The Impact of Language Diversity on Technical Education in the Andaman and Nicobar Islands: Challenges and Strategies in the NEP 2020 Context

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Abstract: Technical education in the Andaman Islands faces challenges due to a diverse student population with varying language proficiencies. The primary hurdles stem from the varying language proficiencies of students, particularly in English, which is often the medium of instruction for technical subjects. Forty-two teachers of Dr. B R Ambedkar Institute of Technology, Port Blair (the only engineering institution in the islands) teaching diploma-level and undergraduate degree programs belonging to various engineering disciplines, participated in this study. Qualitative data was collected in the form of interview responses through semi-structured open-ended questions and a detailed analysis was conducted. Additionally, a focus group discussion with 10 teachers focussing on the challenges and opportunities of this multilingual pedagogic context was also done. The research examines how language diversity impacts teaching practices, the challenges faced by teachers, current strategies used to adapt, and the perceived benefits and drawbacks of multilingual classrooms. It aims to identify effective strategies to create inclusive learning environments and inform policy and practice in technical education, aligning with the National Education Policy 2020's emphasis on multilingualism.

Keywords: *Multilingualism, Technical Education, Language Diversity, Inclusive Learning Environments, National Education Policy 2020*

I. INTRODUCTION

The Andaman and Nicobar Islands, one of the Union Territories of India separated from the mainland is a unique archipelago with a rich linguistic and cultural tapestry, presents a distinctive challenge in technical education: a diverse student population with varying language proficiencies. Many tribal and indigenous communities in the Andaman and Nicobar Islands have yet to participate in higher education, particularly technical education. A significant portion of students, especially those from the inter-island regions (North and Middle Andaman and Nicobar), are first-generation college students, often with English as their third language. Even within relatively homogeneous classrooms in Port Blair, diverse learning styles (auditory, visual, and tactile) and multilingualism can complicate the learning process. This linguistic diversity, while enriching, can create significant communication barriers between teachers and students, hindering effective instruction and learning, considering the fact that the English language is used as the medium of instruction. This research delves into this under-explored area within technical education, focusing on the specific context of the Andaman Islands. By examining the experiences of faculty at Dr. B.R. Ambedkar Institute of Technology, Port Blair, the study aims to uncover the multifaceted challenges and opportunities arising from multilingual classrooms in technical education.

Research on the impact of language diversity on technical education is limited, particularly in regions like the Andaman Islands. Previous studies have primarily focused on the challenges faced by multilingual students in general education settings (Baker, 2011; Cummins, 1999) [1,2]. However, the specific needs of technical education, which requires specialized language and technical skills, remain largely unexplored. While NEP 2020 doesn't explicitly discuss multilingualism in technical education, it does emphasize multilingualism as a key principle throughout the education system. "The policy strongly recommends the use of the mother tongue/home language as the medium of instruction in the early years of schooling, so that foundational literacy and numeracy skills are developed strongly." This principle emphasizes the importance of building a strong foundation in the mother tongue, as it facilitates better understanding and retention of concepts. With relevance to technical education, it can be understood that while technical subjects might require specialized language, using the mother tongue can help students grasp fundamental concepts more effectively. It can also bridge the gap between theoretical knowledge and practical applications, especially in fields like engineering and technology.

It also states that "the policy emphasizes the importance of multilingualism, and recommends that students should learn at least two languages in addition to their mother tongue/home language." Learning multiple languages has been shown to enhance cognitive abilities, including problem-solving, critical thinking, and creativity. These skills are crucial for success in technical fields. At a global level, exposure to multiple languages can broaden students' perspectives and prepare them for a globalized world. This is especially important in technical fields, where international collaboration and cultural understanding are increasingly vital. The policy also highlights that "Every effort will be made to ensure that all languages, including Indian languages, classical languages, and foreign languages, are taught with the highest quality." [3]The policy's emphasis on quality language education is essential for technical education. Students need to develop proficiency in technical English to access global research, publications, and industry standards. Furthermore, in regions with diverse linguistic groups, promoting indigenous languages can help preserve cultural heritage and foster a sense of identity among students. This can also contribute to the development of technical terminology in these languages.

