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## Inclusive Pedagogies in Environmental Education and Life-Long Learning: Teachers Sense-Making Perspectives

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### ABSTRACT

This study relied on the interpretive qualitative study paradigm to explore the newly developed idea of inclusive pedagogies in environmental education and lifelong learning through the lens of sense-making theory. Ten teachers were purposively selected from two public and two private schools teaching in primary Class 3 at Mampong Municipality, Ghana. The thematic analysis uncovered various pedagogies that are used in environmental education under four themes: diverse learning approaches, collaborative and inclusive learning environments culturally relevant teaching strategies and technology for accessibility. The analysis further reviews the many challenges the execution of environmental education faces. They are resource limitations, difficulties in applying personalised teaching pedagogy and lack of effective collaboration and communication. The study's suggestions for action highlight the necessity of providing teachers with continuous professional development to improve their abilities to use inclusive pedagogies and develop innovative solutions to resource limitations.

### INTRODUCTION

According to Ardoin *et al.* (2020), Sukma *et al.* (2020), Ambe *et al.* (2024) environmental education (EE) is essential in promoting responsible attitudes and behaviours by providing people with the information and abilities needed to deal with difficult environmental issues. United Nations assessment revealed that more than half of the planet's ecosystems are ill or malfunctioning. To solve these difficulties, most people suggest using EE for sustainable development. Russell and Hodson (2002) assert that "it is not enough for students to be armchair critics." Kollmus and Agyeman (2002) noted that simple learning about the environment cannot deal with such environmental issues and proposed that learners need to be practical by getting their hands dirty and taking responsible action. Acknowledging the significance of inclusive education (IE), there is an increasing demand to investigate and execute pedagogical strategies that guarantee fair access to EE for every student.

In EE and lifelong learning Elvey and Burke (2023) note that inclusive pedagogies comprise a transformational educational paradigm that aims to meet learners' varied needs, backgrounds, and learning styles at various phases of life. With a foundation in fairness, accessibility, and cultural sensitivity, Sims and Desmarais (2020) explain that inclusive pedagogies go beyond conventional teaching approaches and highlight teachers' critical role as facilitators and translators. Because of Ghana's unique environmental difficulties (Atuguba, 2019), language variances, and rich cultural variety, implementing inclusive pedagogies is necessary and advantageous for promoting sustainable viewpoints. As key players in the educational system, teachers negotiate the complex topography of inclusive pedagogies by utilising their views on sense-

making to bridge the gap between local realities and international educational goals (Nachibi & Morgan, 2023). The inclusive pedagogies in EE and its sustainable practices, environmental stewardship, and the cultivation of an awareness of ecological principles are the goals of EE as a field (Vesterinen, 2024; Horsthemke, 2024). Loskota (2004) proposes that teachers must blend a range of methods to teach students; nevertheless, the most crucial ones include active learning, letting students take charge of their education, offering activities appropriate for their cultural background, and encouraging students to articulate what they have learned. Sims and Desmarais (2020) article about planning to surmount barriers in EE revealed that pedagogies such as excursions, collaboration and communication, and demonstration via technology could be utilized in EE. These all-encompassing strategies must accept differences in learning styles, socioeconomic backgrounds, and cultural diversity (Mallory *et al.*, 2024; Sims & Desmarais, 2020).

The study of inclusive pedagogies used by teachers in EE and lifelong learning is an important examination of how different learning styles interact with students' requirements. The body of research on the subject emphasizes how important it is to create welcoming environments in schools, especially in EE, to meet the needs of students with a variety of backgrounds, skills, and learning preferences. Academics such as UNESCO (2015) and Sims and Desmarais (2020) emphasise the importance of education in tackling ecological problems and the necessity of inclusive pedagogies to improve the usability and efficacy of EE programmes. Research by Loskota (2004) highlights the importance of teacher practices in influencing how pupils learn about climate change and ecological issues.

