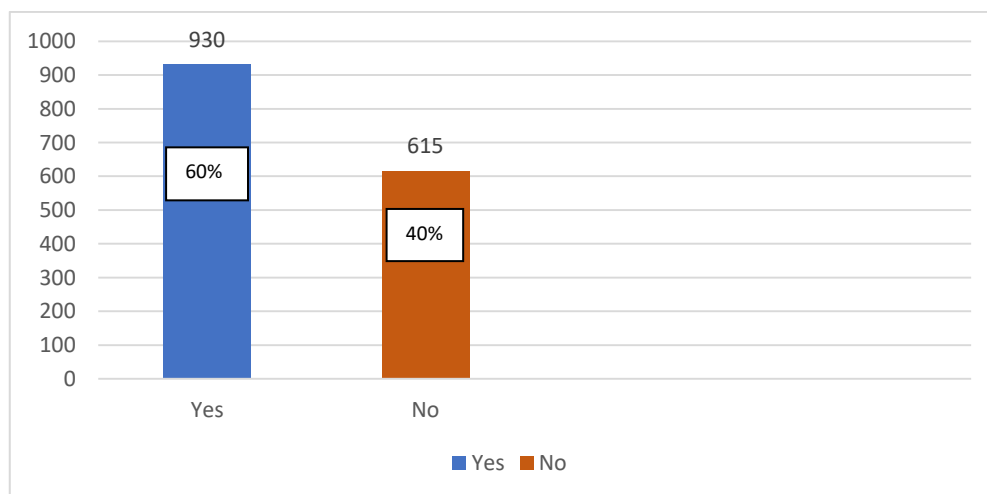
The outcomes for Objective 1 reveal the average degree of awareness of the RPwD Act, 2016 among Mizoram University students. According to the study, 60% of students are aware of the RPwD Act, 2016, while 40% are unaware. This large number of unaware students demonstrates a deficit in spreading knowledge about the RPwD Act, 2016 and its requirements. The RPwD Act is a critical law that protects the rights and dignity of people with disabilities and encourages their full participation in educational and societal settings. However, 40% of students are unaware of this vital deed shows that the institution should employ more effective measures to educate its students.

There are several ways to raise awareness, including adding the RPwD Act, 2016 to orientation programs, holding workshops and seminars, and adding important information to the curriculum. Increased exposure can also be achieved through informative campaigns that make use of both physical and digital media.

Mizoram University can create a more welcoming atmosphere where all students, including those with disabilities, are aware of their rights and the resources accessible to them by raising awareness. Consequently, this will improve the university's general accessibility and inclusion.

Graph showing the average level of awareness of the RPwD Act, 2016 among the students of Mizoram University.

Graph:1. Level of awareness of the RPwD Act, 2016 among the students of Mizoram University



From the graph we can see that only 60% of students who answered the questionnaire were aware of the RPwD Act, 2016, emphasizing the need for increasing awareness. This can be accomplished by

including information on the Act in orientation programs, organizing workshops and seminars, and adding relevant topics to the curriculum. Additionally, informative promotion of the Act via online platforms and physical materials can considerably increase its exposure and comprehension. Raising awareness is crucial and these strategies can ensure that more students are informed and knowledgeable about the RPwD Act, 2016, resulting in improved implementation and adherence to its guidelines.

Findings related to objective two:

Objective 2 of this study aims to determine the proportion of teachers at Mizoram University who are aware of the RPwD Act, 2016, thereby establishing a baseline against which future interventions can be measured.

Table No. 1: Level of awareness of RPwD Act, 2016 among teachers of Mizoram University

Awareness level	Frequency (N=110)	Percentage
Aware	81	73.6%
Unaware	29	26.4%
Total	110	100%

The data reveal that 73.6% of teachers (81 out of 110) at Mizoram University are aware of the existence of the RPwD Act, 2016. Conversely, 26.4% of teachers (29 out of 110) reported being unaware of the Act.

This finding indicates that approximately three out of every four teachers at the university have at least basic awareness that such legislation exists. While this majority is encouraging, the presence of more than one-quarter of teachers (over 26%) who remain completely unaware is a matter of serious concern. In practical terms, this means that in any given classroom of 30 students, there is a high probability that the teacher has no knowledge of the legal framework that guarantees rights to students with disabilities.

Conclusion:

The results for Objective 2 reveal that 73.6% of teachers at Mizoram University are aware of the Rights of Persons with Disabilities (RPwD) Act, 2016. Despite this majority, significant concerns arise: 26.4% of teachers are completely unaware of the Act, indicating a crucial shortfall in professional knowledge that may adversely affect students with disabilities. Furthermore, while awareness among teachers is higher than among students, the difference is minimal at only 13.6 percentage points, highlighting inadequate emphasis on disability rights training for faculty.

Findings related to objective three:

The RPwD (Rights of Persons with Disabilities) Act, 2016 is a crucial piece of legislation that ensures the protection and promotion of the rights and dignity of individuals with disabilities. Evaluating the understanding of its key provisions among students and teachers who are aware of its existence is essential for effective implementation within the university setting. This section compares

the awareness levels and understanding of key provisions between students and teachers at Mizoram University.

Current Awareness and Understanding: A Comparison

The findings from Objective 1 indicate that only 60% of Mizoram University students are aware of the RPwD Act, 2016, leaving a significant 40% who are not. In comparison, findings from Objective 2 reveal that 73.6% of teachers are aware of the Act, while 26.4% remain unaware. This means that teachers are approximately 13.6 percentage points more aware of the Act than students. While this difference indicates that teachers have slightly better awareness, the gap is surprisingly small; one would expect teachers, as professional educators, to be far more knowledgeable about disability rights legislation than students.

When examining the depth of understanding among those who are aware, the differences become more pronounced but still concerning. Among the 150 aware students, their grasp of the Act's essential elements varies greatly. Some students demonstrate thorough comprehension, others show moderate understanding, and many have only basic awareness. Similarly, among the 81 aware teachers, understanding ranges from deep to superficial. However, teachers consistently show deeper understanding than students across almost every provision.

Specifically, teachers demonstrate stronger knowledge of critical provisions such as the right to non-discrimination, accessibility requirements in buildings, education and employment reservations, reasonable accommodations, exam accommodations, assistive devices provision, social security schemes, grievance redressal mechanisms, and penalties for non-compliance. In every single provision measured, teachers outperformed students, with the largest differences observed in exam accommodations, grievance redressal mechanisms, and assistive devices provision.

Despite this better performance by teachers, significant gaps remain for both groups. The least understood provision among both students and teachers is the penalty for non-compliance, followed by grievance redressal mechanisms. This is deeply concerning because without knowledge of penalties, there is no deterrent against violations, and without understanding grievance mechanisms, students with disabilities cannot effectively seek justice when their rights are denied.

Importance of Understanding the RPwD Act, 2016

The RPwD Act, 2016 includes several requirements designed to ensure that people with disabilities can fully participate in educational, social, and professional contexts. The key components include the right to equality and non-discrimination, accessibility requirements, educational and employment rights, and the development of institutional mechanisms to defend these rights.

For students, understanding these regulations enables those with disabilities to fight for their rights and request reasonable accommodations, fostering a more inclusive atmosphere at the university. For teachers, understanding these regulations is not optional but a professional and legal obligation. Teachers who lack understanding may unknowingly violate the law, deny students their legally mandated rights, or fail to provide necessary support.

Need for Enhanced Awareness Campaigns for Both Groups

Given that 40% of students are completely unaware of the RPwD Act, 2016, and among aware students, deep understanding is limited, urgent action is required. Similarly, while 73.6% of teachers are aware, more than one-quarter of teachers (26.4%) remain completely unaware, and even among aware teachers, critical provisions such as penalties and grievance mechanisms are poorly understood. This gap, lack of basic awareness in a substantial minority of both groups, and shallow understanding in the majority demands comprehensive, targeted interventions.

Recommendations for Raising Awareness and Understanding

For Students:

1. **Workshops and Seminars:** Plan frequent events with an emphasis on the RPwD Act, 2016. The details of the Act's requirements should be thoroughly covered, along with helpful advice on how to implement them in a university setting.
2. **Incorporation into Students' Orientation Programmes:** Ensure that new student orientation programs include in-depth discussions of the RPwD Act, 2016. This guarantees awareness from the outset of their academic experience.
3. **Curriculum Integration:** Include important RPwD Act, 2016 related subjects in pertinent courses offered by various academic departments. This will ensure that all students receive education on the Act, irrespective of their subject of study.
4. **Informative Campaigns:** Use both physical and digital media. Information about the RPwD Act, 2016 can be shared through university bulletin boards, websites, and social media platforms.
5. **Interactive Approaches to Education:** Use interactive teaching strategies such as group discussions and quizzes to engage students and improve their comprehension.

For Teachers:

1. **Mandatory Faculty Development Programs:** Require all teachers to complete certified training modules on the RPwD Act, 2016, with periodic refresher courses.
2. **Departmental Workshops:** Conduct targeted workshops for departments with particularly low awareness, such as Commerce and Engineering.
3. **Integration into B.Ed. and M.Ed. Curricula:** Ensure that all teacher education programs include mandatory, credit-bearing courses on the RPwD Act, 2016 and inclusive classroom practices.
4. **Resource Materials:** Provide all teachers with accessible handbooks, guides, and quick-reference cards summarizing key provisions, penalties, and grievance mechanisms.
5. **Accountability Measures:** Include knowledge of the RPwD Act, 2016 as a criterion in teacher performance evaluations.

Conclusion:

Evaluating the awareness of the Rights of Persons with Disabilities (RPwD) Act, 2016 among students and teachers at Mizoram University is crucial for its effective implementation. The analysis reveals that while teachers have a moderate advantage in awareness compared to students, both groups exhibit significant knowledge deficiencies that hinder the Act's application. Specifically, 40% of students are entirely unaware of the Act, and of the 60% who are aware, there is a pronounced lack of understanding regarding critical elements like penalties and grievance mechanisms. Among teachers, 26.4% lack awareness, and even among the 73.6% who are knowledgeable, only a minority grasp vital provisions thoroughly. Alarming, the penalty for non-compliance is the least understood by both groups, indicating a disconnect regarding the consequences of violating disability rights.

To bridge these gaps, Mizoram University must undertake comprehensive awareness initiatives for both students and teachers. Recommended strategies include workshops, seminars, curriculum integration, orientation programs, and interactive teaching methods. Furthermore, teachers should receive mandatory training, participate in departmental workshops, and have access to accountability measures and resource materials. These interventions are essential for ensuring that the university community understands the RPwD Act, 2016 and is equipped to advocate for the rights of persons with disabilities, thereby fostering an inclusive academic environment.

Limitations of the study:

The following limitations should be considered while interpreting the findings:

1. **Self-reported data:** The study relied on participants' self-reports, which may be subject to social desirability bias or inaccurate recall. Both students and teachers may have over-reported their awareness to appear socially conscious or professionally competent.
2. **Single university context:** The study was conducted only at Mizoram University. Findings may not be generalizable to other universities in India or Northeast India, particularly private universities or those with different demographic profiles.
3. **Cross-sectional design:** Data were collected at one point in time. The study does not capture changes in awareness over time or the long-term impact of awareness campaigns.
4. **Possible social desirability bias:** Some participants, particularly teachers who may feel professional pressure to demonstrate knowledge of disability laws, may have over-reported their awareness or understanding.
5. **Modest teacher sample size:** While the student sample (N=250) is robust, the teacher sample (N=110) is relatively modest. Department-wise subsamples for teachers were very small for some departments (e.g., Commerce had only 6 teachers, Engineering had 9), limiting the reliability of department-level comparisons.
6. **Uneven departmental representation:** Teacher respondents were not equally distributed across all departments. Some departments (e.g., Education) had higher representation, while others (e.g., Commerce, Engineering) had fewer respondents, which may affect the generalizability of department-specific findings.
7. **Awareness versus application:** The study measured awareness and understanding, not actual behaviour or implementation of the Act's provisions on campus. A teacher may be aware of the Act but still fail to provide reasonable accommodations in practice.
8. **Disability status verification:** Student disability status was self-reported and not verified through university records or medical documentation. The actual number of students with disabilities at Mizoram University may differ from the 18 reported in this study.

Implications of the study:

The findings of this study have several practical implications for different stakeholders:

For University Administration:

1. **Mandatory sensitization programs:** Mizoram University should introduce compulsory orientation sessions on the RPwD Act, 2016 for all incoming students.
2. **Accessible infrastructure:** Ensure that ramps, elevators, assistive devices, and accessible washrooms are not only present but also well-maintained and publicized.
3. **Establish a Disability Support Cell:** A dedicated cell can coordinate awareness campaigns, provide accommodations, and address grievances of students with disabilities.
4. **Mandatory training programs for teachers:** Given that 26.4% of teachers were completely unaware, the university must require all faculty to complete certified training modules on the RPwD Act.

For Policymakers:

1. **Allocate resources for awareness:** Government and UGC should provide funding specifically for disability rights awareness campaigns in higher education institutions.
2. **Monitor implementation:** Regular audits and assessments should be conducted to ensure universities comply with the awareness and accessibility mandates of the RPwD Act, 2016.
3. **Integrate into policy frameworks:** Awareness of disability rights should be made a criterion for accreditation bodies like NAAC and NIRF.

For Teachers and Educators:

1. **Curriculum inclusion:** Disability rights, inclusive education, and the RPwD Act, 2016 should be integrated into relevant courses (e.g., Education, Sociology, Law, Social Work, Teacher Training).
2. **Teacher training programs:** B.Ed. and M.Ed. curricula must include mandatory modules on the RPwD Act, 2016 and inclusive classroom practices.
3. **Classroom sensitivity:** Teachers should be trained to create inclusive learning environments that accommodate diverse needs without stigmatization.

For Students:

1. **Peer-led awareness:** Student groups and clubs can organize debates, quizzes, and street plays to spread awareness among peers.
2. **Self-advocacy:** Students with disabilities, when aware of their rights, can better advocate for reasonable accommodations and barrier-free access.

Suggestions for Future Research:

Based on the findings and limitations of this study, the following directions are recommended for future research:

1. **Comparative studies across universities in Northeast India:** A multi-university study (e.g., including Assam University, NEHU, Tripura University) would help compare awareness levels and identify region-specific gaps.
2. **Implementation of RPwD Act, 2016 infrastructure at Mizoram University:** A mixed-methods study examining physical infrastructure (ramps, elevators, assistive technology), library accessibility, and hostel facilities for students with disabilities.
3. **Awareness among faculty and non-teaching staff:** Since teachers and administrative staff play a key role in implementation, their awareness and attitudes toward the RPwD Act, 2016 should be studied.
4. **Impact of awareness campaigns on inclusive behaviour:** An experimental or pre-post intervention study to measure whether workshops, seminars, or digital campaigns actually improve awareness and foster inclusive behaviour on campus.

5. **Awareness among non-teaching staff:** This study included teachers, but future research should examine awareness among administrative staff, library staff, hostel wardens, and other non-teaching personnel who also play a role in implementing the RPwD Act.
6. **Barriers to implementation:** Qualitative studies using interviews or focus groups to understand why awareness remains low despite the existence of the Act, and what practical barriers exist at the university level.
7. **Longitudinal study:** Tracking the same cohort of students from first year to final year to see if awareness increases naturally over time or requires structured intervention.

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A Stream-Wise Study of the Personal ICT Resources of College Students in Mizoram and their Use in Preparing Learning Materials

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Abstract

The present study aimed to explore “A Stream-Wise Study of the Personal ICT Resources of College Students in Mizoram and their Use in Preparing Learning Materials.” All the general colleges in Mizoram offering arts, science and commerce teachers formed population of the present study. Out of the 27 colleges, 18 general colleges in the state were selected as sample colleges through multi-stage sampling technique. Further, a sample of 1085 college students comprising of 525 from arts, 285 from science and 275 from commerce streams in each sample college representing arts, science and commerce streams were selected by following simple random sampling method. Majority of college students in Mizoram did not possess ICT resources required for education such as desktop computer, laptop, tablet, printer and wi-fi/internet access. Cell phone was the single ICT resource possessed by large majority (82.2%) of the students. As a whole, profile of college students in Mizoram based on personal ICT resources possessed and their use for preparation of learning materials was not good. The findings reveal that college students in Mizoram hardly used their personal ICT resources for preparation of learning materials.