These principles can be applied to technical education by ensuring that technical concepts are taught in a language that students understand well, whether it is their mother tongue or a language they are proficient in. Additionally, technical institutions can incorporate multilingual resources and teaching materials to cater to the diverse linguistic needs of their students. Thus, NEP 2020 presents both challenges and opportunities for teachers of technical subjects. On one hand, the emphasis on multilingualism and the use of mother tongue/home language can make it challenging to maintain a consistent level of technical language proficiency among students. Teachers may need to adapt their teaching methods to accommodate diverse language abilities and cultural backgrounds. On the other hand, NEP 2020's focus on experiential learning, critical thinking, and problem-solving skills aligns well with the goals of technical education. Teachers can leverage these principles to create engaging and interactive learning experiences that foster creativity and innovation. Additionally, the policy's emphasis on teacher training and professional development can help equip teachers with the necessary skills to effectively implement the new curriculum and teaching methodologies.

II.THEORETICAL IMPLICATIONS OF THE STUDY

The increasing globalization of higher education has brought about a significant rise in multilingual classrooms, particularly in technical institutions. While English has emerged as the lingua franca of science and technology, the diverse linguistic backgrounds of students, especially in the Indian context, presents unique challenges and opportunities in technical education. This research explores the interplay between multilingualism, English as a Medium of Instruction (EMI), and technical education. By drawing on theories such as sociocultural theory, cognitive theory, communicative language teaching, and content-based instruction, this study investigates the impact of these factors on student learning, teacher practices, and institutional policies.

The sociocultural theory emphasizes the role of social and cultural factors in language learning. It highlights the importance of creating a supportive and inclusive learning environment where students can develop their language skills through authentic, real-world contexts. By analysing how cultural and linguistic diversity in the classroom can be leveraged to enhance language learning the study explores how teachers can create culturally responsive learning experiences that cater to the diverse needs of students. Concepts related to schema theory, information processing, and metacognition which are associated with the Cognitive theory of learning delve into the mental processes involved in language learning, such as attention, memory, and problem-solving. It emphasizes the importance of active learning and strategic thinking. By investigating how students process and comprehend technical information presented in English, this study explores strategies to enhance students' cognitive abilities and improve their language learning outcomes.

Communicative Language Teaching (CLT) highlights communicative competence, authentic language use and task-based learning which emphasizes the importance of developing communicative competence, which involves the ability to use language effectively in real-world contexts. It focuses on using authentic materials and tasks to create meaningful learning experiences. teachers as facilitators who guide students' learning journeys. The role of teachers in such contexts involves creating a safe and inclusive space where students feel comfortable using their home language to ask questions and participate in discussions. Teachers can also use scaffolding techniques to support students' understanding of complex technical concepts, regardless of their language proficiency level. Based on these theoretical constructs, the present study aims to understand the challenges faced by teachers in multilingual contexts, the effectiveness of English Medium Instruction in technical education, and the strategies that can be employed to create inclusive and effective learning environments.

III. REVIEW OF LITERATURE

Khubchandani (1978) [4] has explored how the linguistic heterogeneity in India has paved the way for the nation to become one of the linguistic laboratories of multilingual experience in the world. Biswas (2013) [5] identifies migration for economic development as a key reason for the multilingual situation in the Andaman and Nicobar Islands. His study also investigates how the social, economic, political and other situational factors of this place have been of special interest to sociologists, social psychologists, economic and political scientists. The migratory aspects have direct implications for educators too who are responsible for the growth and development of the society in discussion.

Mandal (2023) in his study on 'English Education in Andaman and Nicobar Islands' has presented the evolutionary nature of English as a medium of instruction in the islands from the pre-independence era. His brief study presents the multilingual dimensions of the educational scenario. Das (2024) in his study titled 'An Analysis of Establishment and Development of Schools and higher Educational institutions in the Andaman and Nicobar Islands' has also presented an evolutionary history of the educational scenario in the islands discussing the opportunities and challenges faced by the stakeholders.

Wijayanti (2024) in the study 'Linguistic Diversity in Education: Strategies for Inclusive Learning Environments' investigates the intricate dynamics of linguistic diversity in junior high school education, with the aim of illuminating the experiences of students from diverse linguistic origins. The study emphasizes the importance of recognizing and appreciating the diverse linguistic environments within educational settings. While Bahasa Indonesia is the primary language used by 18 out of 30 students, other languages such as Lampungnese and Javanese are also present.

These studies offer different perspectives on language diversity in education. They highlight the challenges faced, explore various strategies for overcoming them, and emphasize the importance of creating inclusive learning environments that value multilingualism. By exploring a range of research on this topic, you can gain a more comprehensive understanding of the complexities surrounding language diversity in educational settings.

IV. RESEARCH DESIGN

The present study seeks to contribute to the growing body of knowledge on multilingual education by investigating the following key questions:

- How does language diversity impact teaching practices in technical education?