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Discussing climate change education, inclusive pedagogies—which value diversity, take into account particular requirements, and facilitate a variety of learning styles—are crucial. The point is that because environmental issues are intricate, teaching strategies must take into account students' varied backgrounds, encounters, and abilities for learning. United Nations Education, Scientific and Cultural Organisation (UNESCO) stated that the roadmap for reaching the SDGs is solid education policies. They further add that to promote SDGs and solve environmental issues like climate change, nations specifically developing nations must develop educational programmes that can inspire pro-environmental behaviour that is prominent in modern society (UNESCO, 2015).

The convergence of inclusive pedagogies, EE and life-long learning is an important topic of investigation. Although the importance of inclusive methods in developing environmentally conscious and accountable citizens is widely recognised, there is a significant research vacuum about how teachers, who are major executioners of these teaching methods, interpret and navigate them. A complete understanding of teachers' sense-making about inclusive pedagogies, EE, and lifelong learning is lacking, which makes it difficult to establish specific measures and well-informed policies.

According to a 2002 Ghana Education Review Committee report, sustainable development is hampered by low awareness about the environment (GMoE, 2007). It was suggested in the 2007 Educational Reforms that EE be included in elementary and secondary education. Even though Ghanaians occasionally discuss sustainability in political and ecological conversations, the majority of people still do not care about the environment. Teaching young students to become ecologically informed and display environmental consciousness is a permanent duty for teachers, but teachers are the ones who are neglected in terms of EE (Atuguba, 2019). The purpose of this study is to examine the many ways in which teachers understand and implement inclusive pedagogies in EE, taking into account the consequences for a variety of students. Comprehending the inclusive pedagogies utilised by teachers to tackle the global problem of the environment is imperative as the planet struggles with its negative consequences. Since inclusive approaches and learning about the environment are closely related in the context, this investigation intends to both analyse the pedagogical techniques used and to elucidate how teachers negotiate this junction.

### Objectives

1. To understand how teachers interpret and make sense of inclusive pedagogies in environmental education and their implications for diverse learners.
2. To understand the inclusive pedagogies that teachers use in environmental education in the context of climate change.
3. To gain an understanding of the challenges

perceived by teachers in adopting inclusive pedagogies in environmental education and life-long learning.

### Contextualising Ghana's Inclusive Pedagogies in Environmental Education and Life-Long Learning

Ghana's complex socio-cultural, economic, and environmental variety demands a dynamic response, so inclusive pedagogies in EE and lifelong learning are being investigated. Inclusive educational approaches are critical because of the diverse range of racial and cultural backgrounds, languages, and environmental zones found in Ghana, an island nation on the Gulf of Guinea. Ghana's educational system combines local knowledge and modern, international viewpoints. For EE to recognise and include the rich indigenous knowledge systems that many ethnic groups share, inclusive pedagogies are crucial (Koomson, 2023). To navigate this terrain, teachers who act as cultural brokers must integrate local wisdom into EE and promote a comprehensive awareness of ecological challenges.

Ghana's economic diversity from urban to rural areas brings unique possibilities and problems for educational access. By bridging these gaps, inclusive pedagogies help ensure EE is accessible to all parts of the country (Dako-Gyeke *et al.*, 2024). Teachers' sense-making perspectives become essential to modify instructional approaches to fit various economic situations, solve access concerns, and promote environmental stewardship among socio-economic strata. Ghana's dedication to sustainable development aligns with the global agenda, and inclusive pedagogies are crucial in raising a populace aware of environmental issues and equipped to handle the country's unique ecological problems (Lombard, 2024). Teachers actively interact with local environmental concerns through their sense-making processes, modifying global concepts to suit the Ghanaian setting and fostering in students a feeling of responsibility for the environment. Moreover, the Ghanaian context's emphasis on lifelong learning highlights the need for education outside traditional classroom settings. Through the promotion of a culture of lifelong learning, inclusive pedagogies help people become more adaptive and responsive to changing environmental conditions. Teachers are critical in creating a society that can navigate environmental sustainability challenges by facilitating lifelong learning. To put it briefly, the Ghanaian setting highlights the complex interactions between culture, economy, and ecology when implementing inclusive pedagogies for lifelong learning and EE (Vesterinen, 2024). Through promoting inclusion and sustainability in the educational environment, research in this field helps deepen our understanding of how educational approaches may be adapted to Ghana's particular qualities.