Keywords: ICT resources, college students, stream-wise study

Introduction

ICT is extensively utilized in our daily lives, and the necessity for it in the educational field is ever increasing. ICT in education includes ‘presentations, audios, videos, images, and/or a combination of these’ utilised for instruction. “Institutions can provide students with improved learning chances by utilising a combination of audio-visual learning aids in addition to the conventional blackboard” (Virmani, 2023). “The use of ICT makes learning more important than teaching. It makes the learning environment more dynamic and interesting for both teachers and students. Additionally, it transforms instructors' roles from that of only transmitting knowledge to those of learning facilitators, knowledge navigators, and active learners alongside students” (Chatterjee, 2021).

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Teachers need to realise that the only option available to them is to use technology as a tool in the classroom if they want their students to achieve a high degree of proficiency and competition. “Since students rely on it more than just their teachers, a teacher may also be referred to as a ‘teaching technician’” (Chauhan, 2014). Information communication technology (ICT) application in our daily life has brought about many changes in various aspects of our modern society including education system. Buckingham (2005) remarks, “Graduates who are less familiar with digital culture are increasingly at a disadvantage in the national and global economy. Digital literacy—the skills of searching for, discerning, and producing information, as well as the critical use of new media for full participation in society—has thus become an important consideration for curriculum frameworks”. Thus, the significance of ICT for making graduates employable and for making them efficient and productive workers cannot be over exaggerated. This, at the same time, confirms the need for making all the teachers digitally educated which can be fulfilled through capacity building of the teachers in ICT and its effective application in education.

We are in the information era the demands of which have placed tremendous pressure on educational institutions throughout the globe to integrate ICTs into education. “The global economy has changed as a result of ICT advancements. Information may be gathered, assessed, and disseminated at ever-increasing speeds because of amazing advancements in information technology, quick international communication and transit capabilities, and massive technological linkages beyond national boundaries” (Chandra, 2004). The use of online learning has now become popular in education particularly at higher education level. Besides, public interest in social networking systems has grown worldwide. Life these days has become meaningless without internet connectivity and social media. “One of the most important features of social media in cyberspace is user engagement. Information is exchanged in both directions, and the traditional sender-recipient relationship has evolved” (Yeasmin, 2014).

Educational institutions these days need to efficiently handle the suddenly increasing demand for information and skills. With the advent of ICT, the student is not just engaged on the internet for formal interaction. Any learner irrespective of place of living can pay fees through online and access any course of study in an online mode. The world is getting closer and closure as a result of modern technology. Hence, “it is imperative that technological advancements be included into Indian classrooms in order to stay up with the technological revolution in industrialised nations' teaching-learning processes. Information is transmitted through electronic media in nanoseconds. Technology advancements must be included into the teaching and learning process” (Arulsamy, 2014). “The advent of new technologies and expansion of knowledge have opened up new outlooks for teaching and learning” (Mrunalini & Ramakrishna, 2016).

Technology is so important that it is what keeps the world moving forward today. It increases access to education and improves educational quality when used effectively. Popular uses of ICT in education include preparing students for examinations, using instructional resources, and creating notes. ICT use broadens students' grasp of the subject matter since it makes use of a number of readily understandable teaching-learning resources.

ICT is extensively utilized in our daily lives, and the necessity for it in the educational field is ever increasing. ICT in education includes ‘presentations, audios, videos, images, and/or a combination of these’ utilised for instruction. “Institutions can provide students with improved learning chances by utilising a combination of audio-visual learning aids in addition to the conventional blackboard” (Virmani, 2023). “The use of ICT makes learning more important than teaching. It makes the learning environment more dynamic and interesting for both teachers and students. Additionally, it transforms instructors' roles from that of only transmitting knowledge to those of learning facilitators, knowledge navigators, and active learners alongside students”

(Chatterjee, 2021). ICT platforms such as email, chat rooms, and discussion groups enhance the number of communication channels and play a very significant role in making teaching-learning process more effective and interesting. “Frequent use of ICT in a variety of curriculum disciplines can positively motivate pupils to learn. It is important to note that ICT be used in the classroom in order for pupils to learn how to function in the information age” (Radha, 2016).

Review of related studies

Khan et al. (2011) conducted “a survey on IUB faculty of education and students’ use of ICT”. According to the study, students’ use of various ICT facilities, tools and platforms for their education had become unavoidable. Students could quickly retrieve the information they needed by utilizing modern information and communication technologies. They could access and retrieve information such as “e-books, e-journals” through various modern ICTs of the following: “wireless networks, the internet, search engines, databases, websites and web 2.0 technologies”.

Fraillon et al. (2014) studied “students’ use and engagement with ICT at home and school in grade 8 ICILS”. They found that females scored slightly higher than males. Students expressed a strong interest in an enjoyment from using computer technology. It was also found that competence of students in ICT skills had moderate relationship with computer and information literacy achievement.

Bidariana et al. (2011) undertook a study titled “a model for application of ICT in the process of teaching and learning”. They found that introduction of technology in education field was a valuable chance for making some changes and innovations, which increased efficiency and effective educational system. The developed model was the result of a continuous study of obtained findings and the application of ICT in education.

Kumara and Kumar (2018) undertook a study titled “the digital divide among the rural and urban students: an exploration” which was conducted among rural and urban students of 64 high schools. The findings were as follows:

- a. 20.66% of rural students and 69.70% of urban students used computers for academic purposes.
- b. students faced "frequent electric power failure problem" while using computers.
- c. most students depended largely on their teachers to learn computer.
- d. only 6.25% of rural schools had permanent computer teachers.
- e. majority of urban schools (96.87%) had computer teachers.

Thus, the study confirmed the existence of digital divide between rural and urban students and that the digital divide was so large.

Wangdi, Dema and Chogyel (2021) conducted a study on “online learning amid Covid-19 pandemic: perspectives of Bhutanese students”. The research found that internet in Bhutan was too expensive for students, and teachers were inexperienced to manage online classes. Majority of the students did not have personal smartphones and laptops for attending online classes.

Rationale of the Study

Technological application aims at enhancing and improving the processes of teaching, learning, and evaluation; facilitating the preparation and professional development of teachers; enhancing educational accessibility; and optimising the planning, management, and administration of education, including admissions, attendance, and assessments. In order to accomplish these objectives, ‘NEP 2020’ advocates wide applications of disruptive technologies pertinent to education. It proposes the establishment of the “National Educational Technology Forum (NETF)”, an independent organisation that will act as a channel for the integration of technology into numerous aspects of both higher education and the classroom (GOI, 2020). “NEP 2020 is a fundamental shift in the direction of improving the educational system. There is a growing need to include technology into

education. Various digital platforms are being proposed as a means of paving the way for the adoption of constructive policies” (Sharma, 2022).

Students’ talents and skills can now be examined with the help of ICT-based assessment or evaluation. Scoring students’ work, such as multiple-choice examinations, as well as in grading reports, essays, and projects etc., has become easy with the help of computer. “With the advent of read write web and the advancement of software as a service (saas), it is now possible to design and conduct online assessments. There are numerous online service providers, both free and paid, those create and develop online tests and quizzes. There are numerous approaches to incorporate ICT in evaluation practices” (Murugan, 2021).

The incorporation of ICT into the teaching-learning process can result in changes such as e-learning, e-communication, simple access to information, online student registration, and advertising, among other things. “It can also give the means of acquiring, linking, and analysing data on teaching and learning in ways that allow us to more accurately diagnose student needs and evaluate programmes” (Patel & Jadeja, 2022). The integration of ICT into teaching and learning strategies can only be successful if they are well planned, controlled and supported” (Nehru, 2014).

Statement of the Problem

The problem of the present study is thus stated as “A Stream-Wise Study of the Personal ICT Resources of College Students in Mizoram and their Use in Preparing Learning Materials”

Operational Definitions of Key Terms Used

The key terms used are as follows:

College Students: The term ‘college students’ in the present study means college students offering or belonging to arts, science and commerce streams.

ICT resources: ICT resources refer to ICT tools/devices that aid and support teaching and learning

College students: The term ‘college students’ in the present study refers to college students learning general courses such as arts, science and commerce

Stream-Wise: Stream-Wise in the present study refers to area-specific courses that students offer in colleges to take bachelor’s degree

Objectives of the Study

The study has the following objectives:

1. To prepare profile of college students in Mizoram based on personal ICT resources possessed in stream-wise.
2. To study the use of personal ICT resources for preparation of learning materials by college students in Mizoram in stream-wise
3. To suggest some measures for improvement.

Population and Sample

The present study had two groups of “population and sample” briefly described as follow:

- 1) *Population and Sample of Colleges in Mizoram*

Out of the 27 colleges, 18 general colleges in the state were selected as sample colleges through multi-stage sampling technique.

- 2) *Population and Sample of students*

A sample of 1085 college students comprising of 525 from arts, 285 from science and 275 from commerce streams in each sample college representing arts, science and commerce streams were selected by following simple random sampling method.

Construction of Tools

Questionnaire for students for studying personal ICT resources possessed and their use for preparation of learning materials by college students in Mizoram in terms of stream-wise constructed by the investigator were used in this investigation.

Analysis and Interpretation of data

4.5.0 Profile of college students in Mizoram based on personal ICT resources possessed in stream-wise

Table - 4.5.1

Personal ICT Resources Possessed by College Students

Sl. No	Personal ICT Resources Possessed	Total N=1085	Arts N=525	Science N=285	Commerce N=275
1	Desktop computer	342(31.5)	140(26.7)	109(38.2)	93(33.8)
2	Laptop computer	262(24.1)	123(23.4)	85(29.8)	54(19.6)
3	Tablet	323(29.8)	116(22.1)	113(39.6)	94(34.2)
4	Printer	296(27.3)	98(18.7)	111(38.9)	87(31.6)
5	Cell phone	892(82.2)	426(81.1)	238(83.5)	228(82.9)
6	Scanner	547(50.4)	261(49.7)	141(49.5)	145(52.7)
7	Wi-fi/ internet access	388(35.8)	177(33.7)	122(42.8)	89(32.4)

“Figures in the parentheses indicate percentages”

We find from “table 4.5.1” that:

- ICT resources required for education such as desktop computer, laptop, tablet, printer and wi-fi/internet access are hardly possessed by college students in Mizoram. The percentages of the students who are with these resources range from 24.1% to 35.8% only.
- Science students are better than commerce and arts students in terms of possession of personal ICT resources required for their education.
- Cell phone is the single ICT resource which is possessed by large majority of the students, i.e. 82.2%. In this age of technology, it becomes a wonder that there are still 17.8% of college students who do not possess cell phone.
- Scanner is claimed to be possessed by 50.4% of the students. This might be due to the fact that scanner has been downloaded by these students in their cell phones.

Table - 4.6.2

Use of Personal ICT Resources for Preparation of Learning Materials

Sl. No	Personal ICT Resources	Frequency of Use	Total N=1085	Arts N=525	Science N=285	Commerce N=275
1	Desktop computer	Frequently	179(16.5)	58(11.0)	69(24.2)	52(18.9)
		Sometimes	356(32.8)	155(29.5)	107(37.5)	94(34.2)
		Never	550(50.7)	312(59.4)	109(38.2)	129(46.9)
2	Laptop computer	Frequently	204(18.8)	64(12.2)	68(23.9)	72(26.2)
		Sometimes	340(31.3)	146(27.8)	103(36.1)	91(33.1)
		Never	541(49.9)	315(60.0)	114(40.0)	112(40.7)
3	Printer/scanner	Frequently	225(20.7)	97(18.5)	73(25.6)	55(20.0)
		Sometimes	371(34.2)	159(30.3)	112(39.3)	100(36.4)
		Never	489(45.1)	269(51.2)	100(35.1)	120(43.6)
4	Photocopier	Frequently	168(15.5)	57(10.9)	70(24.6)	41(14.9)
		Sometimes	311(28.7)	125(23.8)	102(35.8)	84(30.5)
		Never	606(55.9)	343(65.3)	113(39.6)	150(54.5)
5	Wi-fi	Frequently	374(34.5)	142(27.0)	119(41.8)	113(41.1)
		Sometimes	286(26.4)	141(26.9)	80(28.1)	65(23.6)
		Never	425(39.2)	242(46.1)	86(30.2)	97(35.3)
6	Pendrive	Frequently	162(14.9)	41(7.8)	70(24.6)	51(18.5)
		Sometimes	364(33.5)	148(28.2)	115(40.4)	101(36.7)
		Never	559(51.5)	336(64.0)	100(35.1)	123(44.7)
7	E-resources (e-books, e-journals)	Frequently	124(11.4)	54(10.3)	65(22.8)	5(1.8)
		Sometimes	263(24.2)	155(29.5)	102(35.8)	6(2.2)
		Never	698(64.3)	316(60.2)	118(41.4)	264(96.0)

“Figures in the parentheses indicate percentages”

It is striking to note from “table 4.6.2” that:

- There are many ‘college students’ who never use personal desktop computer, laptop computer, printer/scanner, photocopier, wi-fi, pendrive and e- resources for preparation of learning materials at home and that the percentages of these students are 50.7, 49.9, 45.1, 55.9, 39.2, 51.5 and 64.3 respectively. The percentages of frequent users of personal ICT resources for preparation of learning materials at home range as low as from 11.4 to 34.5.

- b) The percentages of frequent users of personal ICT resources are highest among science students followed by commerce students. However, frequent users of e-resources are more among arts students than among commerce students.

Findings and Discussion

Profile of college students in Mizoram based on personal ICT resources possessed

- 1) Majority of college students in Mizoram did not possess ICT resources required for education such as desktop computer, laptop, tablet, printer and wi-fi/internet access. The percentages of the students who were with these resources ranged from 24.1% to 35.8% only.
- 2) Cell phone was the single ICT resource possessed by large majority (82.2%) of the students. The finding that 17.8% of college students did not possess cell phone was rather a wonder in this age of technology.
- 3) Scanner was claimed to be possessed by 50.4% of the students. This might be due to the fact that scanner had been downloaded by these students in their cell phones.
- 4) In terms of possession of personal ICT resources required for their education, science students were better than commerce and arts students.
- 5) As a whole, profile of college students in Mizoram based on personal ICT resources possessed was not good.

2. Use of Personal ICT Resources for Preparation of Learning Materials

- 1) Many college students never used personal desktop computer, laptop computer, printer/scanner, photocopier, wi-fi, pendrive and e- resources for preparation of learning materials at home and that the percentages of these students were 50.7, 49.9, 45.1, 55.9, 39.2, 51.5 and 64.3 respectively. The percentages of frequent users of personal ICT resources for preparation of learning materials at home ranged as low as from 11.4 to 34.5.
- 2) Science students were better than arts and commerce students in the use of personal ICT resources for preparation of learning materials.
- 3) As a whole, use of personal ICT resources for preparation of learning materials among college students in Mizoram was not good.

Conclusion

- 1) It is sad to note that college students in Mizoram hardly possessed ICT resources required for education such as desktop computer, laptop, tablet, printer and wi-fi/internet access. As cell phone was the only tool that majority of the students possessed, it was not possible for large majority of them to do much work needing the application of ICT.

In this regard, Siddiquah and Salim (2017) in their survey on “ICT facilities, skills, usage, and the problems faced by the students of higher education of Lahore, Pakistan”, found that ‘the students had ICT facilities (computers and internet) at universities and home’ whereas the present study found students as not having the facilities but only cell phones.

- 2) From the present study, we find that college students in Mizoram hardly used either college or personal ICT resources for preparation of learning materials due to the fact that college ICT resources were not accessible to them and that they did not possess personal ICT resources except cell phone. If colleges could make the provision of computer lab with wi-fi for use of the students on rotation basis, it would solve the main problems of the students and that would

promote integration of ICT in education. The finding that science students were better than arts and commerce students in the use of both college and personal ICT resources for preparation of learning materials may suggest two main things. One is that science colleges may be better equipped with ICT resources than arts and commerce colleges. Another is that science students and their parents are more concerned about the use of ICT resources in education than arts and commerce students as well as their parents and as a result, they have better ICT facilities in their homes.

Siddiquah and Salim (2017) in their survey on “ICT facilities, skills, usage, and the problems faced by the students of higher education of Lahore, Pakistan”, reported that ‘the students mostly used computers for recreational purpose but hardly used them for academic purpose’, the finding of which is different from the present ones.