- What specific challenges do teachers face due to language differences in their classrooms?

- What strategies do teachers employ to adapt to the diverse language abilities of their students?

- What are the perceived benefits and drawbacks of multilingual classrooms for both teachers and students?

- What support systems and resources would be beneficial for teachers to overcome language barriers?

By addressing these questions, this research aims to identify effective strategies for creating inclusive learning environments that cater to the diverse linguistic needs of students in technical education. The findings of this study can inform the development of pedagogical approaches, curriculum design, and teacher training programs to enhance the learning experiences of multilingual students in technical institutions. Furthermore, this research aligns with the goals of the National Education Policy (NEP) 2020, which emphasizes the importance of multilingualism in education. By understanding the challenges and opportunities of multilingualism in technical education, this study can contribute to the implementation of NEP 2020's vision in a practical and effective manner. This research employs a qualitative research design to explore the impact of language diversity on technical education in the Andaman Islands. By combining semi-structured interviews and focus group discussions, the approach assisted in gathering rich and in-depth data

from a diverse range of participants. The study involves 42 faculty members from Dr. B.R. Ambedkar Institute of Technology, Port Blair, who teach diploma-level and undergraduate engineering programs. These participants were selected based on their experience and expertise in teaching diverse student populations.

Semi-structured interviews were conducted with individual faculty members to explore their experiences, challenges, and strategies related to teaching in a multilingual context. Interview responses were collected through a virtual tool for open ended questions. Individual responses were also collected from teachers through one to one conversations. The responses to such semi-structured interviews were transcribed and Focus group discussions were organized with a smaller group of 10 faculty members to facilitate open dialogue and generate rich discussions on shared experiences and perspectives. The demographic information of the sample of the research study is presented below.

Out of the 42 faculty members, 29 were male and 13 were female. The teachers' mother-tongue varied widely including Hindi, Punjabi, Bengali, Marathi, Telugu, Tamil, Urdu, Nicobarese and other languages. Similarly, the students in their classrooms spoke at least two or more languages sometimes, the language that was majorly spoken by the students was sometimes unknown to the teacher vice versa. In this linguistically heterogeneous context, the teachers, though bilingual or trilingual, found it challenging to cater to the learning needs of all students especially in the context of technical subjects. Though the medium of instruction was English, based on the varying language proficiency, the teachers modified their choice of the instruction language considering the range of languages being spoken in the class.
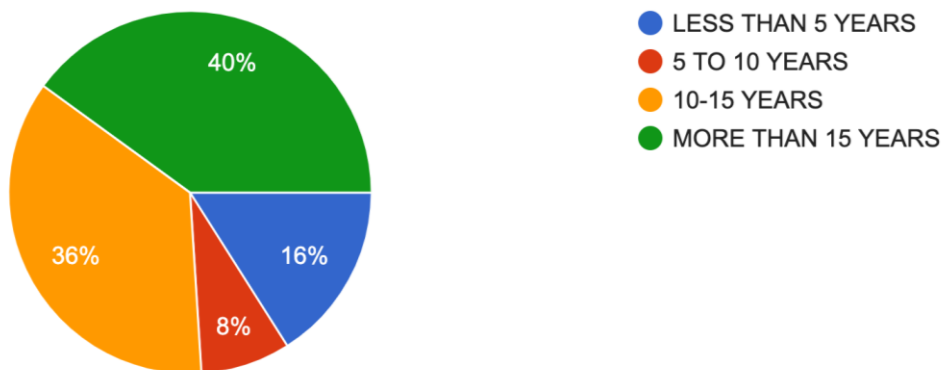

Fig. 1. Distribution of Teaching Experience

A significant portion of the faculty, 40%, has over 15 years of teaching experience. This indicates a strong presence of seasoned educators. The next largest group, comprising 36% of the teachers, has between 10 and 15 years of experience. A smaller proportion of teachers, 16%, has between 5 and 10 years of experience. Only 6% of the teachers have less than 5 years of experience,