### Theoretical Framework for the Study

When looking at teachers' perspectives, the theoretical framework of sense-making theory offers a valuable lens through which to analyse and interpret the adoption

of inclusive pedagogies in EE and life-long learning. Karl Weick (2009) developed the sense-making theory, highlighting how people perceive clues and create meaning to make sense of complicated events. When this concept is used in the Ghanaian educational setting, it clarifies the dynamic process instructors use to negotiate inclusive pedagogies. Teachers in Ghana's educational environment must understand a variety of cultural and ecological cues to engage in sense-making within the framework of inclusive pedagogies. Sense-making theory proposes that teachers engage in a continuous process of interpretation, adapting global environmental concepts to local contexts and weaving them into the fabric of students' experiences as they grapple with the complex mosaic of cultures and varying environmental concerns. The theory also emphasises ambiguity's function in sense-making. Teachers face unclear conditions regarding the best way to adopt inclusive pedagogies in the varied Ghanaian setting, where cultural, linguistic, and economic variety runs rampant. By building cohesive and significant approaches to inclusive EE, teachers use sense-making. This dynamic process involves navigating uncertainty by referencing their professional expertise, cultural insights, and personal experiences. The significance of interaction and social processes is further emphasised by sense-making theory. Teachers and learners make sense of environmental concerns by utilising one another's perceptions. This is consistent with inclusive education, which emphasises co-constructing knowledge and including other points of view.

According to sense-making theory, teachers are crucial in encouraging a continuous learning attitude in the context of lifelong learning. They support students in developing a lifelong connection with environmental concerns and helping them make sense of the always-changing environmental challenges. To summarise, integrating sense-making theory into the theoretical framework of inclusive pedagogies for EE and lifelong learning sheds light on teachers' complex cognitive processes to comprehend, modify, and create meaningful learning opportunities within the distinct Ghanaian context. The idea sheds light on how teachers handle complexity, value diversity, and support the growth of adaptive and ecologically sensitive learners.

### Interpretive Paradigm

Understanding inclusive pedagogies in EE and life-long learning within the interpretive paradigm centres on the notion that people, especially teachers, actively create and interpret meaning considering their social interactions and life experiences. This strategy emphasises educational practices' contextually dependent and subjective character while acknowledging the diversity of Ghana's cultural, economic, and ecological environments. In interpreting inclusive pedagogies, teachers act as translators, contributing their distinct viewpoints, cultural experiences, and life stories. As teachers engage with students, communities, and the

larger socio-cultural milieu, it is critical to investigate how they see their responsibilities in fostering inclusive learning environments. This is made clear by the interpretative paradigm. The statement acknowledges that inclusive pedagogies are a product of continuous interactions and are not a universal approach. Teachers' sense-making perspectives are seen in this framework as dynamic processes shaped by the ongoing negotiation of meanings within the educational setting. Teachers actively interpret and modify inclusive pedagogies based on their pupils' changing needs and cultural variety. Considering the local context and situated knowledge in Ghana as the interpretative lens promotes a thorough examination of the conversations, relationships, and cultural subtleties that influence inclusive educational approaches.

Furthermore, lifelong learning is an ongoing meaning-making process within the interpretative paradigm. As knowledge translators, teachers are essential in creating a culture of lifelong learning, supporting flexibility, and promoting people's ongoing involvement with environmental concerns. To sum up, the interpretive paradigm emphasises the subjective nature of teachers' sense-making perspectives and the dynamic interaction of cultural and contextual factors within the Ghanaian educational setting. It offers a theoretical framework for understanding inclusive pedagogies in EE and life-long learning. This method comprehensively investigates the socio-cultural processes influencing inclusive teaching methods and lifelong learning.

### MATERIALS AND METHODS

Using a descriptive qualitative method, the study intends to explore how teachers make meaning of the inclusive pedagogies they implement in lifelong learning and EE. The design provides rich insights into how educators negotiate the challenges of inclusion in diverse educational environments, which includes an extensive examination of teachers' viewpoints, interpretations, and experiences.