The main challenge lying with students was lack of ICT resources for majority of them. Computer, printer, laptop, tablet and such other ICT tools required for online education were not available for majority of the students. Moreover, internet connection was a big problem for them. The only resource or tool available to majority of them was mobile phone and that also of not a high quality. Poor internet signal was really a big threat.

Integration of ICT in education will be more and more important to make education successful in modern society. As the process will have to be started with the teachers, professional development programmes in the field of ICT in education will be important for them. Availability of the required ICT resources, access to these resources, provision of wi-fi etc needs to be ensured to enable the students to get the benefits to the most.

Suggestions and Recommendations

1. As cell phone is the only tool possessed by majority of the students for integration of ICT in their learning, it is recommended that the state government should make a policy for subsidizing tablet or laptop or desktop computer for college students from economically backward families.
2. Competency of school teachers in Mizoram in application of ICT in teaching-learning process.
3. Usage of ICT resources by teacher educators in teaching – learning process.
4. The digital divide among the rural and urban students: An exploration

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Socio-Demographic correlates of Impulsivity in Patients with Schizophrenia

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Abstract

Schizophrenia is a chronic psychiatric disorder that is characterised by profound disturbances in cognition, emotion and behaviour. Despite its prevalence in the Indian population, studies about the disorder are at an infant stage with socio-demographic and psychological correlates remaining a critical yet underexplored aspect, particularly in the Mizoram context. The present study aimed to investigate the socio-demographic profile of 40 patients diagnosed with schizophrenia in different hospitals in Mizoram and compare them with matched healthy controls on Impulsivity using Barratt Impulsiveness Scale Version 11 (BIS-11). The findings revealed high prevalence of low educational attainment (72%), unemployment (78%), rural residence (56%), low income (62%), winter birth (78%), substance use (62%) and history of psychiatric illness in family (86%) with a significantly higher level of impulsivity among patients with schizophrenia as compared to healthy controls ($p < 0.01$). The study also highlights the influence of social disadvantages, environmental stress and neuropsychological dysfunction in the manifestation and outcome of schizophrenia, further implicating the need for early identification, prevention and integration of socio-demographic risk profiling in clinical practice.

Keywords: Schizophrenia, healthy controls, socio-demographic profile, impulsivity

Schizophrenia Spectrum Disorders are a set of related psychiatric conditions that exist on a spectrum and feature a group of similar symptoms that can vary and change over time. Schizophrenia, in particular, is a chronic and disabling mental disorder that disturbs how a person thinks, feels, and behaves which may cause a loss of touch with reality, and can be distressing not only for them but also for their family and friends. It affects thought, emotion, behaviour which can lead to impaired functioning across one's social, occupational and personal domains.

Globally, schizophrenia affects approximately 24 million people or 1 in 300 people (0.32%) worldwide which is about 1 in 222 people (0.45%) among adults (World Health Organisation, 2019).

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Studies have found that in India, there is a current prevalence of 0.42% and a 1.41% lifetime prevalence of Schizophrenia Spectrum Disorders with higher prevalence among people between the ages 30 to 40 years, having lower education and are unemployed (Hegde, Nirisha, Basavarajappa, Suhas, Kumar, Rao, Rao, Varghese & Gururaj, 2023) and a substantial treatment gap of 72%. Schizophrenia is known to be a massive health burden for the world as it impacts the overall society and economy. The costs of treatment and the debilitating influence schizophrenia poses on the affected individual and their surrounding is a big cause for concern (Guerrin, Doorduyn, Sommer & de Vries, 2021).

In recent decades, research has shifted towards understanding schizophrenia not merely as a biological disease but as a biopsychosocial phenomenon, that is influenced by social environment, demographic context as well as psychological processes (McGurk, Mueser, Walling, Harvey & Meltzer, 2004) The biopsychosocial model by Engel provides a conceptual framework on how biological factors confer vulnerability to the disorder but environmental/ psychological stressors determine expression and course of the disorder (Engel, 1977).

In India, schizophrenia remains a major mental health concern, yet research focused on the underlying determinants such as socio-demographics and psychological correlates are sparse. Within the north-eastern states such as Mizoram, data is nearly absent despite the increasing clinical cases.

The present study therefore aims to bridge the empirical gap by analysing the socio-demographic profiles and examining impulsivity of patients with schizophrenia, further exploring their relationships with illness characteristics.

Socio- Demographic Factors in Schizophrenia

Educational attainment is the highest level of education an individual has completed. It has been known to contribute towards adaptability and resilience through competency building, acquired knowledge and skills. Studies have reported that individuals with schizophrenia tend to have lower educational achievement with evidences implicating that cognitive decline and social withdrawal during prodromal stages contribute to low academic success (Häfner & Maurer, 2005). A study done in the Norwegian population found that 68% of patients with schizophrenia had completed only primary education with education negatively correlated with the duration of untreated psychosis (Tesli, Degerud, Plana-Ripoll, Gustavson, Torvik, Ystrom & Næss, 2022). Lower educational achievements may also implicate socioeconomic disparity, as early life deprivation limits access to educational resources and psychosocial development increasing stress vulnerability (Reininghaus, Gayer-Anderson, Valmaggia, Kempton, Calem, Onyejiaka, Morgan, 2016).

Occupation outcomes demonstrate the functional indicators in schizophrenia. Unemployment rates among patients are typically high with barriers including stigma, cognitive decline and discrimination. This showcases the need for interventions to improve vocational aspects, emphasizing the importance of psychosocial rehabilitation (McGurk, Mueser, Walling, Harvey & Meltzer, 2004)

Socio-Economic Status is found to be related to higher incidence of schizophrenia and poorer outcomes. Factors that are associated include deprivation, early life adversity, limited access to resources and downward social drift (Lund, Brooke-Sumner, Baingana, Baron, Breuer, Chandra, ... & Saxena 2018; Tesli, Hjellvik, Lergenmuller, Hjell, Jangmo, Haram, ... & Bramness, 2024).

Season and place of birth have been suggested as having influence on patterns like winter and early- spring birth among schizophrenia cases in the Northern Hemisphere (Davies, Welham, Chant,

Torrey & McGrath, 2003) possibly through maternal stress, infections or Vitamin D deficiency. While urbanicity has traditionally been linked with increased risk, studies in India report that rural stigma and limited services may lead to underreporting of the disorder and late diagnosis (Patel, Lund, Hatherill, Plagerson, Corrigan, Funk & Flisher, 2010)

Substance use is often reported to be higher among patients with chronic mental illnesses. Self-medication hypothesis posits that patients use substances to relieve symptoms or medication side effects (Khantzian, 1997). However, substances such as cannabis may be associated with precipitating psychosis in genetically vulnerable individuals due to altered neurotransmission (Murray, Bhavsar, Tripoli & Howes, 2017).

Family illness history remains as one of the most reliable predictors in various mental disorders. According to Gottesman, first degree relatives of affected individuals have approximately 10- fold higher risk of vulnerability (Gottesman & Erlenmeyer-Kimling, 2001). However, family environment such as expressed emotion, adaptive coping, and so on, modulates this risk.

Impulsivity in Schizophrenia

Impulsivity is defined as a predisposition towards rapid and unplanned reactions to internal or external stimuli with less regard to potential negative consequences (Moeller, Barratt, Dougherty, Schmitz & Swann, 2001).

Iancu et al., examined the relation between impulsivity, aggression and suicide risk in 69 male patients with schizophrenia where a strong positive correlation was found between high impulsivity and increased suicidality and aggression (Iancu, Bodner, Roitman, Piccone Sapir, Poreh & Kotler, 2010). This emphasizes the critical role of impulsivity in patients with schizophrenia especially with concerns to suicidal behaviours.

In other studies, it has been indicated that impulsivity may exacerbate or contribute to comorbid conditions such as substance use disorders. Higher impulsivity scores in schizophrenia patients have been found to be comorbid with cannabis and cocaine use disorders as compared to individuals without such conditions (Dervaux, Baylé, Laqueille, Bourdel, Le Borgne, Olié, & Krebs, 2001; Duva, Silverstein & Spiga, 2011).

Despite the clinical relevance impulsivity seems to have, it has received limited targeted research within schizophrenia population.

Objectives

Based on the available research, the following objectives were attempted for the present study: The first objective of the study was to assess the socio-demographic profile of patients diagnosed with schizophrenia in Mizoram. The second objective was to assess difference in the levels of impulsivity between patients with schizophrenia and matched healthy controls. The third objective was to explore the relationship between socio-demographic variables and impulsivity in patients with schizophrenia.

Method

The present study adopted an exploratory cross-sectional design to examine socio-demographic profiles and differences in impulsivity patterns between patients with schizophrenia and matched **healthy controls**.

Sample:

Data was collected from 3 different hospitals and centres located in Aizawl functioning under the state Government of Mizoram. Using consecutive and purposive sampling, 40 patients with schizophrenia were selected and 40 normal healthy controls equivalent to the patients selected were identified to ensure equal representation and socio-demographic profiles to control extraneous variables.

Tools used:

(i) *Socio-Demographic Data Sheet a Semi-structured Performa (Ramdintluangi, 2023)* The researcher constructed a Socio-Demographic Data Sheet a Semi-structured Performa containing important information about socio-demographic variables such as age, sex, religion, education, marital status, residence, occupation, seasonal effects on timing of birth, place of birth, substance abuse, family history of illness of the subjects which can be used as sources of information for the study. (ii) *The Barratt Impulsiveness Scale Version 11 (BIS-11; Patton, Stanford & Barratt, 1995)* is a gold-standard measure that has been influential in shaping current theories of impulse control and has played a key role in studies of impulsivity and its biological, psychological, and behavioural correlates. It measures the impulsive behaviour, self or clinician administered, and having high reliability and internal consistency.

Procedure:

Informed consent forms and sociodemographic forms were constructed by the researcher. Appropriate permission was taken from the authorities and along with the participants and caregivers. The socio-demographic details and psychological scale were administered as per instruction of the test manual. Ethical guidelines of the American Psychological Association (APA) were strictly followed. After completion, the scales were collected after the researcher made sure that all the necessary responses have been given.

Results and Discussion

Descriptive statistics was used to examine the socio-demographic profile of the samples, independent t-test was used to analyse the difference in Impulsivity levels between patients and matched healthy controls and Pearson product moment correlation coefficient(r) was used to determine the relation between impulsivity and socio-demographic variables in schizophrenia.

Psychometric adequacy check:

The test scales were constructed for other cultures and its applicability to the target population has to be checked. The normality, reliability and homogeneity were checked as presented in Table-1.

Table 1: Psychometric property check- Normality (Mean, SD, Skewness, and Kurtosis), Reliability (Cronbach alpha) and Homogeneity (Levene statistics) for Impulsivity, and depression among the samples.

Statistics		Impulsivity
Normality	Mean	71.02
	SD	9.28

	Kurtosis	0.88
	Skewness	0.93
Reliability coefficient		0.83
Test of homogeneity (Levene's F statistics)		0.35

The Mean, SD, Kurtosis and skewness showed the normality of the variances. The reliability of the tool used was estimated using Cronbach's alpha among the target population for impulsivity was 0.83 and the Levene statistics showed the homogeneity of the variance that impulsivity was 0.35 which explained the trustworthiness of the psychological scales and the appropriateness of using parametric statistics for further analysis.

Table 2: Socio-Demographic factors in patients with schizophrenia (n=40)

Variables	Categories with frequency and percent among samples			
Level of education	Below cl X 29 (72%)	Class XII 7 (18%)	BA 3 (8%)	MA 1 (2%)
Occupation	Unemployed 31 (78%)	Labourer 3 (8%)	Self employed 5 (12%)	Govt servant 1 (2%)
Season of birth	Winter 31 (78%)	Summer 3 (8%)	Monsoon 6 (14%)	
Socio-economic status	Below 10000 62% (25)	10001-40000 26% (10)	40001-above 5 (12%)	
Marital status	Unmarried 20 (50%)	Divorced 11 (28%)	Married 9 (22%)	
Place of birth	Urban 18 (44%)	Rural 22 (56%)		
Substance use/abuse history	Non users 9 (22%)	Users 25 (62%)	Abuse 6 (16%)	
History of illness in family	General illness 6 (14%)	Psychiatric illness 34 (86%)		

The study collected data about the level of educational qualification from the samples which was categorized as Below class x, class XII, UG and PG and above which was presented in the Table 2. The results revealed that 29 out of 40 (72%) were below class X, 7 out of 40 (18%) studied till Class XII, 3 out of 40 (8%) till UG and 1 out of 40 (2%) studied PG and above.

The results of the present study had a consistency with earlier research finding that individuals with schizophrenia in general have lower educational attainment compared with the general population, the association between educational attainment and mortality is smaller in schizophrenia subjects than in the general population (Tesli et al., 2024).

Similarly, occupational status or employment status was evaluated from the samples which was categorized as Unemployed, Self-employed, Labourer and Government servant as given in the Table 2. Out of the 40 samples, 31 (78%) were Unemployed, 3 (8%) were Labourers, 5 (12%) were self-employed and 1(2%) was working as a government servant.

The results of the present study had a consistency with earlier research findings that lower levels of educational attainment and occupation are frequently reported among individuals with schizophrenia, either as a pre-existing vulnerability or as a consequence of early disease onset. Occupational status often declines after illness onset, reflecting the disorder's functional impact (McGurk et al., 2004).

The study collected data about the different seasons of birth from the samples which was categorized as Winter, Summer and Monsoon. The results revealed that there were 78% (31) Winter births, 8% (3) summer births and 14% (6) monsoon births among patients with schizophrenia.

This is complimentary to various researches wherein season of birth has emerged as a modest but consistent risk factor, with winter and early spring births showing increased schizophrenia prevalence, possibly due to prenatal exposure to infections or nutritional deficits (Davies et al., 2003).

Data was collected for place of birth among the patients with Schizophrenia and was categorised as either Urban or Rural. The results revealed that out of 40 participants, 18 or 44% were from urban regions while 22 or 56% of them were from rural areas.

This is contrary to the popular notion that urbanicity is more prevalent among patients with severe mental disorders such as schizophrenia. However, various previous researches have contributed to the idea that factors such as social adversity, lack of education and stigma in rural areas may lead to underreporting during symptom development, leading to more severe clinical presentations when patients do engage with mental health services (Patel et al., 2010).

Similarly, socio-economic status (SES) was studied where 25 out of 40 samples (62%) make up for SES below 10000, 10 samples (26%) between 10001-40000 and 12% or 5 samples were among 40001 and above. This is consistent with previous researches which have established that lower SES may be linked to increased risk and poorer outcomes, likely due to the stress and limited access to care associated with poverty (Hudson, 2005).

Additionally, marital status was evaluated where it was categorized as unmarried, married or divorced. 20 samples (50%) came under Unmarried, 11 (28%) under divorced and 9 (22%) were married to a spouse. Previous literature suggests that marital status and family history also play a role in the manifestation and management of schizophrenia. Being unmarried is often more prevalent

among individuals with the disorder, potentially reflecting impaired social functioning (Bora & Baysan Arabaci, 2009).

Table 3:

Groups	Statistics	Impulsivity
Schizophrenia	Mean	104.51
	SD	13.828
	Kurtosis	0.87
	Skewness	0.94
Healthy controls	Mean	37.53
	SD	4.738
	Kurtosis	0.89
	Skewness	0.91
Independent t-test between the groups		5.93**
Note: N= 80, **p < 0.01		

Descriptive statistics and independent t-test for patients with schizophrenia and healthy controls (n=40).

The results reveal a significant difference in impulsivity levels between patients with schizophrenia and healthy controls. Patients with schizophrenia exhibited a notably higher mean impulsivity score (M = 104.51, SD = 13.83) compared to healthy controls (M = 37.53, SD = 4.74).

The independent t-test yielded a value of 5.93, which is significant at the 0.01 level, indicating that the difference in impulsivity between the two groups is statistically significant. Both groups showed similar levels of kurtosis and skewness, suggesting a normal distribution of scores within each group. These findings suggest that impulsivity may be a prominent characteristic in individuals with schizophrenia and could have important implications for clinical assessment and intervention. This result is supported by a growing body of research demonstrating that individuals with schizophrenia exhibit elevated levels of impulsivity compared to healthy controls (Hoptman, Antonius, Mauro, Parker & Javitt, 2014).