suggesting a relatively stable faculty with a limited number of recent hires. Overall, the data suggests a faculty with a strong blend of experienced and moderately experienced teachers, indicating a balance between institutional knowledge and fresh perspectives.
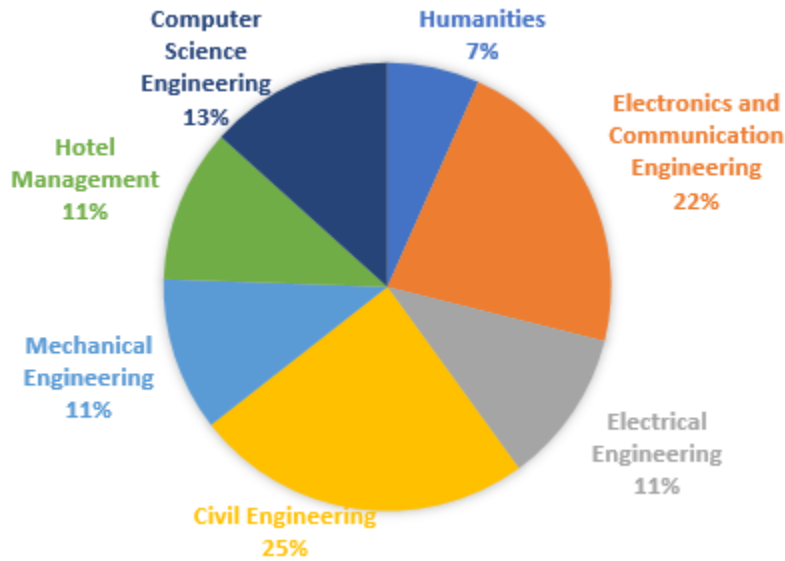

Fig. 2. Distribution of Domain Specialisation

The teacher population is primarily concentrated in engineering disciplines, with the majority of teachers (24%) belonging to the Electronics and Communication Engineering department. Civil Engineering follows closely with 24% of the faculty. Mechanical Engineering and Hotel Management each account for 11% of the faculty, while Electrical Engineering constitutes 10%. Computer Science Engineering has 13% of the faculty, and Humanities has the smallest representation with only 7%.
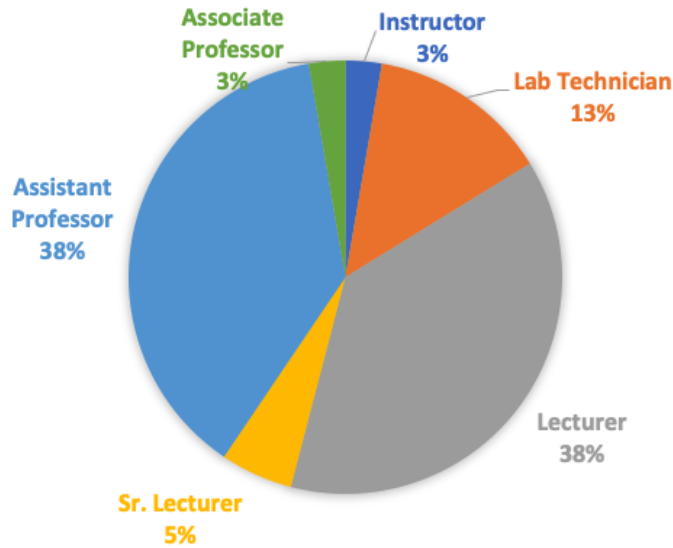
Fig. 3. Distribution of Designation

Lecturers constitute the largest group, making up 44% of the total faculty. Assistant Professor: The next largest group is Assistant Professors, accounting for 44% of the faculty. Lab Technicians: Lab Technicians make up 16% of the total faculty. Other Designations: The remaining designations, namely Instructor, Sr. Lecturer, and Associate Professor, each represent a small percentage of the faculty, with 3%, 6%, and 3%, respectively.

VI.   ANALYSIS AND INTERPRETATION

This section presents an analysis, interpretation, and codification of teacher responses for the interviews conducted on challenges of language differences. The collected data was analysed using thematic analysis identifying key themes and patterns within the interview transcripts and focus group discussions. The analysis will focus on understanding the impact of language diversity on teaching practices, the challenges faced by teachers, the strategies employed to adapt to diverse language abilities, and the perceived benefits and drawbacks of multilingual classrooms.

A. How language diversity affects their teaching practices

Based on the data from the interview responses, language diversity impacts teaching practices and experiences in engineering classrooms in Andaman in several ways. The challenges included communication barriers due to which students struggle to understand lectures, textbooks, and assignments due to limited English proficiency can make it difficult for teachers to effectively communicate concepts. Moreover, students who are shy to speak in class due to language limitations can hinder classroom discussions and reduce opportunities for formative assessment. One teacher mentioned "Students struggling to understand lectures due to limited English proficiency..."This highlights the communication barrier issue. Another teacher added "Students who are shy to speak in class due to language limitations..." This emphasizes the potential for reduced participation. In order to tackle this challenge, teachers adapted the following strategies. Some teachers reported using a mix of Hindi and English to explain concepts, while others