Purposive sampling was used in this study to choose 10 teachers who have worked with inclusive pedagogies in environmental education and lifelong learning. Participants were selected based on their areas of expertise, representation from urban and rural educational contexts, and variety in teaching levels (e.g., elementary, and secondary school). The goal of this diversified sample strategy was to gather a variety of viewpoints that represent the diversity of the educational environment. Teachers' sense-making on inclusive pedagogies can be improved by using thematic analysis to find patterns, themes, and variances. This approach entails methodically classifying and categorising qualitative data to identify reoccurring patterns and produce a deep, nuanced knowledge of the topic under study. To guarantee the quality and depth of the findings, the analysis was iterative, including several cycles of coding and refining. Teachers who participate were given comprehensive details on the study's aim, methods, and possible

consequences. Informed permission was requested to ensure that participants were fully aware of their voluntary engagement and the confidentiality of their replies. Participants were granted the ability to leave the research at any time without penalty. To protect participant privacy, all data was anonymised before analysis and publication. Pseudonyms were used instead of identifying information, and any information that jeopardised participants' anonymity was eliminated or changed. The study intended to improve knowledge of inclusive pedagogies and encourage practical implementation solutions, which would benefit educators and the larger academic community. There was no coercion to divulge private information, and participation in the study was entirely optional. Teachers were told their involvement or withdrawal would not affect their relationships and professional status.

Participants received a summary of the study's main conclusions after the data-gathering procedure if they indicated interest. This debriefing session preserves transparency on the study's findings while recognising and appreciating the work of the teachers. To get a deep, contextualised knowledge of educators' experiences, a descriptive qualitative technique was selected for this study on teachers' sense-making on inclusive pedagogy in environmental education and life-long learning. By following moral guidelines, the study protected teachers' welfare, privacy, and voluntary involvement, which advances the ethical conduct of educational research.

**Study Participations**

A purposefully selected sample of teachers with a range of experiences adopting inclusive pedagogies in environmental education and lifelong learning from Mampong Municipality participated in the study. Eight participants selected from two public and two private school teaching in primary Class 3 were selected based

on their proficiency in inclusive practices, with various primary school teaching experiences included. I had teachers from 4 rural basic schools in the municipality. To promote diversity, the sample included instructors with a range of years of experience, considering the possible influence of tenure on their opinions on sense-making. The research prioritises teachers dedicated to inclusive education to provide in-depth insights into the possibilities, problems, and tactics of adopting inclusive pedagogies. The study aims to offer a thorough knowledge of how instructors negotiate the complexity of inclusive pedagogy in environmental education and life-long learning by incorporating participants from various backgrounds and educational situations.

**Data Collection Methods**

The study explored teachers' inclusive pedagogy in environmental education and lifelong learning using semi-structured interviews. Through semi-structured interviews, teachers can express their experiences, perspectives, and thoughts on implementing inclusive pedagogies on a customised platform. The subtleties of instructors' sense-making processes were captured through in-depth investigation made possible by these interviews. Encouraging the sharing of ideas, experiences, and cooperative reflections on inclusive pedagogy, complementing individual interviews and focus group discussions, will support the dynamic interactions among instructors. Using this approach, group conversations revealed shared interests and a range of opinions, offering a collective perspective. Combining these qualitative data-gathering methods fully conveyed the complexity and breadth of educators' understanding of inclusive pedagogies in environmental education and lifelong learning contexts.