Meta-analyses and large-scale studies confirm that individuals with schizophrenia exhibit significantly higher impulsivity across both self-reported and behavioural dimensions relative to healthy control groups (Su, Liu, Li, Lappin, Li, Wu, ... & Bao, 2018). These findings support the view that impulsivity is a trait-like vulnerability in schizophrenia, potentially exacerbated during symptomatic episodes.

Hoptman et al. (2014) also found that reduced connectivity between the ventral prefrontal cortex and amygdala is correlated with increased impulsivity and aggression in schizophrenia, suggesting a neurobiological mechanism that differentiates these individuals from healthy controls.

Table 4: Correlation coefficients between impulsivity and socio-demographic variables among samples

Variables	1	2	3	4	5
2	-0.12				
3	-0.28*	0.14			
4	-0.41*	0.08	0.25		
5	0.38*	-0.09	-0.20	-0.35*	
6	0.36*	-0.07	-0.10	-0.28*	0.31*
Note: 1-Impulsivity, 2-Age, 3- Education, 4- Socio-economic status, 5- Substance use, 6- Family Psychiatric history, [* p<0.05 (two-tailed)].					

A negative correlation was observed between impulsivity and education ($r = -0.28$) significant at the 0.05 level. This indicates that lower educational attainment is related with higher impulsivity. This is supported by previous findings that cognitive or/and executive dysfunction can limit progress in education and further enhance impulsive behaviour (Wood & Worthington, 2017). Another negative correlation between impulsivity and socio- economic status was found ($r = -0.41$, $p < 0.05$) suggesting that individuals from a lower socio-economic status tend to have higher impulsivity scores. This may reflect the chronic stress, limited resources and exposure to adversities associated with poverty (Hudson, 2005). The study also observed a positive correlation between impulsivity and substance use ($r = 0.38$, $p < 0.05$) which implies that individuals with substance use display higher impulsivity. This is consistent with prior research which have reported shared neurobehavioral mechanisms between the two (Billieux, Fineberg, King & Rumpf, 2024). Moreover, the findings revealed a positive correlation between family history of psychiatric illness and impulsivity which suggests heritability of traits such as impulsivity (Bevilacqua & Goldman, 2013). Additionally, the study also showed negative correlation between Socio-Economic status and Substance use ($r = -0.35$, $p < 0.05$) and a positive correlation between substance use and Family psychiatric history ($r = 0.31$ *, $p < 0.05$).

Conclusion and Implication

This study contributes to the limited body of research in the Northeast India specifically Mizoram, by empirically examining socio-demographic risks and psychosocial correlates among patients with schizophrenia in Mizoram. It highlights the complex interplay of various biopsychosocial factors in the manifestation and progression of the disorder. It emphasizes that addressing schizophrenia extends beyond pharmacological treatments and requires social inclusion, education, empowerment. Hence integrating holistic community-based frameworks focused on early detection, prevention and rehabilitation is essential for management of schizophrenia.

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Analysis of Class V English Textbook used by Schools under the Mizoram Board of School Education

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Abstract

The research is an analysis of Class V English textbook with special reference to teaching and learning of English grammar. The researcher used Revised Bloom's Taxonomy (2001) as a guideline for analysing the cognitive processes of the textbook. The findings include an analysis of the activities and exercises in the textbook where it was concluded that the textbook is appropriately organised and good enough for teaching and learning of English grammar. There are 577 activity items in the English textbook where it was found that the number of "Apply" level items is comparatively higher as compared to the other levels of learning.

Keywords: Mizoram Board of School Education, Revised Bloom's Taxonomy (2001), cognitive process.

Introduction

Textbook analysis has become an important assessment of curriculum. It is an indirect approach of articulating awareness for textbook developers since the textbook is an embodiment of language and grammar learning. The National Curriculum Framework (NCF) (2005) states, "Improved textbooks that are carefully written and designed, professionally edited and tested, offering not merely factual information but also interactive spaces for children are important." Assessing textbooks is a key step in creating useful teaching and learning resources. Because education is a dynamic process, educational materials and resources must be relevant and reliable.

Textbook analysis is not a new concept in the field of research in Mizoram. However, the scope of analysis is comparatively limited to an extent. There can be critical assumptions with regards to the approaches of teaching and learning English in government and private schools since English has now been commonly used by children; from pre-schoolers to elementary school students, not only in schools but also at home and among their peers.

The extent to which an English textbook is an instrument in learning English grammar is reflected in the study. Textbook analysis is a much needed process, especially in subjects which deal with facts, history, culture, science, economics, etc. Mukundan (2010) described the importance of textbook evaluation and how the right kind of evaluation is important for teaching and learning to be fruitful. The study provides content for understanding the curriculum in the field of teaching and learning of English grammar in Mizoram.

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Literature Review

Chawngthu and Chuaungo (2017) conducted an evaluative study of English Literature Reader for Class X under Mizoram Board of School Education where the contents of the book were quite appropriate. It was found that the primary textbook is suitable for development of the listening, speaking, reading, and writing skills of students.

Ayu and Indrawati (2018) analysed an English textbook which revealed that the textbook has a shortcoming towards the development of listening skill, but it is concluded that the textbook is suitable for learning English language. The study suggests teachers to be more critical and creative in overcoming the limitation of textbooks used by making their own materials which contain additional exercises for learning English.

According to Hestinationsih's (2016) research, students' understanding of grammar and vocabulary has no significant impact on their argumentative writing. This implies that writing skill is developed independently, through practice and reading, and knowledge of grammar and vocabulary skills are complementary.

Rationale

The study is an initiative in understanding the teaching and learning mechanism in Mizoram with regards to English grammar. English is a commonly used language for communication among school children in Mizoram. This is due to enforcement from the teachers especially in private schools. On the other hand, schools may not be the only source of knowledge or factor for learning in children in today's world. With the advancement of technology and access to internet among children in almost in every home, there is a notable increase in the use of English language among younger generations at home, among peers, school, and outside home environment. This shows that English is correctly or incorrectly, intentionally or unintentionally learnt not only in schools but is a result of children's interactions with the global world, and which happens mostly through mobile phones. Since most of the videos they watch and the games they play are of English content, the language is learnt easily and automatically.

The study is an implementation of the mentioned knowledge of the contemporary world in relation to the cognitive process of learning as developed in the realm of education. Children may not understand the real life application that the language they study in schools is the same language they listen to the most when they watch YouTube or play mobile/computer games. The study is an attempt to trigger further future studies about how mundane life activities promote language learning by finding out the cognitive processes contained in a textbook.

The present study is significant in understanding the role of the teachers and textbook developers in the teaching and learning of English- as a language and also as rules of grammar. Even though instructions for teachers are clearly given in the textbook, it may be difficult for all teachers to follow or comply with them. This is mainly due to differences in teaching methodology, teaching skills, and teaching materials. The findings are a component of knowledge which shows that the English textbook is made up of six levels of learning and that if teachers put enough effort, they would be able to inculcate grammar knowledge while learning language and vice versa.

Research Objective

The objectives of the research are given as follows:

1. To categorise the exercises and activities of Class V English textbook used by schools under the Mizoram Board of School Education using Revised Bloom's Taxonomy (2001)
2. To analyse the exercises and activities of Class V English textbook used by schools under the Mizoram Board of School Education with special reference to grammar.

Research Methodology

The research uses Descriptive Research Design where Qualitative Research is employed to analyse the English textbook.

Population and Sample

The population of the study comprises of Class V English textbook, *Marigold*, used by schools under the Mizoram Board of School Education. No sample was taken for the study and the Textbook is analysed in a qualitative manner.

Tools used

The researcher used Revised Bloom's Taxonomy (2001), a framework that organises the learning objectives into different categories of hierarchy of skills. (It is often used for construction of learning objectives as well as for assessment of learning) as a guideline for analysis in the present study. The Bloom's Taxonomy

In this study, the Bloom's Taxonomy has been used to identify the different skills required for students in executing the exercises and activities in their English textbook. The cognitive domain of Bloom's Taxonomy is used to identify the level of activity items in the English textbook. The hierarchy of levels in Bloom's Taxonomy are: Remember, Understand, Apply, Analyse, Evaluate, and Create. Each level subsequently requires higher order thinking; from recalling facts, grasping knowledge, executing knowledge, critical thinking, judging and comparing knowledge, to creating a new object from their own ideas respectively.

Analysis and Interpretation

Objective no. 1: To categorise the exercises and activities of Class V English textbook used by schools under the Mizoram Board of School Education using Revised Bloom's Taxonomy (2001)

The table below shows the category of exercises and activities found in Class V English textbook.

Table no. 1.1

Sl. No.	Taxonomy Level	No of items (N=577)	Percentage
1	Remember	89	15.42%
2	Understand	191	33.10%
3	Apply	272	47.14%
4	Analyse	11	1.91%
5	Evaluate	4	0.69%
6	Create	10	1.73%

The above table shows that there are 577 activity items in the textbook where 89 items fall under "Remember" level which is 15.42 percent of the total items. There are 191 items in the "Understand" level which is 33.10 percent of the total items. There are 272 items in the "Apply" level that owns majority of the Taxonomy Level in the textbook which is 47.14 percent of the total items. The "Analyse" level has 11 items which is 1.91 percent of the total items. The least item in the textbook belongs to the "Evaluate" level which is only 0.69 percent of the total items in the textbook. In "Create" level, there are 10 items which is also only 1.73 percent of the total items. There is a significant gap in the number of items in the textbook as shown in the above table, Table 1.1.

Objective no. 2: To analyse the exercises and activities of Class V English textbook used by schools under the Mizoram Board of School Education with special reference to grammar

The NCF 2005 recommends language learning using various learning materials, where the textbook is only a supplementary component among the different approaches used by the teacher (Pal, n.d.). Separate English grammar book is not developed by the State Council of Educational Research and Training, Mizoram and the *Marigold* textbook is the sole English textbook prescribed for Class V. Teaching and learning of English grammar should be inclusive in learning the language where the teachers have to be active facilitators towards students' acquisition of knowledge. This means that teachers have to be dynamic in their teaching methodology and in their assessments of students learning. However, a question can be raised as to whether the English teachers feel the need for an English grammar textbook for teaching grammar.

The item distribution of exercises and activities in the textbook is found to be suitable for elementary school students. The "Apply" level in Bloom's Taxonomy owns majority of the items which reflects an appropriate assessment of learning in the elementary stage of education. Majority of the "Apply" level in the textbook consist of grammar exercises. This enables students to understand grammar as well as their applications to real life situations. Since elementary school students are keen to discover new things and try out their own unique ways of applying new knowledge, the textbook serves a good purpose to a great extent. It is important for teachers to effectively teach so as to enable students to apply their new learning in different situations.

The item distribution of "Remember," "Understand," and "Apply," being higher as compared to the "Analyse," "Evaluate," and "Create" is suitable for Class V English textbook in essence that students at this stage of education are in the process of developing curiosity and how to express their feelings. The NCF-SE 2023 also identifies the middle school stage as 'a key phase for developing clear thinking, expression, storytelling ability, and readiness for future learning challenges' (National Council of Educational Research and Training, 2023).

Major Findings

The major findings of the present research include the following:

- Majority of the items in Class V English textbook are under "Apply" level of Bloom's Taxonomy.
- The least items in Class V English textbook are under "Evaluate" level of Bloom's Taxonomy.
- The distribution of items in Class V English textbook is found to be suitable for teaching and learning of English grammar.

Discussion

The study is an attempt to understand the activities and exercises of Class V English textbook used by schools under the MBSE. The intellectual rigour of the textbook developers is revealed from the findings as majority of the items is under "Apply" level of Bloom's Taxonomy. Through items in the "Apply" level, students are given opportunity to execute their comprehension abilities through activities which is appropriate for the age level of class V students. The activities are mostly filling blanks, making sentences, or writing correct answers items. Although they may be simple, they are equally important for the teachers for formative evaluation of students' performance.

In general, the majority of Class V students belong to the pre-adolescent age group who tend to process information more slowly than adolescents. They are in the stage of developing their cognitive processes. In this stage of development, the number of "Evaluate" levels of items in the textbook marks an appropriate distribution of assessment of knowledge for Class V students. The students are in the stage of learning how to analyse their own decisions and evaluate the options

available, which would be in their best interest. They will then be able to apply these skills in evaluating abstract ideas provided in the Textbook.

The findings show the suitability of English textbooks developed by the SCERT. However, the study is an analysis of only one textbook, and the quality of English textbooks cannot be generalized from one finding. The findings of the study do not represent the diversity of English textbooks used in Mizoram.

Conclusion

From the discussion, conclusions can be drawn from different perspectives with regards to teaching and learning of English grammar as well as understanding the potentials and credibility of middle school students in various aspects. Middle school students especially Class V students who are entering their pre-adolescence stage, tend to be highly sensitive in absorbing knowledge. Students can be oblivious to certain approaches of knowledge acquisition despite the fact that they are developing meta-cognition about their learning. However, their grammar knowledge can be developed through activities and exercises which are present in their textbook.

Looking at the way the textbook is developed, English grammar is meant to be learned in an implicit manner while learning the language itself. It can also be learned in a systematic and elaborative manner if the teachers wish to teach grammar explicitly. The study shows that teachers are not forced to follow one guideline in teaching English grammar. It is not known whether the teachers are given full authority and independence in adopting the approach that works the best for their school, classroom, and students; or whether they are neglected to be provided with the teaching material they need. The absence of a separate English grammar textbook says it otherwise.

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Educational Mobility and Public Employment in Mizoram: Assessing the Role of Income and Institutional Background

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Abstract

A systematic analysis of the socio-economic and educational backgrounds of successful candidates recruited through the Mizoram Public Service Commission (MPSC) has remained largely unexplored. In Mizoram, where government employment continues to be one of the most secure and preferred occupations due to limited alternative employment opportunities, recruitment through the MPSC carries significant socio-economic importance. The present study examines the relationship between family income, educational background, and public employment attainment among successful candidates recruited through the Commission.

The study is based on both primary and secondary data. Primary data were collected from successful candidates through a simple random sampling method, while secondary data were obtained from official reports, statistical publications, government records, and relevant literature. The analysis focuses on educational dimensions such as places of study, ownership patterns of institutions, medium of instruction, and academic performance.

The findings reveal considerable disparities in educational mobility and institutional access across income groups. Higher-income families possess greater access to institutions outside the state, English-medium education, and wider academic exposure. The study also highlights the dominant role of government institutions and the increasing importance of English-medium and bilingual education in shaping recruitment outcomes. The findings underscore the need for policies aimed at reducing educational inequalities and promoting equitable access to educational opportunities and public employment.

Keywords: *income, public employment, educational mobility, educational inequality*

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Introduction

Public employment occupies a central position in the socio-economic structure of Mizoram owing to the limited expansion of large-scale industrial and private-sector activities within the state. In the absence of substantial employment opportunities in the secondary and tertiary sectors, government service continues to be regarded as one of the most secure and prestigious avenues of livelihood. Consequently, recruitment conducted through the Mizoram Public Service Commission assumes immense social and economic significance.

Despite the importance of public employment in the state, systematic studies examining the socio-economic and educational backgrounds of successful candidates recruited through the Commission remain limited. Recruitment outcomes are often perceived as being based solely on merit and competitive performance; however, educational opportunities and access to quality institutions are themselves shaped by broader socio-economic conditions such as family income, geographical location, medium of instruction, and institutional background. Therefore, an examination of the profiles of successful candidates provides important insights into the structural factors influencing access to public employment.

The economic structure of Mizoram further reinforces the relevance of such an enquiry. According to the Economic Survey of Mizoram 2024–25, agriculture and allied activities contributed only 23.71 per cent to the Gross State Value Added (GSVA) in 2021–22, indicating gradual structural transformation but limited diversification of employment opportunities outside the government sector. In such a context, public service recruitment becomes not merely an administrative exercise but also a critical channel of socio-economic mobility.

Although Mizoram is relatively homogeneous in terms of ethnicity and tribal composition, disparities based on income, educational access, spatial location, and institutional exposure continue to influence opportunities available to individuals. Differences in access to quality schooling, higher education outside the state, English-medium education, and financially resourceful institutions may create varying levels of preparedness among candidates appearing in competitive examinations.