mentioned catering to students from Bengali backgrounds. They also emphasised the importance of clear explanations, potentially using simpler language and varied teaching methods like presentations, demonstrations, and digital tools. Additionally, they believed in creating a supportive environment where students feel comfortable using their preferred language initially, then gradually building confidence to participate in English, was mentioned by one teacher. "Some teachers reported using a mix of Hindi and English to explain concepts..." This showcases a strategy for addressing communication barriers. "Teachers emphasize the importance of clear explanations, potentially using simpler language..." This highlights a general teaching adaptation for diverse language proficiency. Having students from diverse backgrounds can bring in multiple perspectives and enrich classroom discussions. Overall, the impact of language diversity appears to be mixed. While it creates challenges, teachers adopt various strategies to address them. The excerpt also highlights the potential benefits of multilingual classrooms.

B. The specific challenges they face due to language differences.

Comprehension of Instructions and Explanations: The response "students fail to give answer when I ask questions...students writing skills are very poor" and "At times students hesitate to ask questions...Teachers may face difficulties in communication and ensuring all students understand the material equally," offers some insights into the challenges teachers face due to language differences. This suggests students struggle to answer questions and have limited writing skills. This may indicate difficulties understanding technical terms, complex instructions, or the overall content of lectures due to language barriers. This may also imply that students lack the necessary language skills to comprehend questions or express themselves effectively in writing.
Limited Student Participation: The statement about students hesitating to ask questions indicates a potential barrier to participation as mentioned by a teacher." At times students hesitate to ask questions..." Students may feel uncomfortable speaking due to language limitations, leading to reduced engagement in discussions. It also suggests shyness or apprehension related to language proficiency.
Ensuring Understanding Across the Class: The statement regarding teachers potentially facing difficulties in communication and ensuring comprehension implies challenges in conveying complex technical topics in a way that caters to all students' language abilities. "Teachers may face difficulties in communication and ensuring all students understand the material equally" highlights the teachers' concern about achieving equal comprehension for all students.
Additionally, challenges may vary based on the subject's vocabulary and complexity. For example, subjects with a heavy reliance on specialized terminology might pose greater communication barriers. Based on the identified themes, we can categorize the challenges into broader groups highlighting understanding deficit, reduced participation and uneven comprehension. Students have difficulties understanding instructions, explanations, and technical vocabulary due to language barriers. Students exhibit hesitancy to ask questions and participate in discussions due to language limitations. Teachers are concerned about ensuring all students, with varying language abilities, grasp the material equally especially in technically subjects. This also necessitates a nuanced approach to teaching, as different students may prefer auditory, visual, or tactile learning styles. This linguistic and cultural diversity can lead to increased reliance on teachers and a more complex learning environment.

C. Teacher adaptation strategies for multilingual classrooms

There is some extent of observed success of the institute's skill-based and activity-based learning in addressing the challenges of multilingual classrooms. However, for producing globally competent professionals, following strategies are also adapted:

Language Simplification and Supportive Materials: Teachers said "Break down complex topics into smaller, easier-to-understand chunks..." This highlights the use of simpler language and breaking down complex concepts. Others agreed "Use of Pictures, diagrams, and models that help explain ideas without needing much of words..." This emphasizes the use of visual aids to support understanding. Both quotes showcase teachers adapting their explanations to be more accessible for students with varying language proficiency levels. By using simpler language, breaking down complex topics, and incorporating visual aids, teachers attempt to bridge the language gap and enhance comprehension.

Multilingual Strategies: "English becomes the mode of communication...Incorporating varied cultural knowledge in the class, collaborative/team learning, visual transcript" While this prioritizes English, it also suggests incorporating cultural elements and collaborative learning, which can benefit students with diverse language backgrounds. This quote showcases a combination of strategies. English is the primary mode of communication, but incorporating cultural knowledge and collaborative learning can provide additional support for students. Additionally, the mention of a "visual transcript" might imply using translated materials or visual representations alongside spoken language.

Promoting Interaction and Alternative Assessments: "Teachers adapt their methods by using differentiated instruction...using alternative assessment methods." This suggests using various methods beyond just written exams, but doesn't explicitly mention group work. The quote indirectly suggests using alternative assessments. To strengthen this category, you'll need to look for quotes in the complete data that directly reference using group work or collaborative learning strategies to promote interaction and provide alternative assessment methods beyond written exams. Teachers often utilize personality tests and learning style assessments to foster collaboration and trust, which can be challenging due to the islands' unstable weather, natural calamities, and sometimes hostile social environment. Understanding students' backgrounds and experiences is crucial for effective teaching. The current recruitment process through the UPSC (Union Public Service Commission) ensures a diverse pool of teachers, addressing the linguistic needs of the student population. Many teachers provide technical vocabulary glossaries to aid comprehension. Consistent efforts are made to incorporate culturally relevant content into the curriculum.