**Data Analysis**

**Table 1:** Themes that emerged from the data analysis

Main theme	
Fostering Equity and Inclusion in Environmental Education	Sub-theme one: Celebrating Diversity and Unique Viewpoints
	Sub-theme two: Tearing Down Roadblocks to Learning
	Sub-theme three: Equity and Justice in Environmental Education
Inclusive Teaching Strategies for Climate Change Education	Sub-theme four: Diverse Learning Approaches
	Sub-theme five: Collaborative and Inclusive Learning Environments
	Sub-theme six: Culturally Relevant Teaching Strategies
	Sub-theme seven: Technology for Accessibility
Navigating Challenges for Inclusive Pedagogies	Sub-theme eight: Difficulties in applying personalized teaching pedagogy
	Sub-theme 8: Resource constraints
	Sub-theme nine: Collaboration and Communication

**Theme One: Fostering Equity and Inclusion in Environmental Education**

The focus "Fostering Equity and Inclusion in Environmental Education" is on teachers' interpretation and dedication to establishing a learning setting that

values variations and guarantees everyone's equitable access to EE. Participant emphasises how crucial inclusive pedagogies are, which traverse exclusively recognising diversity to proactively confront structural issues and advance justice. This subject also emphasises how EE can

cross social conventions and boundaries to build a feeling of responsibility and care for the environment.

### **Sub-Theme One: Celebrating Diversity and Unique Viewpoints**

The subject of “Celebrating Diversity and Unique Viewpoints” highlights the essential part that IP plays in fostering an exciting atmosphere for teachers seeking to achieve the goal of EE. The brief quote provided below highlights a shared dedication to appreciating and acknowledging the many positions, experiences, and dexterities that each learner contributes to EE and the learning environment. According to them’

Developing a welcoming and valued educational atmosphere is a key component of inclusive pedagogies. In my case, I see IP as respecting and appreciating the many individualized perspectives, experiences, and talents that every child adds to classroom education (Participant 1)

In my experience, inclusive pedagogies in environmental education entail fostering a classroom atmosphere where each student is respected for who they are, despite their diversities. We need to understand that children differ in various ways (Participant 4).

The goal of inclusive pedagogies in environmental education is to value children’s differences and richness. Basically, this notion entails proactively implementing diverse cultural viewpoints into our curriculum and lesson plan rather than just recognising distinctions (Participant 8).

The participants’ views convey an identical dedication to fostering a diverse and inclusive educational setting in EE. About environmental education, the participant’s narration that “ inclusive pedagogies in environmental education entail fostering a classroom atmosphere where each student is respected for who they are, despite their diversities” probably refers to instructional strategies and tactics that are intended to accept and accommodate students with a variety of backgrounds, skills, and learning preferences. This remark implies that the teaching strategies that teachers use in environmental education seek to establish a friendly and inclusive atmosphere for diverse educational, economic, demographic, economic and other backgrounds. In this context, “diversity” might refer to variations in ability, social class, sex, colour, ethnicity etc. The ultimate objective is linked to a broader spectrum of students who might access and benefit from environmental studies. Teachers stressed how important it is to acknowledge and value each student’s distinct viewpoints, experiences, and skills. When we talk about environmental education, inclusion is modifying the curriculum to fit different knowledge acquisition processes and skill levels so that each student feels respected and accepted for who they are.

### **Sub-Theme Two: Tearing Down Roadblocks to Learning**

By examining Breaking Down Barriers to Learning in environmental education, teachers shed light on the inclusive pedagogies’ transformational potential. Two

participant comments highlight how important inclusive teaching strategies are to break down obstacles that might prevent learners from actively participating in class and understanding environmental subject matter. Their ideas are evident in the data below:

Thank you very much. As far as I know, inclusive pedagogies in environmental education involve removing obstacles to learning for children. It is essentially about recognising and meeting the various requirements of pupils in order to guarantee everybody may fully engage and flourish. That is, it! (Participant 5).

Thank for you your question. Inclusive pedagogy simply describes that fairness and justice are at the centre of environmental learning. It has to do with recognising systemic difficulties that some pupils may experience while attempting to acquire and comprehend environmental ideas. (Participant 7)

Teachers remark that “It has to do with recognising systemic difficulties that some pupils may experience” and emphasise that inclusive pedagogies necessitate a critical awareness of institutional obstacles that some students may face while attempting to learn environmental ideas. This theme emphasises the need for teachers to identify and address architectural hurdles that prevent some students from gaining a complete knowledge of environmental concerns. To provide effective and fair education, their view emphasises the significance of creating a welcoming classroom that tackles and lessens such persistent problems. Therefore, teaching techniques and resources must be tailored to diverse learning styles and abilities to create inclusion in environmental education.