Against this backdrop, the present study seeks to analyse the relationship between family income, educational background, and recruitment outcomes among successful candidates of the Mizoram Public Service Commission. The study specifically examines places of study, ownership patterns of educational institutions, medium of instruction, and academic performance in order to understand how socio-economic conditions shape educational attainment and opportunities for entry into public service.

Study Area

Geographically, Mizoram is a landlocked state located in the northeastern part of India. It lies between latitudes 21°56'N and 24°31'N, and longitudes 92°16'E and 93°26'E, covering an area of approximately 21,087 square kilometres. The state shares international boundaries with Myanmar (about 404 km to the east and south) and Bangladesh (approximately 318 km to the west), and is bounded by the Indian states of Assam, Manipur, and Tripura.

Due to the COVID-19 pandemic, the decennial national census—normally conducted every ten years—was delayed. Consequently, the 2011 Census remains the most recent source of official population data. According to this census, Mizoram had a total population of 1,097,206, comprising 555,339 males and 541,867 females. Rural population shares 47.59 per cent by 2011.

The Mizoram Public Service Commission (MPSC) is a constitutional body established under Part XIV of the Constitution of India to regulate public employment and service administration in the state. Following the attainment of statehood in 1987, Mizoram was constitutionally required to establish its own Public Service Commission. Accordingly, the Mizoram Public Service Commission Regulation, 1989 was promulgated, providing for a Chairman and up to three Members. The Commission formally began functioning in October 1991 under the leadership of its first Chairman, Pu S. R. Vala, with Pu M. Lalmanzuala as the first Member, supported by a small administrative staff.

The primary function of the Commission is to conduct recruitment to various civil services and posts under the Government of Mizoram through fair, transparent, and merit-based procedures, including written examinations and personal interviews. In addition to direct recruitment, the Commission plays a crucial advisory role to the Government on matters relating to appointments, promotions, transfers, and disciplinary actions concerning government servants. It also provides expert consultation on the framing, amendment, and relaxation of Service Rules and Recruitment Rules, thereby ensuring a sound and updated regulatory framework for public administration.

Furthermore, the Commission conducts departmental and limited departmental examinations for in-service personnel, facilitating career progression and enhancing administrative efficiency. These functions underscore the institutional role of the MPSC in facilitating a merit-oriented and rule-governed recruitment system within the state's administrative framework. Over the years, the Commission has made significant contributions to public service recruitment, having recommended a total of 3,805 candidates for direct appointment up to the year 2024–2025, reflecting its pivotal role in strengthening the administrative machinery of Mizoram.

Methodology

The present study is based on both primary and secondary sources of data. Primary data were collected from successful candidates recruited through the Mizoram Public Service Commission (MPSC) by adopting a simple random sampling technique. A total of 293 valid responses were obtained in 2021. Considering that 3,506 candidates had been recruited by the MPSC up to the financial year 2020–2021, the sample represents approximately 8.36% of the target population, which is considered sufficiently representative for the purpose of analysis.

Secondary data were collected from reliable and authoritative sources, including the official website of the Census of India. In addition, various government reports, statistical publications, records, and official documents were consulted, both through physical access to concerned offices and through their respective online platforms. These sources provided the necessary background information and contextual data for the study.

With regard to income analysis, the respondents have been classified into different categories on the basis of their household income levels. Similarly, respondents have also been grouped under various categories for the purpose of other socio-economic analyses.

The study primarily adopts a descriptive and analytical approach. No advanced statistical techniques have been employed; instead, the data have been systematically organised, interpreted, and critically analysed to understand the underlying patterns and to present a realistic picture of the geographical and socio-economic dimensions of recruitment. This approach enables a clear and meaningful interpretation of disparities without over-reliance on complex statistical modelling.

Discussion

For convenience, the sample populations are categorized into five income groups based on their average monthly income, with the highest income group being those earning above Rupees one lakh per month, and the lowest income group earning below ₹5000 monthly.

Table 1 : Average monthly income of the respondents and their share in the recruitment done by MPSC

Sl. No.	Average Monthly Income (in Rupees)	% to total respondents
1	Below 5,000	7.55
2	5,001 – 10,000	16.55
3	10,001 – 50,000	46.40
4	50,001 – 100,000	17.99
5	Above 100,000	11.51

Source : Author's field survey

1. Income and Places of Study

Family income significantly influences the place of schooling of an individual. Higher-income families generally possess greater financial capacity to send their children to educational institutions outside the state, where better academic facilities, exposure, and opportunities may be available. In contrast, lower-income households are often constrained by financial limitations and therefore depend largely on nearby or locally available institutions. As a result, educational mobility and access to wider academic opportunities tend to increase with rising income levels.

Table 2 : Places of Study by Income Groups

Income Groups	Elementary		Middle		High School		HSS		Graduate	
	Mizo-ram	Other State	Mizo-ram	Other State	Mizo-ram	Other State	Mizo-ram	Other State	Mizo-ram	Other State
Below 5,000	91.67	8.33	87.50	12.50	87.50	12.50	79.17	20.83	72.73	27.27
5,001 – 10,000	93.48	6.52	93.48	6.52	93.48	6.52	89.13	10.87	71.74	28.26
10,001 – 50,000	96.92	3.08	95.42	4.58	94.66	5.34	85.50	14.50	62.79	37.21
50,001 – 100,000	90.20	9.80	86.27	13.73	86.27	13.73	74.51	25.49	45.10	54.90
Above 100,000	100.00	0.00	93.75	6.25	87.50	12.50	78.13	21.88	43.75	56.25

Source : Author's field survey

The table presents the relationship between household income and the places where respondents pursued their education at different stages, namely Elementary, Middle, High School,

Higher Secondary School (HSS), and Graduate levels. The data reveal important socio-economic patterns in educational mobility and access to institutions outside Mizoram.

At the elementary and middle school levels, an overwhelming majority of respondents across all income groups studied within Mizoram. In most income categories, more than 90 per cent of respondents completed their early schooling within the state. This indicates that primary and middle-level educational facilities within Mizoram are sufficiently accessible to most sections of society, irrespective of income level.

However, as the level of education advances, the proportion of respondents studying outside Mizoram gradually increases, particularly among higher-income groups. At the Higher Secondary level, the percentage of students studying outside the state becomes more noticeable. For instance, among respondents belonging to the income group of ₹50,001–100,000, about 25.49 per cent pursued Higher Secondary education outside Mizoram, while the figure stands at 21.88 per cent for those earning above ₹100,000.

The disparity becomes most pronounced at the graduate level. Among the lowest income group (Below ₹5,000), only 27.27 per cent studied outside Mizoram for graduation. In contrast, more than half of the respondents belonging to the higher income groups pursued graduate studies outside the state, accounting for 54.90 per cent in the ₹50,001–100,000 category and 56.25 per cent among those earning above ₹100,000.

The table therefore indicates a strong relationship between family income and educational mobility. Higher-income households possess greater financial capacity to send their children outside Mizoram for higher education, where they may gain access to better educational institutions, wider academic exposure, and enhanced career opportunities. On the other hand, lower-income families remain more dependent on educational institutions within the state due to financial constraints.

Overall, the findings suggest that economic background significantly influences educational opportunities, particularly at higher levels of education. The increasing tendency of affluent groups to pursue higher studies outside Mizoram reflects unequal access to broader educational resources and may subsequently influence competitive recruitment outcomes and socio-economic advancement.

2. Places of study by ownership status of the schools / institution

The analysis conducted aimed to shed light on the educational backgrounds of successful candidates in the recruitment process overseen by MPSC. This investigation encompassed considerations such as school ownership, which directly correlates with family income. Notably, while certain church-owned schools may not charge fees, gaining admission to such institutions remains highly competitive. Conversely, government-owned schools typically offer more affordable education, rendering them accessible to lower-income families.

Table 3 : Places of Study in terms of ownership of School / Institute

Sl. No.	Owner of institution	Educational Level (in %)				
		Elementary	Middle School	High School	HSS	Graduate
1	Central Govt (Govt. of India)	1.39	2.07	3.10	11.76	27.97
2	Govt. of Mizoram	54.86	52.76	51.03	46.71	38.46

3	Other State Government	1.74	1.38	2.07	7.61	18.53
4	Church	15.97	17.59	15.86	15.22	4.20
6	Deficit Mission School / College	5.90	7.24	12.76	7.96	3.85
7	Deficit school / college managed by Managing Board	1.39	2.41	3.79	1.73	3.85
8	Private	18.40	16.21	11.03	7.96	0.00
9	Others	0.35	0.34	0.34	1.04	3.15

Source : Author's field survey

Table 3 presents the distribution of respondents according to the ownership of schools and institutions attended at different educational stages, ranging from elementary to graduate level.

The findings clearly indicate that institutions run by the Government of Mizoram constitute the principal avenue of education at all levels. More than half of the respondents studied in state government institutions during the elementary (54.86%), middle school (52.76%), and high school (51.03%) stages. Although the proportion gradually declines at higher levels, Government of Mizoram institutions still account for the largest share at the HSS (46.71%) and graduate levels (38.46%). This reflects the dominant role played by the state government in providing educational access across Mizoram.

Institutions under the Central Government exhibit a steady increase in representation as the level of education advances. Only 1.39% of respondents attended Central Government institutions at the elementary stage, but the proportion rises significantly to 27.97% at the graduate level. This trend suggests that Central Government institutions are comparatively more concentrated in higher and specialised education.

Similarly, institutions run by other state governments account for a very small proportion at the school level but increase substantially at higher levels, particularly at the graduate stage (18.53%). This may indicate interstate educational mobility among students pursuing higher education outside Mizoram.

Church-managed institutions occupy an important position in the educational system, especially at the school level. Their share remains relatively stable from elementary (15.97%) to HSS level (15.22%), demonstrating the historical and social significance of church-sponsored education in the state. However, their presence declines sharply at the graduate level (4.20%), indicating limited church participation in higher education.

Deficit Mission Schools/Colleges and deficit institutions managed by managing boards also contribute meaningfully, particularly at the high school stage where deficit mission institutions account for 12.76% of respondents. Their role appears supplementary to government institutions in expanding educational opportunities.

Private institutions exhibit a declining trend with increasing educational level. While 18.40% of respondents studied in private institutions at the elementary stage, the proportion falls steadily to 7.96% at the HSS level and becomes negligible at the graduate level. This suggests that private educational participation is more concentrated in early schooling rather than higher education.

Overall, the table highlights the overwhelming dependence on government institutions for education in Mizoram, while also revealing the complementary contributions of church, deficit, and private institutions in shaping the educational experiences of students.

3. Medium of Instruction

Students' comprehension and understanding of what they learn in school largely depend upon the medium of instruction adopted in the educational system. The issue of medium of instruction has long remained a subject of academic and policy debate, particularly in multilingual societies such as India. Recognising its significance, the Government of India has laid down specific policy guidelines in this regard. According to the National Education Policy 2020:

“Wherever possible, the medium of instruction until at least Grade 5, but preferably till Grade 8 and beyond, will be the home language/mother tongue/local language/regional language. Thereafter, the home/local language shall continue to be taught as a language wherever possible.” (NEP 2020)

The policy underscores the importance of mother tongue or local language instruction during the foundational years of education in order to enhance conceptual clarity, cognitive development, and effective learning outcomes among students.

The present study indicates which educational policy is more likely to provide opportunities for becoming a government servant. However, the proportion of Government schools using vernacular language as the medium of instruction is not comparable with institutions following other policies. In this context, if the share of schools adopting other educational policies were at par with that of Government schools, the findings and outcomes of the study might have been different.

Table 4 : Medium of Instruction of Successful Candidates of MPSC's recruitment

Sl. No.	Medium of Instruction	Educational Level (in %)		
		Primary	Middle	High School
1	English	26.64	26.90	41.38
2	Hindi	0.00	0.00	0.34
3	Mixed (English + Local Language)	21.80	21.72	39.31
4	Mixed (Hindi + Local Language)	0.35	0.34	0.00
5	Native / Local language/dialect (Mother Tongue)	51.21	51.03	18.62
6	Others	0.00	0.00	0.34

Table 4 presents the medium of instruction followed by successful candidates of Mizoram Public Service Commission during their primary, middle, and high school education. The table highlights significant shifts in the medium of instruction as students progress through different stages of education.

The findings reveal that mother tongue or native/local language constituted the dominant medium of instruction at the primary and middle school levels. More than half of the respondents studied through their native or local language at the primary (51.21%) and middle school (51.03%) stages. This reflects the strong prevalence of vernacular education during the foundational years of schooling in the state.

However, the proportion of students educated through the mother tongue declines sharply at the high school stage to only 18.62%. This suggests a gradual transition from local language instruction to English-oriented education as students move towards higher levels of schooling.

In contrast, the share of respondents studying through English medium increases considerably with educational advancement. While only 26.64% and 26.90% of respondents studied in English medium at the primary and middle levels respectively, the proportion rises substantially to 41.38% at the high school level. This trend indicates the growing importance of English as students approach higher education and competitive examinations.

Similarly, respondents educated through a mixed medium of instruction (English and local language) also show a notable increase at the high school stage. The proportion rises from 21.80% at the primary level and 21.72% at the middle level to 39.31% at the high school level. This reflects the existence of bilingual or transitional educational practices, where both English and local languages are used simultaneously in the learning process.

The use of Hindi medium and mixed Hindi-local language medium remains negligible throughout all educational stages, indicating the limited role of Hindi as a medium of instruction in the educational context of Mizoram.

4. Academic record

An individual's academic achievements significantly influence the types and levels of employment they secure, whether in the public or private sector. Those with stellar academic records are rarely left unemployed, as their qualifications open doors to diverse opportunities. However, it's crucial to recognize the interplay between academic success and family income.

While the exceptional talents of gifted individuals can lead to success regardless of socioeconomic background, it remains undeniable that children from higher-income families typically receive superior education in prestigious institutions. Consequently, their academic records are often bolstered by access to top-tier educational resources. The following figures provide compelling evidence of this reality, highlighting the profound impact of family income on academic attainment and subsequent career trajectories.

Table 5 : Academic Record of Respondents

Division	Share of Different Divisions in Board Exams (in %)				
	PSLC	MSLC / MESLC	HSLC	PUC/ HSSLC	Graduate
Distinction	31.10	23.19	17.65	4.14	5.99
I Div.	44.88	43.48	33.22	31.38	29.23
II Div.	14.96	24.28	28.03	47.93	48.59
III Div.	4.72	5.07	19.38	16.21	6.34
Simple Pass	4.33	3.99	1.73	0.34	9.86

Source : Author's field survey

Table 5 presents the academic performance of respondents at different stages of education, ranging from PSLC to Graduate level, based on the divisions secured in public examinations. The data reveal noticeable variations in academic achievement across different educational stages.

At the elementary and middle school levels, a substantial proportion of respondents secured higher divisions. In the PSLC examination, 31.10 per cent obtained distinction, while 44.88 per cent secured First Division. Similarly, in the MSLC/MESLC examination, 23.19 per cent achieved distinction and 43.48 per cent obtained First Division. This indicates that a majority of respondents demonstrated strong academic performance during the early stages of schooling.

However, the proportion of respondents obtaining distinction gradually declines at higher educational levels. In the HSLC examination, the share of distinction holders decreased to 17.65 per cent, while it further declined sharply to 4.14 per cent in the PUC/HSSLC examination and slightly increased to 5.99 per cent at the graduate level. This trend suggests increasing academic competition and greater difficulty in securing top grades at advanced stages of education.

At the same time, the proportion of respondents obtaining Second Division increases progressively at higher educational levels. While only 14.96 per cent secured Second Division in PSLC, the figure rose to 47.93 per cent in PUC/HSSLC and 48.59 per cent at the graduate level. This indicates that average academic performance becomes more common as students advance in higher education.

Another important observation is the relatively higher percentage of Third Division in the HSLC examination (19.38 per cent), compared to other stages. In contrast, the share of simple pass candidates remains comparatively low throughout most levels, except at the graduate stage where it rises to 9.86 per cent.

Overall, the table indicates that although many successful candidates performed well academically during their early education, the proportion securing top divisions decreases at higher educational stages. Nevertheless, the presence of a considerable number of candidates with Second and even Third Divisions among successful respondents suggests that recruitment success is not exclusively confined to academically exceptional individuals, but may also be influenced by other socio-economic and institutional factors.