D. Perceived benefits and drawbacks of multilingual classrooms for teachers and students

The benefits as perceived by students could include improved understanding - "Understandability (from the students' point of view)") suggests students perceive a benefit in being able to use their home language for clarification. The teacher perception includes diverse perspectives as teachers felt "Exploring diversity and learning new languages" are the perceived benefits, cultural enrichment - "Students and teachers get knowledge about others cultures and share knowledge about their culture that creates some emotional bond and strong understanding", and improved communication "Students interact quickly with teachers". However, these are teacher perceptions. The drawbacks from the student perspective include difficulty in "grasping complex topics as complex topics might be harder to grasp initially when explained in a non-native language". As a

result, students often become overly reliant on teachers and struggle to maintain focus when traditional lecture-based methods are employed. DBRAIT Institute has been successfully addressing this issue by adopting a skill-based and activity-based approach, reducing the reliance on lengthy lectures. Active experimentation has led to higher placement rates for technical education graduates. Teachers highlight communication challenges - "Language barriers can make it difficult to communicate effectively with all students", time constraints - "Takes more time to cover lessons", and challenges with assessments "Preparing students to understand answer questions in English for the board exams". Thus, it is clear that while students perceived an enhanced understanding through home language use teachers felt that exposure to diverse perspectives, cultural enrichment, and potentially improved student interaction. On the other hand, in a multilingual classroom, students had difficulty understanding complex topics in a non-native language and teachers faced communication challenges, time constraints due to adaptation methods, and assessment difficulties related to language variations.

E. Teacher Requested Support Systems and Resources

Professional Development: Training on teaching multilingual learners - "Training on effective pedagogy for multilingual classroom" and cultural competency - "Training in Culturally Responsive Teaching" are mentioned as helpful resources.
Language Support Specialists: Teachers mention a need for specialists such as bilingual aides "Teachers believe that translated materials, language support specialists, and professional development on effective strategies would be helpful" or ESL (English as a Second Language) teachers "Teachers believe that support systems such as language specialists, bilingual aides, professional development on teaching English as a second language...would be helpful".
Instructional Materials and Technology: The teachers mention the need for translated materials - "Teachers believe that translated materials, language support specialists, and professional development on effective strategies would be helpful" and access to technology for language support "Access to language support technology". Some teachers mentioned bridge courses "Bridge courses to read, speak and write in English as it's the medium of learning" and textbooks in various languages "Textbook availability in various languages" as helpful resources.
Perspectives from the Focus Group Discussion:

In focus group discussions, teachers expressed frustration with the limited availability of technical vocabulary in regional languages, hindering students' ability to grasp complex concepts and apply them in practical settings. Teachers highlighted the lack of standardized technical terminology in regional languages, leading to confusion and inconsistency in communication and assessment. They also expressed concern about the lack of culturally relevant examples and case studies in technical textbooks, making it difficult to connect with students from diverse backgrounds. It was also clear that teachers felt overwhelmed by the additional workload associated with adapting teaching methods and materials to cater to diverse language abilities. These perspectives summarise the challenges teachers faced in multilingual contexts in technical classrooms. Contrarily, the discussion also threw light on how certain benefits emerged in such classrooms. A few teachers observed that multilingual classrooms fostered a deeper understanding of different cultures and perspectives, enriching the overall learning experience. Students from diverse linguistic backgrounds often brought unique insights and problem-solving approaches to technical challenges. Additionally, multilingual classrooms encouraged students to develop stronger

communication and interpersonal skills, essential for collaborative work in the engineering field. The table below summarises the key points from the focus group discussion held based on the thematic orientation highlighting challenges, benefits, strategies and support systems.

