



ETHNOPEDAGOGY IN THE SCIENCE CLASSROOM: CHALLENGES AND SUPPORTS FOR IN-SERVICE TEACHERS

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Article DOI: <https://doi.org/10.36713/epra28240>

DOI No: 10.36713/epra28240

ABSTRACT

Ethnopedagogy has emerged as a key framework for rethinking science education in culturally diverse societies. Ethnopedagogy approach is particularly useful in science teaching as many of the scientific concepts are already embedded in the local practices of the indigenous people related to their food, ecology, health, weather prediction, agriculture, crafts etc. However, majority of the studies related to ethnopedagogy and science education focused on the learning outcomes, engagement, scientific literacy of the students and only a few studies paid attention to how that knowledge is transected by the in-service teachers and the issues associated with it. Therefore, in this paper an attempt has been made to explore the challenges faced by the in-service teachers in the implementation of ethnopedagogy and the supports that can be given to them in order for them to make learning more culturally imbedded and interesting. Ethnographic fieldwork was used to collect the data from Pushparajgarh Tehsil of Amarkantak region in Annappur district of Madhya Pradesh. The sample consisted of twelve science teachers from two higher secondary and two secondary schools of Amarkantak region. The data was collected using interpretive paradigm and narrative inquiry method. The study reveals that while in-service science teachers are genuinely interested in ethnopedagogy and already use local examples in intuitive ways, they lack formal understanding, suitable resources and adequate time to integrate local knowledge systematically with science concepts.

KEYWORDS: *Ethnopedagogy, In-Service Teacher, Science Education, Indigenous Knowledge, School Education*

INTRODUCTION

Ethnopedagogy is conceptualized as an educational approach that applies local cultural values and local wisdom within the learning process in order to strengthen students' cultural identity, character and knowledge (Sakti et al. 2024). Originated from the works of G.N Volkov, it is described as 'a branch of science that explores, systematizes and extends folk education. Folk education expresses its own educational ideas, methods, experiences and practices which is formed by the people themselves, while ethnopedagogy refers to the discipline scientifically researching, systematizing and presenting these ideas, methods and experiences of the people.' (Alagoz Hamzaj & Selvi, 2020, p.320). According to Alimbekov (2007), Ethnopedology has two central aims which are to collect and scientifically systematize the oral and written educational material that has been passed from one generation to the author, and the second is to research how these materials can be used as teaching material (ethno-didactics) and the way this knowledge can be transected in the classroom (Alagoz Hamzaj & Selvi, 2020). Ethnopedagogy has increasingly become a key framework for rethinking science education in culturally diverse societies. For instance, Ariana (2025), in her systematic literature review shows that when science teaching connects scientific concepts with students' local culture and daily life, students engage more deeply, practice science process skills, and develop a kind of independent, inquiry-oriented learning that 21st century science education demands. The study further said, teachers need to design or adopt ethnoscience-based materials like e-module and other resources that integrate local

culture with formal science content. Such materials and approaches can increase teacher's creativity and shift their role towards facilitator of knowledge.

REVIEW OF LITERATURE

In the recent years, ethnopedagogy has an alternative approach of teaching has been explored by the researches in order to make the teaching learning process culturally responsive and locally grounded. For instance, Rahmawati et al. (2020) examined how the integration of ethnopedagogy in science learning influences students' engagement, cultural identity, scientific understanding, and learning skills. The findings revealed ethnopedagogy has a positive effect on students' learning experience in science classroom. Ethnopedagogy acknowledges that learners are not blank slates rather they hold in them a reservoir of community knowledge, language, values, practices and experiences from their respective communities which in a way shapes how they understand and navigates in the society. Ethnopedagogy functions as a bridge that connects this community knowledge with the formal knowledge and in a way, it helps the students connects the new knowledge with their previous schema, that makes the learning far more enriching and interesting. Hidayat et al. (2023) in their study found that ethnopedagogy as a culture based educational approach, can help teachers design learning content that reflects student' cultural values and it can also fulfil the technological demands of the society 5.0 era. The paper further suggested to integrate online learning, Augmented reality and virtual reality with ethnopedagogy to make learning



more personalized, interactive and effective. Ethnopedagogy approach is particularly useful in science teaching as many of the scientific concepts are already embedded in the local practices of the indigenous people related to their food, ecology, health, weather prediction, agriculture, crafts etc. The study conducted by Rahmawati et al. (2021) revealed that ethnopedagogy based science learning helped students develop scientific literacy, particularly in understanding science concepts related to energy transfer. By connecting science learning with cultural practices such as Aruk Beras from Bangka, students became more interested in learning. However, the study also found that students faced difficulty in providing scientific reasoning and connecting scientific concepts with everyday life due to their emphasis on rote learning. Thus, the previous studies have shown that the integration of ethnopedagogy in science classroom can enhance students' engagement with the topic, cultural awareness, scientific literacy, collaboration and problem-solving abilities. Ethnopedagogy helps learners understand science not as an abstract textbook concept but something which can be studied in real life culture, environment and society.