Conclusion

The present study reveals that educational attainment and recruitment outcomes in Mizoram are closely associated with socio-economic background, particularly family income, institutional access, and educational exposure. Although recruitment through the Mizoram Public Service Commission is formally based on merit and competitive examinations, the findings demonstrate that opportunities for success are significantly shaped by broader structural conditions.

The study shows that higher-income families possess greater capacity to provide educational advantages to their children, particularly through access to institutions outside the state, English-medium education, and better educational environments. Educational mobility beyond Mizoram increases substantially at higher educational stages among affluent groups, indicating unequal access to wider academic opportunities and exposure. In contrast, respondents from lower-income backgrounds remain more dependent on locally available institutions due to financial constraints.

The findings further highlight the dominant role played by Government of Mizoram institutions in the educational trajectories of successful candidates, especially during the elementary and secondary stages. At the same time, the increasing presence of Central Government and out-of-state institutions at higher educational levels reflects the growing importance of advanced educational exposure in shaping career prospects.

With regard to medium of instruction, the study indicates that mother tongue or vernacular education continues to play a major role during the foundational years of schooling. However, English-medium and bilingual education become increasingly prominent at higher educational stages, particularly among successful candidates. This transition suggests the growing importance of English proficiency in higher education and competitive recruitment processes.

The analysis of academic performance demonstrates that while a substantial proportion of successful candidates secured high divisions during early schooling, recruitment success is not confined exclusively to academically exceptional individuals. Candidates with average academic records also succeeded in entering public service, indicating that multiple socio-economic and institutional factors interact in shaping recruitment outcomes.

Overall, the study underscores that public employment in Mizoram is influenced not only by individual merit but also by disparities in educational access, income, institutional background, and educational opportunities. The findings therefore highlight the need for policies aimed at reducing educational inequalities, strengthening rural and government educational institutions, improving access to quality education across socio-economic groups, and ensuring a more equitable framework of opportunity in public recruitment.

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A Study of the Palaeoclimate and Tectonic Setting of Bhuban Sandstone of Surma Basin in the Indo-Burmese Tectonic Collision Zone of Mizoram

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Abstract

The Bhuban sandstones of the Surma Group in Kolasib District of Mizoram constitute an important sedimentary unit within the Indo-Burmese Ranges. This study integrates detailed petrographic observations with major and trace element geochemical data to reconstruct the provenance, paleoredox conditions, paleosalinity and tectonic setting of the Bhuban sandstones of Surma Group. Major oxide geochemistry was employed to calculate the C-value which ranges from 0.24 to 1.15, indicating deposition under semi-arid to warm humid climatic conditions with moderate to intense chemical weathering of the felsic source rocks. Paleosalinity conditions was determined using Sr/Ba ratios (0.22-0.59) and the Sr-Ba discrimination diagram suggesting a transitional brackish to freshwater environment with dominant continental influence, consistent with a near-shore fluvio-deltaic depositional system. Redox-sensitive trace element ratios such as V/Ni (1.0-2.21), V/Cr, U/Th (0.05-0.29) and Ni/Co versus V/Ni discrimination plots, indicate predominantly oxidic- to sub-oxidic depositional conditions, reflecting well-oxygenated shallow-water environments. Tectonic discrimination diagrams based on major and immobile trace elements, including QFL and QmFL plots, La-Th-Sc ternary diagrams, La/Sc versus Ti/Zr bivariate plots indicated that the Bhuban sandstones were primarily derived from Active Continental Margin. The petrographic characteristic predominated by quartz along with fewer presence of feldspars and rock fragments inferred recycled orogenic provenance.

Keywords: Bhuban sandstone, Mizoram, Surma group, palaeoclimate, palaeodepositional environment, tectonic setting

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Introduction

Sandstone petrography and geochemistry provide robust tool for reconstructing provenance, palaeoclimate, palaeodepositional environment and tectonic settings of sedimentary basins. The elemental compositions of clastic sediments reflect the nature of source rocks, intensity of chemical weathering, transport history and depositional processes, thereby serving as an important archive of basin evolution and regional tectonics (Bhatia, 1983; Bhatia and Crook, 1986; Dickinson and Suczek, 1979). In tectonically active regions, such as convergent plate margins, integrated petrographic and geochemical studies are particularly effective in unraveling complex sedimentary histories.

The Surma Basin (Evans, 1932), a significant sub-basin of the Bengal Basin serves as an archive of the geological evolution that is related to the uplift and unearthing of the Himalayas and the Indo-Burmese Ranges. It formed as a result of oblique subduction and collision of the Indian Plate with the Burmese arc covering Bangladesh, Mizoram, southern Assam, and Tripura. Miocene deposits formed in environments ranging from deep marine to shallow marine conditions and subsequent Pliocene delta progradation resulted in the development of the modern delta (Mahmood Alam, M. Mustafa Alam, Joseph R. Curray, M. Lutfar Rahman Chowdhury, M. Royhan Gani, 2003). Ongoing deformation may have diverted the Brahmaputra westward around the rising hillong plateau (Johnson & Alam, 1991; Govind, G., Najman, Y., Copley, A., Millar, I., van der Beek, P., Grujic, D., and Davenport, J. 2018). Stratigraphic evidence reveals an evolution of facies from delta front to intertidal and fluvial settings, marking shifts in deposition work shows facies evolving from delta front to intertidal to fluvial, marking depositional changes (Sincavage, R. S., Paola, C., & Goodbred, S. L., 2019). Ultimately resulting in the deposition of the Tipam Group during the regressive phase (Shrivastava, P. K., Ganesan, S and Roy, D. 1974; Wanderley, M. M., Depalle, P, 2004).

The Surma Group of the Indo-Burmese Ranges (IBR) represents one of the most extensive Cenozoic sedimentary successions in Northeast India. Among the lithostratigraphic units of Surma Group, Bhuban Formation constitutes thick succession of sandstones, shales and siltstones that record the evolution of fluvio-deltaic to shallow-marine depositional systems under active tectonic influence (Lalnunmawia et al. 2021, Hauhnar et al 2021, Orizen M. S. Dawngliana, Jimmy Lalnunmawia, Malsawmtluangkima Hauhnar, Jehova Lalmalsawm Darngawn, Santanu Ghosh, V. Vanthangliana, 2025). Despite its regional significance, the geochemical application for the determination of palaeoclimate, redox conditions, salinity and tectonic provenance of the Bhuban sandstones in Mizoram have not been thoroughly investigated. Previous studies on the Surma Group have largely focused on sedimentology and structural aspects, while the systematic application of major and trace element geochemistry for palaeoenvironmental and tectonic discrimination has received less attention to previous workers. Major element ratios such as Al_2O_3/SiO_2 , K_2O/Na_2O , and $(Fe_2O_3 + MgO)$, along with immobile trace element proxies (e.g., La, Th, Sc, Ti, Zr), are widely used to infer provenance characteristics and tectonic settings, minimizing the effects of post-depositional alteration (Bhatia, 1983; Bhatia and Crook, 1986). Similarly, elemental ratios such as Sr/Ba, V/Ni, V/Cr, and U/Th serve as reliable indicators of palaeo-salinity and depositional redox conditions (Jones and Manning, 1994; Galarraga et al., 2008; Wang et al., 2021). In addition, palaeoclimate conditions exert strong control on intensity of chemical weathering in the source areas which is reflected in the geochemical composition of clastic sediments. The C-value, derived from major oxide proportions, has been successfully applied to discriminate climatic regimes ranging from arid to humid conditions and provides insights into sediment generation and transport under varying climatic settings (Zhao et al., 2007; Cao et al., 2012; Moradi et al., 2016). Therefore, the integration of petrography and geochemistry of sandstones allow comprehensive reconstruction of sedimentary processes that operated during basin development.

In the light of the above research gaps, the present work aims to reconstruct the palaeoclimate, palaeodepositional environment, redox state and tectono-provenance of the investigated Bhuban sandstones of the Indo-Burmese region. This can be achieved through integrated approach involving petrographic and geochemical analyses, and the constructive linkages between various elemental ratios in unraveling sedimentary history. Thus, the present work will help better understanding of the Cenozoic evolution of the Indo–Burmese sedimentary basin and the provenance of the Surma Group in Northeast India. The Bhuban formation of the Surma group was deposited during the early to middle Miocene under predominantly warm and humid climatic conditions. Sedimentological characteristics such as sandstone-shale alteration and abundant fluvial deltaic deposits, indicate high sediment supply driven by intense chemical weathering in the hinterland. The resulting depositional environments range from shallow marine and fluvial settings, reflecting interaction between monsoon driven sediment supply, tectonic uplift and basin subsidence (Uddin & Lundberg, 1998; Alam *et al*, 2003; Rahman & Suzuki, 2007)

Study Area

The study area of Kolasib is located in the north western part of Mizoram, India. It is part of Surma Basin in the Indo-Burmese tectonic belt. The geological set up comprises of sandstone, siltstone and shale of Surma and Tipam Group having a thickness of about 560 m. The study area lies in the Survey of India Toposheet No. 83D/12, falling within the geographic coordinates of latitudes 24°15'N to 24°12'N and longitudes of 92°40'E to 93°41'E. The location and geological map of the study area is given in Fig. 1.

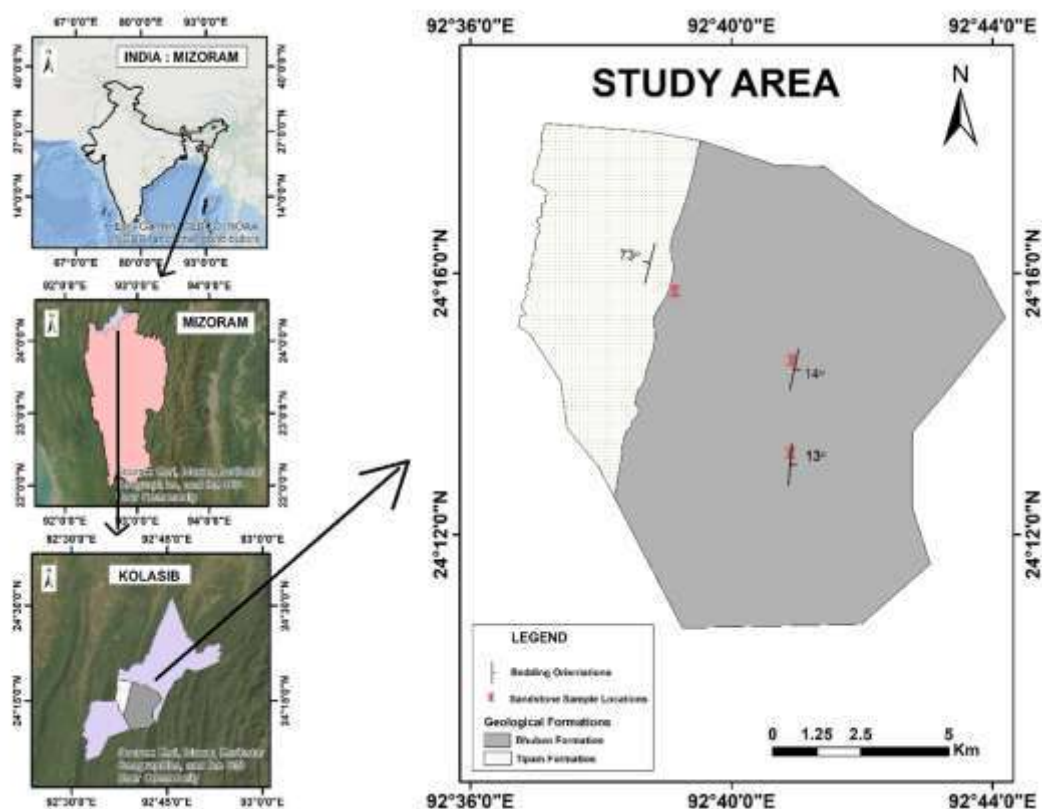


Fig 1: Location and geological map of the study area.

Materials and Methods

Extensive geological field work was carried out in and around Kolasib. Thirty (30) sandstone samples were collected with seventeen samples from Kualmawi Quarry to Kolasib labeled as RK, five (5) samples from Rengtekawn to Zero Point labelled as RB and four (4) samples collected within Kolasib town which were labelled as K. Out of the thirty (30) samples, 24 representative sandstones were prepared into thin sections using Petro-thin thin sectioning equipment in the Department of Geology, Mizoram University. Identification of detrital components of the rocks and modal analysis were carried out using Leica DM2700 P Polarization Microscope equipped with motorized stepping stage PetrogLite, image analysis software and microphotographic imaging system in the Department of Geology, Mizoram University. During modal analysis, Gazzi-Dickinson method (cf. Ingersoll *et al.*, 1984) was followed. A minimum of 300 counts for each sample was taken for identification and textural classifications. The detail procedure of geochemical analysis is available in Roy *et al.* (2007). Sedimentological software used for data processing and plotting is OriginPro 9.0 software. The major/minor oxides analysis was done using Philips model PW2440 MagiX PRO wavelength dispersive X-ray Fluorescence spectrometry (WD-XRF) equipped with automatic sample changer and software super Q 3.0 in Wadia Institute of Himalayan Geology, Dehradun. The sandstones were manually powdered into 200 ASTM mesh size. Pressed pellets were prepared from the powdered sandstone samples with the help of boric acid in collapsible aluminium cups which were pressed at hydraulic pressure of 25 tonnes in two cycles (5 sec each). The pressed pellets were analysed using WD-XRF. In geochemical analysis of trace element and REE, 0.05 g of powdered sandstone samples were put in a Savillex. Acid mixture of HF and HNO₃ in the ratio 7:3 was added. The Savillex vessels were closed and kept on a hot plate at 150 °C for 48 hrs followed by the addition of 1 to 2 drops of HClO₄ and left for evaporated to near dryness. The residual paste of the samples was dissolved by adding 10 ml of 1:1 HNO₃. After the dissolution, the samples were again heated on a hot plate for 40 min at 80 °C to dissolve all suspended particles and later transferred into 250 ml standard flask. 10 ml of 1:1 HNO₃ and Rhodium (Rh) solution was added again in the standard flask with Millipore water. The Rhodium (Rh) solution is used as an internal standard. Finally, 5 ml was taken out from 250 ml solution of the samples and then made the volume into 50 ml with Millipore water and the final solution was stored in Eppendorf tubes for High Resolution-ICPMS analysis. The HR-ICPMS was calibrated with Chinese geochemical standard GSR-4. In the present study, two standards i.e. GSR-4: Chinese sandstone standard GSR-4 (Geochemical standard reference for sandstone) after Xuejing *et al.*, 2007 and Upper Continental Crust (UCC) after Rudnick and Gao (2003, 2005) values were used for comparison.

Results and Discussion

Paleoclimatic Conditions

The geochemical data are presented in Table 1. To elucidate palaeoclimatic conditions, the C-value is used, following the methodology proposed by Cao *et al.*, (2012), Moradi *et al.* (2016) and Zhao *et al.* (2007). The results were shown in Table 2. The C-values ranges from 0.09 to 0.23 with an average of ~0.16. The Sr/Ba ratio ranges between 0.22 and 0.59 in the Bhuban sandstones (Figure 2). The study shows that the sediments were deposited in brackish to fresh water transition (semi-saline) environment (Table 3, following Tiwari *et al.*, 2023) and more specifically in a near-shore terrestrial freshwater environment as observed from micro-petrography.