Table 1. Results of the Focus Group Discussion

Theme	Teacher Perception	%	Views as quoted by teachers
Challenges	Comprehension of Instructions and Explanations	70	"It's frustrating when students struggle to understand basic technical terms, even after repeated explanations."
	Limited Student Participation	6	"The lack of consistent technical terminology across different languages creates a significant barrier to effective communication and assessment."
	Uneven Comprehension	70	"Many students come from diverse cultural backgrounds, and it's challenging to find relevant examples that resonate with all of them."
Benefits	Diverse Perspectives	50	"Having students from diverse linguistic backgrounds brings a richness to classroom discussions that I wouldn't have otherwise experienced."
	Improved Understanding	50	"I've learned so much about different cultures and perspectives from my students, which has broadened my own understanding of the world."
	Stronger Skills	75	"Students who have to navigate different languages often develop strong communication and problem-solving skills."
Strategies	Peer Learning	65	"Peer learning has been incredibly effective. Students who are more proficient in English can help those who are still learning."
	Technology Integration	85	"I've started using online dictionaries and translation tools to assist students in understanding technical terms."
	Local Resources	40	"Incorporating local case studies and real-world examples has increased student engagement."
	Safe Environment	60	"Creating a safe and inclusive classroom environment is important. Students need to feel comfortable asking questions without fear of judgment."
Support Systems	Professional Development	80	"We need more professional development opportunities specifically focused on teaching multilingual learners."
	Feedback and Support	70	"Regular feedback and support from experienced colleagues would be extremely beneficial in navigating the challenges of teaching in a multilingual environment."

VII. DISCUSSION AND INTERPRETATION: LANGUAGE DIVERSITY IN TECHNICAL EDUCATION

This research explored the challenges and opportunities of language diversity in technical education classrooms in the Andaman. By analysing teacher responses, we gained insights into how language differences impact teaching practices and the perceived benefits and drawbacks of multilingual classrooms.

Challenges and Teacher Adaptation: The data highlights communication barriers and student hesitation to participate as key challenges. Teachers adapt by using simpler language, incorporating visual aids, and leveraging multilingual strategies like translation tools or a common language alongside English. These efforts resonate with NEP 2020's emphasis on fostering a multilingual learning environment. However, challenges remain, particularly regarding assessment methods that may not adequately cater to diverse language proficiency levels.

Perceived Benefits and Drawbacks: The perceived benefits include exposure to diverse perspectives and cultural enrichment for both teachers and students. Students also appreciate the potential for improved understanding through their home language. However, drawbacks exist. Students might struggle with complex topics initially, while teachers face communication challenges and time constraints due to additional adaptation methods. Addressing these issues requires further exploration of effective assessment methods for multilingual classrooms, aligning with NEP 2020's goal of holistic learning assessments.

Support Systems and Resources: Teachers identified a need for professional development in teaching multilingual learners and cultural competency. Additionally, access to language support personnel, translated materials, and technological tools was emphasized. These needs align with NEP 2020's vision of providing quality teacher education and promoting inclusivity. Future implications include developing training programs for teachers on effective multilingual teaching methodologies, integrating cultural competency into teacher education curriculum and investing in resources like bilingual aides, translated materials, and language learning technology for classrooms.

VIII. RECOMMENDATIONS AND FUTURE IMPLICATIONS

Addressing language diversity in technical education requires a multi-pronged approach. The slower pace of teaching required to accommodate diverse learners may lead to a reduced curriculum coverage. Additionally, academic isolation and limited access to training opportunities can hinder teacher development. Exposing students to competitive technical environments and industry experts can motivate them and bridge the gap between theory and practice.

By building teacher capacity, providing necessary resources, and potentially adapting assessment methods, we can create more inclusive learning environments that leverage the strengths of multilingual classrooms. As suggested by James and Brookfield (2004), critical incident questionnaires can be used to assess teaching styles and encourage a shift towards more visual and interactive approaches. Team teaching can foster inclusive learning environments, particularly when combining the strengths of oral and visual teachers. By training oral teachers to be more interactive and visual teachers to be more student-centered, a more effective and engaging learning

experience can be created. This aligns with NEP 2020's vision of promoting multilingualism and fostering excellence in education for all. Further research could explore specific subject-based challenges and opportunities within multilingual classrooms, along with the effectiveness of different teacher adaptation methods and support systems. This will contribute to a more comprehensive understanding of how to optimize technical education for diverse language backgrounds in India and beyond.

The focus-group discussion (FGD) with ten teachers addressing the question "How can teachers navigate this path of a multilingual environment and make learning effective?" The following observations were recorded as discussed by teachers. Based on the FGD, the following recommendations can be made. Teachers can foster a student-centered environment with opportunities for peer interaction and group work in mixed-language groups, encourage students to explain concepts in their preferred languages to enhance understanding and build confidence, integrate diverse cultural contexts and examples into technical subjects to promote cultural relevance, create safe and inclusive spaces where students feel comfortable using their home languages to ask questions and participate.