### **Sub-theme Three: Equity and Justice in Environmental Education**

For us to ensure a resilient and welcoming society, environmental education must prioritise fairness and justice. This is particularly true because as we face global environmental concerns, educational efforts must provide fair access and opportunity for all learners. In the opinion of two participants five and 8 should foster equity and fairness in environmental education:

When we talk about inclusion, it is a very broad idea, especially in environmental education. This philosophy is related to educating students about the environment and helping them develop a feeling of responsibility and concern for it, irrespective of their own experiences (Participant 5).

To ensure that students can benefit from each other’s varied experiences and viewpoints, inclusive pedagogies also entail building a feeling of community inside the classroom. (Recipient 8)

Participants established in the theme “Equity and Justice in Environmental Education” that there is a close relationship between the quest for equity and justice and inclusive pedagogies. The replies show a common dedication to environmental education as a transforming force that cuts over conventional barriers and aims

to implant in all students, no matter their background, a feeling of duty and concern for the environment. In addition to teaching about the environment, this subject highlights educators' views on how inclusive pedagogies may encourage a commitment to fair and just behaviours, which can work as a catalyst for social change through environmental education. This viewpoint emphasises the comprehensive character of inclusive teaching strategies, stressing the significance of establishing a relationship with oneself and an obligation to environmental stewardship in addition to informational content. The participants note that the long-term objective of inclusion pedagogy is to help children develop a true feeling of responsibility and a greater awareness of the environment they live in.

### **Theme Two: Inclusive Teaching Strategies for Climate Change Education**

The theme "Inclusive Teaching Strategies for Climate Change Education" is connected to the pedagogical strategies that support a varied and inclusive educational setting in climate change education. This theme emphasises the approaches teachers use to teach pupils from a variety of backgrounds, making the conversation about climate change understandable and relevant to everyone. The thematic analysis generated four sub-themes including Diverse Learning Approaches, Collaborative and Inclusive Learning Environments, Culturally Relevant Teaching Strategies and Technology for Accessibility.

### **Sub-Theme Four: Sub-Theme: Diverse Learning Approaches**

According to the teachers who were interviewed, various learning approaches are incorporated to meet the diverse abilities and needs of the students when learning about climate change in environmental education. Some said, There are several teaching approaches available but it depends on the lesson objectives. In the case of climate change education, I use a project-based learning strategy. This approach enables students to look out for climate change concerns practically and customise their projects to match their abilities (Participant 1).

Okay, normally because we aim to accommodate diverse learning styles and skill levels and make sure that every student can relate to the theme of the lesson, I usually incorporate differentiated instruction strategies (Participant 4).

To provide a variety of learning experiences that meet the needs of various student preferences, I integrate experiential learning opportunities, including field excursions and outdoor activities, to supplement classroom teachings (Participant 7).

As demonstrated by the subject "Diverse Learning Approaches," teachers use a range of instructional strategies to meet student's diversities and strengths. The remarks made by Participant 1 highlight the use of a "project-based learning" methodology and stress the need for personalised projects and practical

experiences to help learners comprehend climate change. Teacher 4 adds to this by stressing the incorporation of differentiated instruction strategies, making sure that different approaches to learning and capacities are taken into account. The additional statement from Teacher 7 emphasises the value of practicable, real-life scenarios in advancing students' awareness of climate change and strengthens this subject by offering experiential learning opportunities, including excursions and adventures. The goal is to give pupils a variety of resources and chances to comprehend and interact with lessons when it comes to tackling climate change problems. The evidence demonstrates that it involves conversations, group projects, field visits, real-world demonstrations, and others. The intention is to provide students with the freedom to investigate and understand topics related to climate change to fit their unique learning styles and capacities.