However, majority of the studies focused on the learning outcomes, engagement, scientific literacy of the students and only a few studies paid attention to how that knowledge is transected by the in-service teachers and the issues associated with it. Therefore, in this paper an attempt has been made to explore the challenges faced by the in-service teachers in the implementation of ethnopedagogy and the supports that can be given to them in order for them to make learning more culturally imbedded and interesting.

OBJECTIVES OF THE STUDY

To Explore the challenges faced by in-service science teachers and the supports required for implementing ethnopedagogy in the science classroom.

METHODOLOGY

The researchers collected the necessary data from the field using ethnographic fieldwork from Pushparajgarh Tehsil of Amarkantak region in Anuppur district of Madhya Pradesh. The sample consisted of twelve science teachers from two higher secondary and two secondary schools of Amarkantak region. In order to explore the research problem, the researchers utilized interpretive paradigm (Pervin & Mokhtar, 2022), which is based on the assumption that social realities do not exist in isolation rather they are shaped by the socio-cultural contexts specific to a society. Therefore, in order to understand these social realities, the researcher needs to subjectively understand the specific contexts attached to the different issues of the society (Taylor & Medina, 2011). The researchers have further utilized the narrative inquiry method to jot down the real-life experiences of the science teachers in implementing ethnopedagogy in their classroom teaching and learning. In Narrative inquiry approach the researchers' collect stories as data from the people who share their first-hand experiences in a specific time and context with the researcher (Smit, 2017). It is considered useful in exploring the social, cultural and institutional narratives which shapes the experiences of the individuals (Clandinin, 2022). The researchers collected the

data following the steps given by Sharp et al. (2019) for narrative inquiry method. Before the collection of data, the researchers shared their purpose of the study and took the necessary consent for the study. The data was collected using a semi-structured interview questionnaire. Besides, the researchers took extensive field notes during interview, all of the data was transcribed and categorized using open coding, followed by axial coding to understand the relationship between the data, and thus from the categories of data, the major themes emerged which were further arranged with the stories using rich descriptions.

FINDINGS & ANALYSIS

The present study aimed to explore the challenges faced by in-service science teachers and the support required for implementing ethnopedagogy approach in science classroom teaching learning process. The findings are presented thematically based on the responses of the participants. The major themes that emerged from the data include teachers' understanding of ethnopedagogy, challenges in integrating local knowledge with science concepts, curriculum and examination related constraints, lack of teaching learning resources, need for professional development and institutional and community-based support.

Theme 1: Teacher's Understanding of Ethnopedagogy: The first major theme that emerged from the collected data is related to the teachers' understanding of ethnopedagogy. Most teachers were familiar with the idea of using local examples in science teaching, but they were less familiar with ethnopedagogy as a systematic pedagogical approach. The teachers' understanding of ethnopedagogy emerged from their classroom experience rather than from formal training. It reveals that teachers do practice certain form of ethnopedagogy informally in their teaching, but they don't have proper understanding of it. On this note, Narrator 7 said,

"I have not received any formal training on ethnopedagogy, but I try to explain science with examples from students; daily life...When I teach plants, I ask them about the trees they have seen in their village, or the local herbal medicine that they collect from the forest. Students become more active when they hear examples related to their village or home."

Form these narratives we can understand that the teachers view ethnopedagogy as a connection between science content and the students' daily experiences. However, their response also indicates towards their limited conceptual clarity as the teachers don't have any formal training.

Theme 2: Challenge in Integrating Local Knowledge with Science Concepts: The second theme that emerges from the data is related to the difficulty teachers face in connecting the local knowledge with the formal scientific concepts. During our discussion with the teachers, they said, although local knowledge is rich and meaningful, it is not always easy to relate it directly to the scientific concepts. They often feel uncertain about which local practices can be used scientifically and how to explain them without misinterpreting either science or culture. Regarding this, narrator 3 shared with the researchers,



“Once, I was teaching the chapter on electricity, I asked the students have they seen thunder in the sky during rainy session. One student said, when thunder falls on somebody or something, that place become cursed, because Indra Dev is angry and punished through lightening. As a science teacher I know that lightening is not God’s anger and it is an electrical discharge caused by the accumulation of charges in clouds. But telling students directly that ‘this is not God’ can be tricky. If I say it in a harsh way, student may feel that I am disrespecting their family belief or religion. So, I have to be very careful”