To develop strategies for effective communication, teachers can utilize simpler language and break down complex topics into smaller, manageable units, incorporate visual aids like diagrams, models, and pictures to support explanations, explore using a common language alongside English, if appropriate, for initial explanations, consider using translation tools and technologies to support student comprehension.

Additionally, they can adapt assessment methods by moving beyond traditional written exams towards a more holistic approach, including assessments that allow students to demonstrate their understanding in various ways, like presentations, practical tasks, or projects. They can also consider using formative assessments throughout the learning process to identify areas where students might need additional language support.

In a similar vein, policies can be framed for investing in teacher training focusing on developing and offering professional development programs focused on effective teaching methodologies for multilingual classrooms. Training programs can also educate teachers on methods to integrate cultural competency training into the teacher education curriculum. Teachers can be provided with resources and support by allocating resources for hiring bilingual aides or ESL teachers to provide in-class language support. Creating translated instructional materials and textbooks in various languages relevant to the curriculum and equipping classrooms with technological tools for language learning and translation support can also be helpful. Aligning Assessment Systems by exploring ways to adapt assessment methods to better accommodate diverse language proficiency levels and considering offering exams in multiple languages or developing alternative assessment formats that don't heavily rely on written English skills can be recommended. It is obvious that promoting inclusivity and equity by acknowledging the value of multilingualism in technical education and promote inclusive learning environments can be valuable. Similarly, developing policies and practices that support the integration of students from diverse language backgrounds into technical education programs is also crucial. By implementing these recommendations, both teachers and policymakers can work together to create a more inclusive and effective learning environment for all students in multilingual technical classrooms. This aligns with the goals of NEP 2020 and paves the way for a future where language diversity is seen as an asset, not a barrier, in technical education.

IX.   LIMITATIONS

This research study offers valuable insights into language diversity in technical education, but there are some limitations to consider. The research only analysed a limited set of teacher interviews. A larger and more diverse sample size, including students from various backgrounds, could provide a more comprehensive picture of the challenges and opportunities. The study primarily focused on teachers' experiences. Including interviews with students would offer their perspective on communication barriers, preferred learning styles, and the effectiveness of teacher adaptation methods. The data doesn't specify the technical subjects taught. Challenges and opportunities might vary depending on the subject's complexity and vocabulary usage. Ideally, the research would consider how language diversity impacts different technical fields. While the analysis identified some teacher adaptation methods, a deeper dive into their perceived effectiveness would be valuable. Further research could explore specific strategies and solicit teacher feedback on their success. Despite these limitations, the research provides a valuable starting point for understanding the complexities of language diversity in technical education. Future research can address these limitations to build a richer and more nuanced understanding of this topic, ultimately leading to the development of more effective teaching practices and policies for multilingual classrooms.

X.   CONCLUSION

This study examines the challenges and strategies needed to address the unique situation in the Andaman where students come from various linguistic backgrounds, many from tribal and indigenous communities yet to fully participate in higher technical education. This research also explored the challenges and opportunities presented by language diversity in technical education classrooms in the Andaman and Nicobar Islands. By analysing teacher responses, we gained valuable insights into how communication barriers impact teaching practices and how teachers currently adapt their methods.

The research highlights the potential benefits of multilingual classrooms, including fostering diverse perspectives and enriching cultural understanding for both teachers and students. However, it also identifies key challenges like communication difficulties, limitations in assessment methods, and the need for additional support systems.

Moving forward, addressing these challenges requires a multi-pronged approach. Teachers can benefit from professional development in teaching multilingual learners and culturally responsive teaching. Additionally, providing access to resources such as bilingual aides, translated materials, and language learning technology can empower teachers to create more inclusive learning environments. Policymakers play a crucial role in supporting this shift by investing in teacher training, allocating resources for multilingual classrooms, and exploring ways to adapt assessment systems to better accommodate diverse language proficiency levels.

This research aligns with NEP 2020's vision of promoting inclusivity and multilingualism in education. By embracing this diversity and implementing effective strategies to overcome challenges, we can empower students from all linguistic backgrounds to excel in technical education and contribute to India's future workforce.

Further research directions can include exploring the specific challenges and opportunities of language diversity in different technical subjects, investigating the effectiveness of various teacher adaptation methods in promoting student learning, conducting research involving students' perspectives on language diversity in technical education and examining the impact of language policies and assessment systems on multilingual classrooms. By continuing to explore these areas, we can build a comprehensive understanding of how to harness the power of language diversity to create thriving technical education programs for all students in India.

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