Table 1: Major/minor oxide data of Bhuban Formation of Surma Group of the study area in the Indo-Burmese tectonic belt, Mizoram

SN	Sample	Na ₂ O %	MgO %	Al ₂ O ₃ %	SiO ₂ %	P ₂ O ₅ %	K ₂ O %	CaO %	TiO ₂ %	MnO %	Fe ₂ O ₃ %
1	K-1	0.67	1.85	16.28	62.75	0.15	2.91	0.37	0.79	0.13	6.49
2	K-2	0.84	1.68	15.74	64.73	0.15	2.80	0.20	0.76	0.04	5.84
3	K-3	1.70	2.12	12.85	70.87	0.09	2.31	0.68	0.60	0.04	4.13
4	K-4	1.66	1.67	13.72	68.56	0.11	2.47	0.40	0.65	0.10	4.51
5	RB-2	1.10	1.64	14.02	71.26	0.10	2.77	0.34	0.72	0.03	4.32
6	RB-3	1.45	2.37	15.17	65.04	0.12	3.12	1.78	0.75	0.08	5.65
7	RB-6	1.53	2.21	14.70	66.46	0.13	2.98	0.97	0.75	0.06	5.77
8	RB-7	1.11	1.96	14.79	67.79	0.11	2.90	0.44	0.68	0.04	4.84
9	RB-10	1.58	2.06	12.73	69.53	0.08	2.61	0.32	0.69	0.06	6.76
10	RK-1	1.49	2.23	12.86	68.76	0.13	2.66	1.00	0.78	0.05	5.74
11	RK-3	1.54	2.90	14.04	65.68	0.10	2.95	1.20	0.73	0.06	6.18
12	RK-4	1.49	2.68	13.74	66.52	0.11	2.92	1.39	0.73	0.06	6.02
13	RK-5	1.53	2.61	13.35	67.21	0.11	2.87	1.36	0.72	0.06	6.06
14	RK-7	1.01	1.05	10.88	76.71	0.06	1.96	0.15	0.47	0.05	3.32
15	RK-8	0.82	2.02	17.21	61.09	0.09	3.19	0.18	0.77	0.46	6.79
16	RK-9	1.34	2.09	14.90	66.87	0.10	2.84	0.29	0.74	0.05	5.41
17	RK-10	1.64	2.48	13.81	66.80	0.12	2.80	1.13	0.79	0.05	6.17
18	RK-11	1.23	2.02	14.86	66.98	0.10	2.70	0.30	0.69	0.04	4.97
19	RK-13	1.45	2.33	13.62	67.75	0.13	2.81	1.44	0.82	0.08	6.19
20	RK-14	1.60	2.26	14.47	67.16	0.11	2.92	0.49	0.79	0.05	6.21
21	RK-15	1.10	1.65	13.06	70.12	0.08	2.43	0.40	0.59	0.05	4.85
22	RK-17	1.23	3.01	14.32	60.95	0.14	3.00	4.24	0.70	0.10	5.82
23	RK-18	1.28	2.33	13.39	69.56	0.09	2.76	1.04	0.66	0.06	4.86
24	RK-19	0.78	2.22	17.65	62.23	0.12	3.35	0.18	0.81	0.07	5.93
Std	GSR	0.06	0.06	3.55	90.31	0.20	0.64	0.28	0.24	0.02	3.24
Std	UCC	3.27	2.48	15.40	66.60	0.15	2.80	3.59	0.64	0.10	5.04

Table 2: Discrimination of Climatic conditions of Bhuban Formation of Surma Group of the study area in the Indo-Burmese tectonic belt, Mizoram after Zhao *et.al.* (2017)

C- Value	K-1	K-2	K-3	K-4	RB-2	RB-3	RB-6	RB-7	RB-10	RK-1	RK-3	RK-4
	0.49	0.48	0.27	0.43	1.15	0.45	0.45	0.75	0.43	0.35	0.34	0.33

Table 2 (cont....):

C- Value	RK-5	RK-7	RK-8	RK-9	RK-10	RK-11	RK-13	RK-14	RK-15	RK-17	RK-18	RK-19
	0.32	0.47	0.49	0.36	0.30	0.39	0.33	0.36	0.49	0.24	0.30	0.36

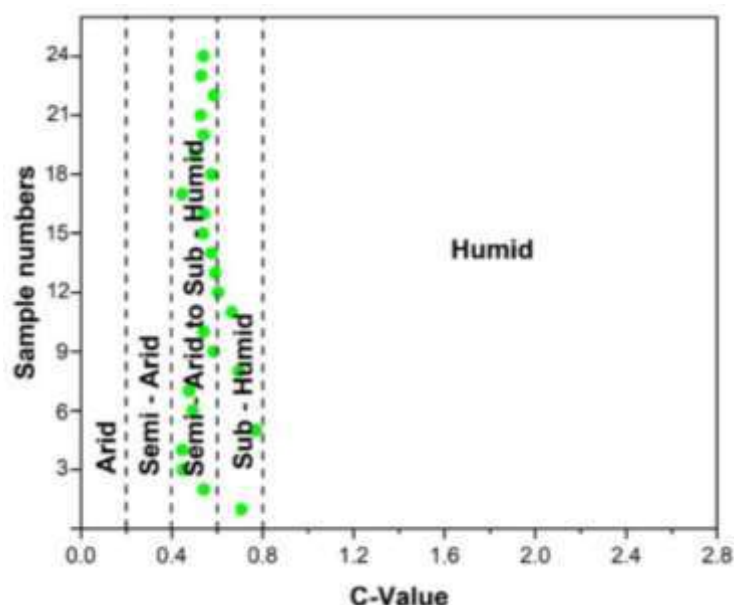


Figure 2: Paleodepositional environment of Bhuban Formation of Surma Group of the study area in the Indo-Burmese tectonic belt, Mizoram after Zhao *et.al.* (2007).

A low Sr/Ba ratio ($< 0.2\text{--}0.6$) suggests freshwater or continental environments (Wang *et.al.*, 2021). It is suggested that the Bhuban sandstones of the study area were deposited predominantly under humid to semi-humid paleoclimatic conditions, characterized by moderate to intense chemical weathering. These values reflect significant leaching of mobile elements and enrichment of relatively immobile components, consistent with warm, humid climatic conditions during the deposition of the sediments. The micro-petrographic and geochemical observations in this study support a near-shore terrestrial/fluvio-deltaic freshwater depositional environment for the Bhuban sandstones.

Table 3: Paleosalinity indicator of Bhuban Formation of Surma Group of the study area in the Indo-Burmese tectonic belt, Mizoram after V.M Goldschmidt (1937).

Sr/Ba Ratio	K-1	K-2	K-3	K-4	RB-2	RB-3	RB-6	RB-7	RB-10	RK-1	RK-3	RK-4
	0.22	0.23	0.24	0.27	0.29	0.3	0.3	0.31	0.32	0.32	0.33	0.33

Table 3 (cont.....): Paleosalinity indicator of Bhuban Formation of Surma Group of the study area in the Indo-Burmese tectonic belt, Mizoram after V.M Goldschmidt (1937).

Sr/Ba Ratio	RK-5	RK-7	RK-8	RK-9	RK-10	RK-11	RK-13	RK-14	RK-15	RK-17	RK-18	RK-19
	0.34	0.34	0.35	0.35	0.36	0.36	0.37	0.38	0.39	0.42	0.45	0.59

The V/Ni ratio of studied sandstone ranges from 1.0 to 2.21 (Figure 3), which indicates mostly sub-oxic condition to transitional oxic and anoxic environments. Further, the V/Cr ratio, another proxy for palaeo-redox conditions, it was discovered oxic depositional conditions (Figure4) based on the discrimination range as suggested by Galarraga *et al.* (2008). In the studied sandstone samples, the U/Th ratio ranges from 0.05 to 0.29 (Table 4), pointing towards an oxic environment

(Jones & Manning, 1994). This further supported the interpretation of predominantly oxic conditions during sediment deposition. The low Strontium and high Barium is an indicator of fresh water input. The Ni/Co versus V/Ni discrimination plot indicated that majority of the samples fall within the oxic field, indicating the abundant availability of oxygen during accumulation of the sediments (Figure 4). The Sr-Ba discrimination diagram after Wang *et.al.* (2021), with the effective concentration ranges of Ba (300-700 ppm) and Sr (0-25 ppm), showed that the Bhuban sandstones clustered in the continental freshwater field. The low Sr and high Ba contents indicated dominant terrigenous input, suggesting deposition under fluvio-deltaic to near shore terrestrial conditions (Figure 5).

Table 4: Depositional Oxygenation Conditions after Jones & Manning, 1994.

U/Th	K-1	K-2	K-3	K-4	RB-2	RB-3	RB-6	RB-7	RB-10	RK-1	RK-3	RK-4
	0.24	0.20	0.00	0.00	0.20	0.17	0.18	0.19	0.14	0.26	0.22	0.20

Table 4 (cont.....): Depositional Oxygenation Conditions after Jones & Manning, 1994.

U/Th	RK-5	RK-7	RK-8	RK-9	RK-10	RK-11	RK-13	RK-14	RK-15	RK-17	RK-18	RK-19
	0.06	0.00	0.08	0.14	0.29	0.15	0.19	0.20	0.05	0.08	0.06	0.00

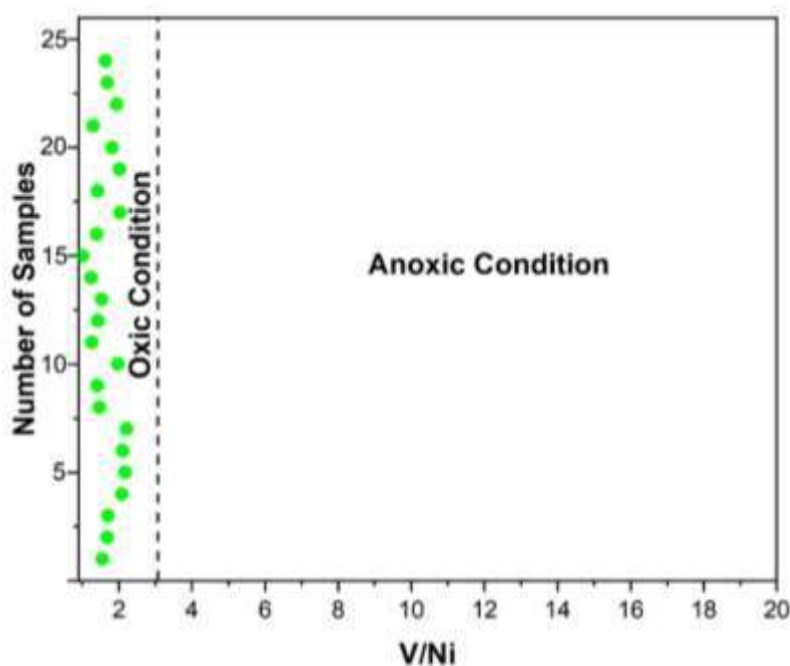


Figure 3: Paleo-redox conditions after Galaragga *et.al.* (2008).

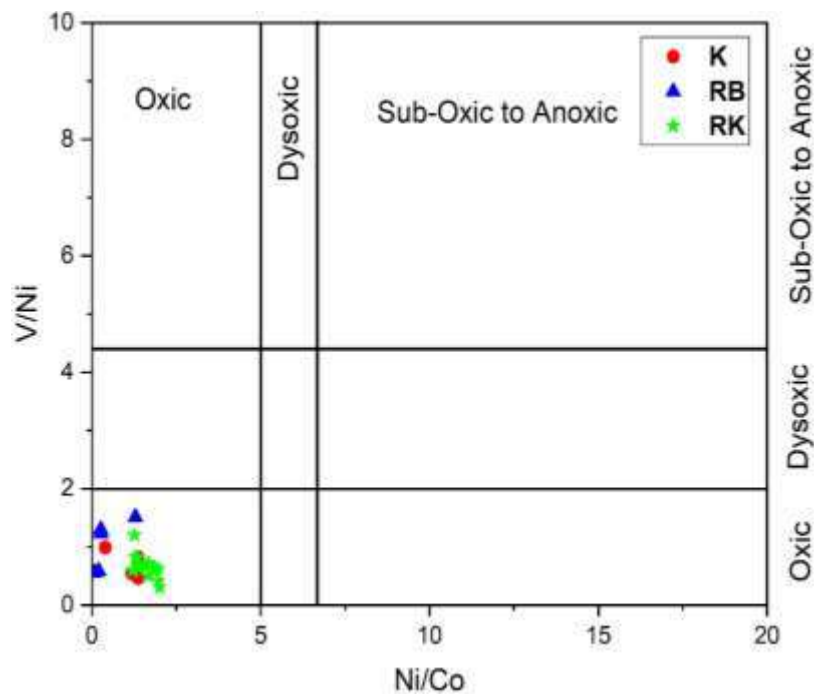


Figure 4: Cross plots of trace elements ratios (V/Ni vs. Ni/Co) after Jones and Manning, 1994.

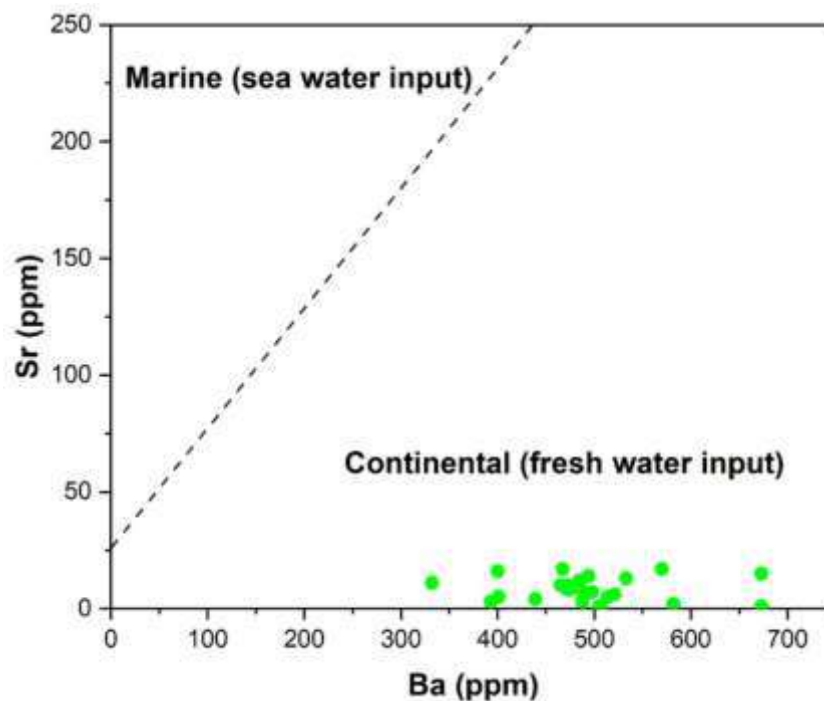


Figure 5: Sr–Ba discrimination diagram after Wang *et.al.* 2021.

Tectonic Settings

The tectonic history of the Bhuban sandstones are determined using major elemental discrimination diagrams, such as $(\text{Fe}_2\text{O}_3+\text{MgO})$ vs $\text{Al}_2\text{O}_3/\text{SiO}_2$ (Bhatia, 1983), $(\text{Fe}_2\text{O}_3+\text{MgO})$ vs $\text{K}_2\text{O}/\text{Na}_2\text{O}$ (Bhatia, 1983), and immobile trace element discrimination diagrams like La/Sc vs Ti/Zr (Bhatia and Crook, 1986) and the $\text{La}-\text{Th}-\text{Sc}$ ternary plot (Bhatia and Crook, 1986), binary discrimination diagram of Bhatia (1983), Bhatia and Crook (1986) using minor and major oxides. REE and Trace element data was used to depict in ternary discrimination diagram of Dickinson and Suczek (1979), Dickinson (1983) and Bhatia (1983). In the present study, the QFL diagram indicated

the affinity of the Bhuban sandstones to tectonic setting of Recycled Orogeny (Figure 6), with the majority of samples clustering in the Quartzose Recycled origin, while only a few samples are related to the Transitional Recycled setting on the QmFLt plot (Figure 7). A few rounded quartz grains indicated a supplementary support for the recycled origin, whereas angular grains and the presence of rock fragments suggest the textural immaturity of the rock.

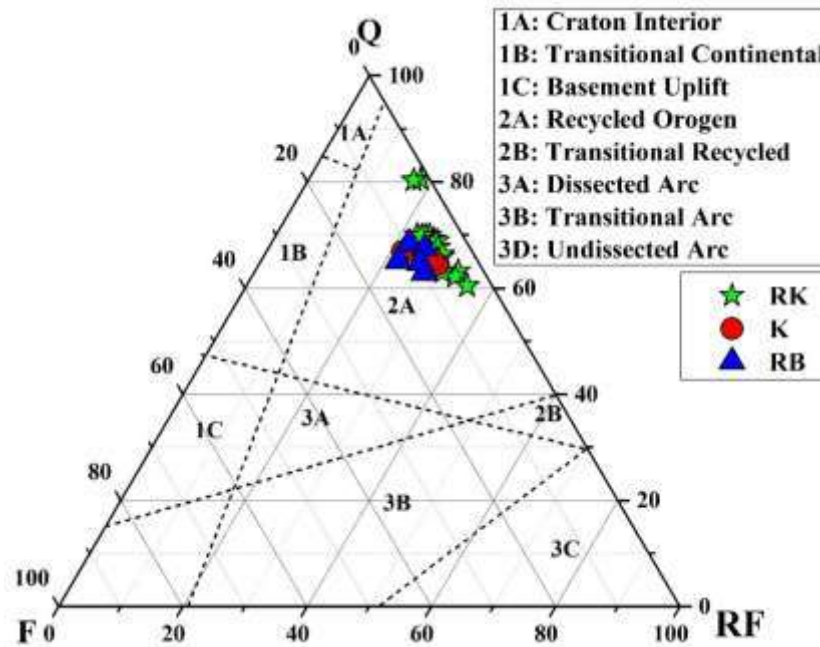


Figure 6: Q-F-L triangular plot for tectonic settings after Dickinson & Suczek, (1979).