Theme 3: Curriculum and Examination related Constraints: Another significant challenge faced by the teachers was curriculum and examination pressure. Teachers reported that they are expected to complete the syllabus within a limited time and prepare students for examinations. As a result, activity-based and community-oriented learning are often pushed aside. Although they have acknowledged the value of ethnopedagogy, they felt that the existing school structure does not provide enough time or flexibility for such practices. Ethnopedagogical teaching requires discussion, observation, field-based activities, community interaction and reflection. However, exam-oriented teaching encourages fast completion of textbook content. Narrator 5 explained, *“I want to take students outside the classroom to observe soil, plants, and local farming practices. But there is always pressure to complete the chapter. The school asks us to finish the syllabus for revision classes before examination. So, I have decided to teach from textbooks only”*

On similar note, Narrator 8 said, *“It is (ethnopedagogy) indeed a good method, but our exams are still based on textbook questions. If I spend too much time on local examples and other techniques, the students may enjoy the class, but I don’t think they will be able to perform well in test. And if that happens, I will be responsible”*

Theme 4: Lack of Teaching-Learning Resources: The findings also revealed that teachers lack appropriate teaching-learning materials for implementing ethnopedagogy. Teachers reported that textbooks rarely provide sufficient examples from students’ local culture or indigenous practices. They also mentioned the absence of lesson plans, activity manuals, digital resources and the lack of documentation of the local knowledge as major reasons behind their inability to integrate ethnopedagogy. As a result, teachers have to depend on their own knowledge and creativity. This makes ethnopedagogy teaching difficult, especially for teachers who are already overloaded with routine academic and administrative duties. In this context, Narrator 11 asserted, *“The textbooks give general examples, but it does not include examples from our local culture, If I want to teach using local cultural examples, I have to collect all the information myself and then prepare the lesson. Sometimes, I do not have that much time to prepare such materials... If there were demo lesson plans showing how to connect local practices with science chapters, it would be very helpful”*

Theme 5: Need of Professional Development: The data strongly indicated the need for professional development.

Teachers expressed that they required training to understand the meaning, purpose, and classroom application of ethnopedagogy. They need support in lesson planning, activity design, local knowledge documentation, community collaboration and assessment. Narrator 12 said, *“During teacher training, we learned methods like lecture, demonstration, and activity method, but we did not learn how to integrate local knowledge with science. This should be included in teacher training programmes”*

Theme 6: Institutional and Administrative Support: Teachers also emphasized the importance of institutional support. Even if individual teachers are interested, they cannot implement ethnopedagogy effectively without the support from the school administration. Teachers need timetable flexibility, permission for field visits, support for inviting community resource persons and encouragement for project-based learning from the administration. Narrator 2 said, *“If the school organizes science exhibitions based on community practices and local knowledge, students will learn better. But such activities need planning and administrative support which we don’t get.”*

Theme 7: Community based Support and Participation: Community participation is essential for the proper implementation of ethnopedagogy. Teachers shared that elders, farmers, artisans, healers, forest workers, and other community members possess rich knowledge that can support science learning. However, teachers reported that schools rarely have formal mechanisms for involving community knowledge holders in science education. Narrator 1 and 4 said in this regard, *“Students learn many things from home and community, but school does not give value to that knowledge... Many elders in the village know about plants, seasons, animals and farming. If they come to school and share their knowledge, students will be benefitted. But we need a proper way to involve them.”*

Theme 8: Need of Flexible Assessment: Teachers also indicated that existing assessment practices do not adequately support ethnopedagogical learning. Traditional tests mainly evaluate factual recall and textbook based answers. However, ethnopedagogy involves observation, discussion, field-based learning, project work, group activities and reflection. Therefore, teachers require flexible assessment tools that can evaluate students’ conceptual understanding, cultural connection, inquiry skills, communication, collaboration and application of science in everyday life. In this context, Narrator 6 and 10 said, *“Students may not write perfect textbook answers, but they can explain many things orally from their experience. Assessment should also include oral presentation and project work.”*

CONCLUSION

After the collection and analysis of the data, the researchers understood that majority of the teachers wants to adopt ethnopedagogy methods, but they need proper support for that. Teachers’ current use of local examples is mostly intuitive and experience based rather than grounded in a formal understanding of ethnopedagogy, which limits the depth and



consistency of their practices. Although they recognize the richness of community knowledge, teachers struggle to scientifically connect local practices with formal science concepts, and they are often unsure how to maintain both scientific accuracy and cultural sensitivity. Curriculum load, examination pressure, and rigid timetables further restrict opportunities for discussion based, field based, community-oriented learning. The situation gets worse by the lack of lesson plans, activity guides, digital tools and documented local knowledge, which forces that already overburdened teachers to rely solely on their creativity and research. The study therefore argues that for the meaningful implementation of ethnopedagogy we need more than just the teachers who are interested, rather a system that helps them sustain that interest and apply ethnopedagogical methods in teaching learning. Teachers need targeted training, administrative support, permission and time for field visits, collaboration with local knowledge holders and flexible assessment that value inquiry and real-life application of science.

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