### **Sub-Theme Five: Collaborative and Inclusive Learning Environments**

Collaborative and inclusive learning environments are classrooms that value student participation and accept diversity in all facets of the educational process. Teachers' views suggest that they adopt the creation of collaborative and inclusive learning settings for the students in environmental education as demonstrated by the quote:

I use a collaborative learning paradigm where I allow students to collaborate in various teams. I do this because I want them to understand and deal with climate change concerns by utilising each other's talents (Participant 3). Because Ghana is not an island, I include a global perspective in my teaching approaches. I frequently collaborate with teachers and other students from across the world via virtual exchanges and group projects (Participant 4).

I promote diversity by matching students from different backgrounds and skills to learn from one another and develop a friendly learning community (Participant 6).

Another strategy is organising community involvement projects. This has enabled students to collaborate on projects that solve domestic community climate change concerns, promoting a feeling of collaborative accountability (Participant 7).

I combine student-organized conversations and tasks, which allows students to take control of their learning and offer their unique viewpoints on the climate change issue. For example, to understand the value of teamwork, I created a group project where students had to design an extensive climate action plan for the school. This programme is recognised and applied in tackling the issues of climate change by promoting cooperation and giving learners of varying capacities the chance to help in numerous capacities. (Participant 8).

The evidence demonstrates how teachers are that are committed to creating welcoming and stimulating environments for diverse students. In addition to stressing

the value of cooperation and utilising individual talents to address environmental issues and concerns together, participant 3 strongly emphasises the application of collaborative learning techniques. Teacher 4 takes this theme a step further by introducing an international viewpoint via online discussions and group projects, which encourages students all around the world to feel linked to one another. Participant 7 statement “This has enabled students to collaborate on projects that solve domestic community climate change concerns, promoting a feeling of collaborative accountability” posits that the adoption of inclusive and collaborative learning settings has resulted in students taking a proactive role in initiatives that attempt to solve environmental issues in their communities. This method encourages collaboration among students and the application of information to problems encountered in the actual environment, traversing the usual classroom setting. This places equal accentuation on helping students develop a sense of unified accountability for the results of their group projects as much as on academic information acquisition.

#### **Sub-Theme Six: Culturally Relevant Teaching Strategies**

To meet the differences among the students, participants in the study indicated that, culturally relevant teaching strategies are used in environmental education. They do this by connecting the lesson to the origin of the students. The quotes below demonstrate this point:

I make environmental education more approachable for pupils by using culturally sensitive teaching techniques, including local instances and traditional understanding into my classes on climate change (Participant 3).

To make the curriculum relevant to our kids’ real-life situations, I host guest speaker sessions where I invite leaders and professionals from the community to give their perspectives on climate change (Participant 5).

I include stories and literature from many ethnic backgrounds in my teachings to ensure students may relate to them on a personal and cultural level. The story-telling strategy promotes empathy and a better grasp of the intersectionality of climate challenges in addition to giving a forum for different points of view (Participant 6).

The information supplied by the study participants points to their dedication to tying environmental education to their pupils’ lives and cultures. They stress how important it is to make environmental education approachable and applicable by emphasising the incorporation of age-old knowledge and local instances into the curriculum. Additionally, they use storytelling and written texts from a variety of ethnic origins, giving the students stories that relate to their cultural heritage. When taken as a whole, these remarks highlight the teachers’ commitment to fostering a culturally inclusive learning environment and their grasp of the value of local viewpoints and cultural relevance in advancing students’ comprehension of climate change.

The data suggest that students who use the storytelling

method develop empathy and feel more deeply connected to the problems caused by climate change. This also improves their comprehension by exposing the complex intersectionality of environmental problems and showing the connections between climate-related difficulties and more general social, economic, and cultural variables. Furthermore, this tactic guarantees a greater inclusive learning environment where a variety of viewpoints add to an exhaustive investigation of climate change by offering a platform for opposing viewpoints.

#### **Sub-Theme Seven: Technology for Accessibility**

According to the interviewee, technology is leveraged to teach so that teaching and learning can be more appealing and make environmental education content accessible to every child despite their background.