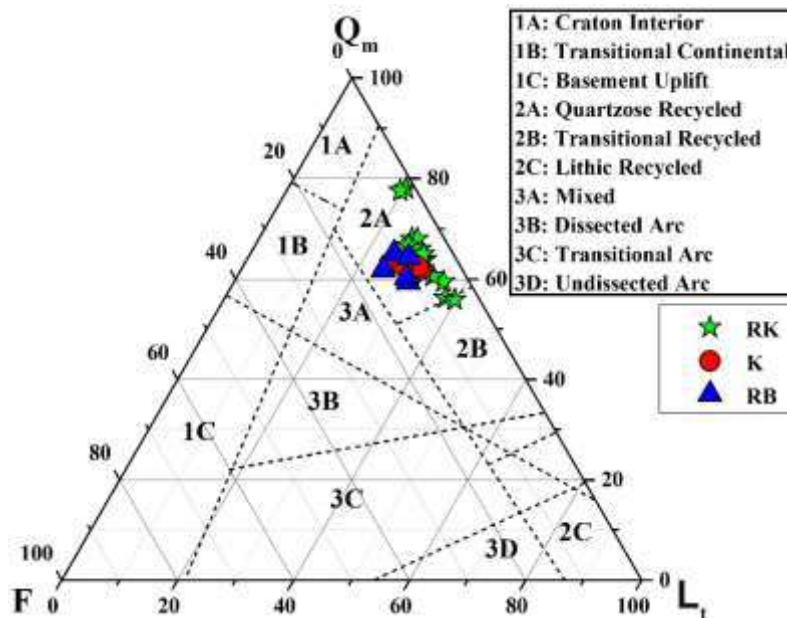


Figure 7: Q_m-F-L_t triangular plot for tectonic settings after Dickinson *et al.*, (1983).

The samples, when plotted on the La-Th-Sc ternary diagram, clustered in the fields of active continental margin (ACM) and continental island arc (CIA) (Figure 8). Plotting the samples on binary discrimination diagrams of (Fe₂O₃+MgO) vs Al₂O₃/SiO₂ (Figure 9) and (Fe₂O₃+MgO) vs TiO₂ (Figure 10) revealed that most samples fall within the continental island arc, while a few samples

were observed to fall within the active continental margin and oceanic island arc (OIA). The binary discriminant function plot (Bhatia, 1983) showed that the majority of samples fall within the active continental margin. Combining geochemical data with petrographic evidence, it can be concluded that the Bhuban sandstone sediments originated from mixed environments of active continental margin settings and oceanic island arc, supporting the diversity of source rocks and suggesting a recycled orogeny environment.

The average ratio of La/Sc of the studied Bhuban sandstones is 1.56 which according to Bhatia and Crook, (1986) indicated mixed source environment. Plotting of the samples in the ternary diagram of La-Th-Sc indicated an active continental margin (ACM) and continental island arc (CIA) (Figure 8) tectonic settings. Bhuban sandstones are showing $\text{Al}_2\text{O}_3/\text{SiO}_2$ (Avg: 0.21), $\text{Fe}_2\text{O}_3+\text{MgO}$ (Avg: 7.68) and $\text{K}_2\text{O}/\text{Na}_2\text{O}$ (Avg: 2.32) which are almost similar to the values suggested by Bhatia, (1983). Plotting of the samples in the binary discrimination diagram of $(\text{Fe}_2\text{O}_3+\text{MgO})$ vs $\text{Al}_2\text{O}_3/\text{SiO}_2$ (Bhatia, 1983) and $(\text{Fe}_2\text{O}_3+\text{MgO})$ vs TiO_2 (Bhatia, 1983), majority of the samples fall in active continental margin and few samples clustered near active continental margins and passive continental margins.

Plotting of the samples in bivariate plot of La/Sc vs Ti/Zr (Bhatia and Crook, 1986) shows that majority of the samples of Bhuban sandstones clustered in the field of Active Continental Margins and (Figure 11). Moreover, plotting of the studied samples in the binary plot of discrimination function (Bhatia, 1983) also shows that all of the samples fall in the field of Active Continental Margin (Figure 12). Based on the geochemistry together with petrography, it can be inferred that the sediments of the Bhuban sandstones are derived from active continental margins and oceanic island arc which subsequently affirm the source rock diversity of the investigated sandstones indicating a recycled orogeny setup.

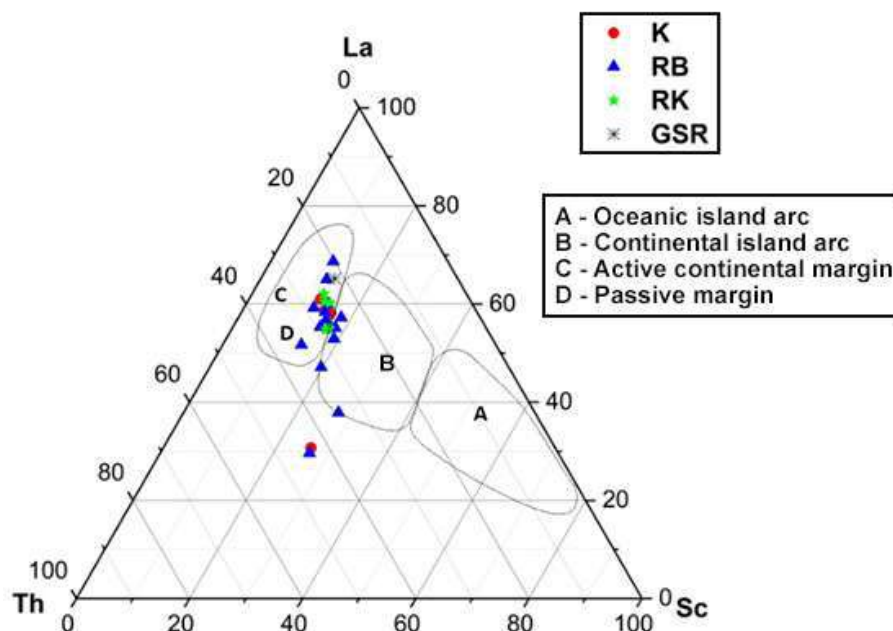


Figure 8: Ternary plot of La-Th-Sc for tectonic settings (After Bhatia,1983)

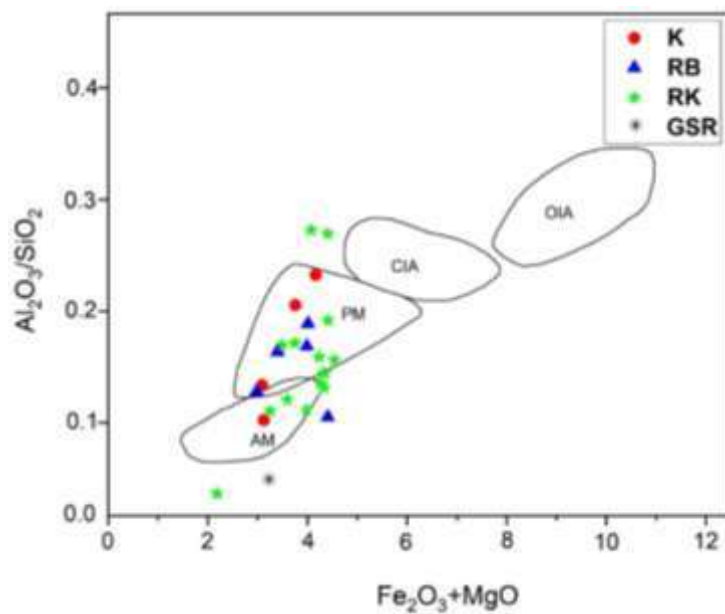


Figure 9: Discrimination plot of $\text{Fe}_2\text{O}_3+\text{MgO}$ vs $\text{Al}_2\text{O}_3/\text{SiO}_2$ (Bhatia,1983)

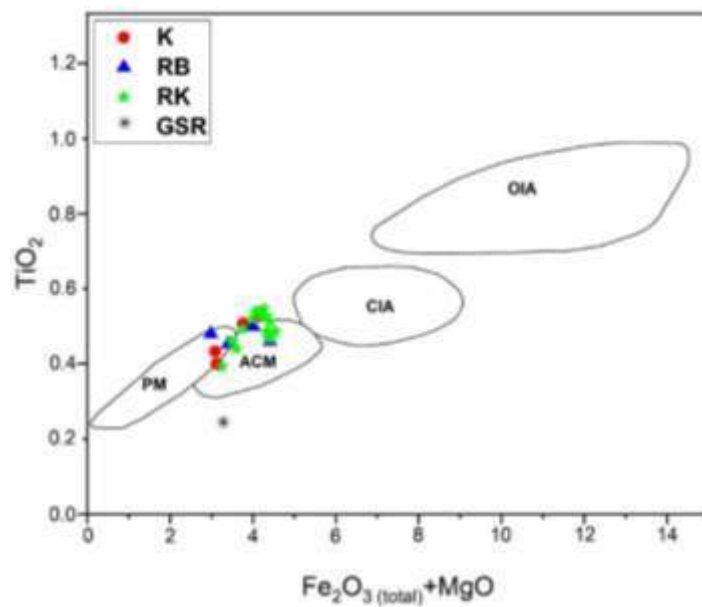


Figure 10: Discrimination plot of $\text{Fe}_2\text{O}_3+\text{MgO}$ vs TiO_2 (Bhatia,1983)

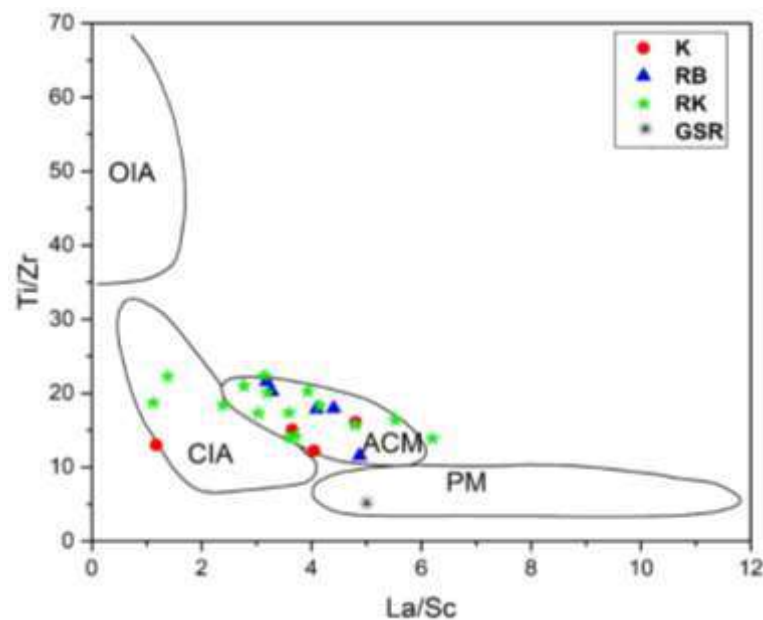


Figure 11: Bivariant tectonic setting plot using La/Sc Vs Ti/Zr (Bhatia and Crook, 1986).

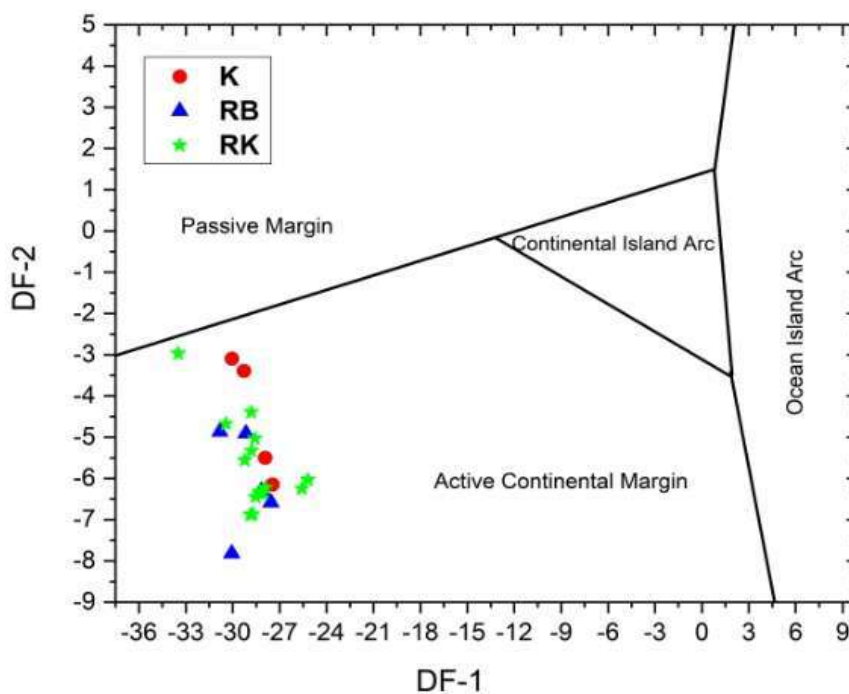


Figure 12: Discrimination function plot of DF-1 against DF-2 for tectonic settings of Bhuban sandstones after Bhatia, (1983).

Conclusion

In order to shed light on the tectonic settings, palaeoclimatic conditions and depositional environment of the Bhuban sandstones of the Indo-Burmese fold belt in Mizoram, India, combined interpretation of Bhuban sandstones in terms of petrographic and geochemical analyses were considered. It can be concluded that the sediments were deposited in semi-arid to warm, humid climates with low to moderate precipitation, according to the C-value (0.24–1.15). Due to the moderate chemical weathering of primarily felsic source rocks facilitated by these climatic conditions, the sediments underwent medium levels of physicochemical alteration before deposition. This conclusion is in agreement with the petrographic features and geochemical signatures found in the sandstones. The Sr/Ba ratios, ranging from 0.22 to 0.59, serve as paleodepositional environmental proxies for deposition in a transitional, brackish to fresh, environment. Examples of these proxies include a predominantly near-shore environment that changes from terrestrial to fluvial delta deposits that were dominated by fresh water. In addition, the redox-sensitive elemental ratios, such as V/Ni (ranging from 1.0 to 2.21), V/Cr and U/Th (0.05 to 0.29), all suggested sediments deposition under predominantly oxic to suboxic conditions in well-oxygenated shallow-water environments. Further, various tectonic discrimination diagrams using major and trace elements indicated that the Bhuban sandstones of Surma Basin in the Indo-Burmese fold belt are predominantly derived from active continental margin and continental island arc settings, with very minor contributions from oceanic island arcs. In addition to having predominantly quartzose recycled components, most samples contained a combination of rounded and angular quartz grains indicating recycled orogenic provenance. Hence, it can be stated that the sediments are having multiple tectono-provenances with mixture of source lithologies. The Bhuban sandstones were deposited in semi-arid to sub-humid climate and fluvio-deltaic warm environment. These results help elucidate the sedimentary and tectonic history of the Indo-Burmese Ranges of Surma Group in NE India. Knowledge of the depositional environments, tectonic settings and other geochemical conditions directly incorporates with hydrocarbon industries and environmental geology. The fluvio-deltaic depositional environment and shallow marine conditions which is indicated by the studies Bhuban sandstones suggests favorable settings for hydrocarbon reservoir development. The moderate chemical weathering and alteration of felsic source rocks implies the preservation of primary porosity, which is essential for reserve estimation of groundwater and petroleum. The mixed tectono-provenance and recycled orogenic sources also suggests the possible accumulation of heavy minerals (zircon, tourmaline, rutile) which have high economic value in industrial applications.

‘The authors declare that there is no conflict of interest’.

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