I make use of the Universal Design for Learning principles, offering a variety of representational, interactive, and expressive mediums to ensure children with diverse abilities and backgrounds can take part in the learning process. This guarantees that data on environmental education is delivered in a variety of ways that suit different tastes and styles. Using interactive simulations, data visualisations, and films, I can convey complicated material to a wide audience of students by utilising technology. (Participant 1).

I use technology to improve accessibility, ensuring that all the children can interact with the environmental education content through the use of multimedia materials and assistive devices. Students may cooperate, share ideas, and participate in conversations using digital platforms, which encourages diversity by giving a platform for a range of views to be represented. Besides this, I make use of interactive web tools that accommodate a variety of learning preferences and skill levels and let learners investigate the complex aspects of climate change (Participant 2).

Through the use of virtual reality simulations, I make the material appealing and readily available to a wider range of learners by giving them the chance to witness climate change situations directly (Participant 6).

My approach to group projects involves utilising digital channels, which enable students to virtually work together on climate change activities and exchange viewpoints, therefore fostering an inclusive environment (Participant 7). I have observed that some of the learners like aural learning, so I provide podcasts and audiobooks as alternate resources. This way, I can make sure that a variety of materials are available to suit various types of learning. As example, I launched a podcast initiative on climate change topics to improve accessibility and serve students with auditory impairments. Through research and creating podcasts, students were able to explore subjects orally. This project enhanced the entire educational process by integrating various media into the environmental education curriculum, in addition to offering a substitute resource for individuals who like auditory learning. This guarantees an inclusive learning

environment by enabling every learner to demonstrate their understanding of the subject matter in a way that aligns with their unique abilities and tastes (Participant 8). The interviewee's methods, which emphasise a wide range of representational, interactive, and expressive media to encourage children from all walks of life to participate in their education, are based on the ideas of Universal Design for Learning. Incorporating technology is essential to improving accessibility; multimedia resources and assistive devices are prioritised to guarantee that all kids can interact with environmental education materials. Interestingly, Cho and Park (2023) note that virtual reality simulations seem to be an effective technique that increases the accessibility of instructional content by putting students in climate change situations. The dedication to diversity also extends to group initiatives, where digital platforms allow for virtual cooperation on climate change-related activities, creating a space that welcomes a range of opinions. The inclusion of podcasts and audiobooks, which appeal to individuals who prefer auditory learning, reflects the interviewee's astute awareness of diverse learning preferences. This creates an extensive and easily accessible instructional model that supports a range of studying modes.

The statement from Participant 10 emphasizes the dedication to promoting diversity in the classroom by using a customized strategy. This educational method recognizes and supports a variety of learning styles by letting students express their comprehension in a way that best suits their skills and preferences. In addition to fostering an accessible and fair classroom, this personalized technique celebrates and acknowledges the unique abilities and needs of each student, making for a fulfilling and deeper educational experience.

### **Theme 3: Navigating Challenges for Inclusive Pedagogies**

This theme encapsulates the various challenges teachers face in utilizing inclusive pedagogies in EE including the proposed solutions. The themes that emerged are Difficulties in applying personalized teaching pedagogy, resource constraint and communication and collaboration.

#### **Sub-Theme Eight: Difficulties in Applying Personalized Teaching Pedagogy**

Participants in the study commonly agreed that one of the dominant challenges of the experience is applying customising teaching methods in EE as shown by the data below.

Based on my observations, a common difficulty that teachers including myself have is implementing inclusive pedagogies, mostly because of the complexity of customising methods to meet the needs of each unique student. The challenge is that it necessitates dealing with variations in learning styles, aptitudes, and other personal traits, which can be laborious and lengthy. Careful preparation is necessary to balance the various requirements and learning styles in environmental

education and lifelong learning. To ensure that every student has the help they need to succeed academically, it becomes essential to carefully allocate resources (Participant 5).

The challenging effort of customising techniques for each student frequently impedes the uptake of inclusive pedagogies is what we frequently face. Tackling many demands and learning preferences seen in both environmental education and lifelong learning environments is not easy. To effectively navigate this obstacle and guarantee that every student has the assistance they need for optimal learning, as teachers we must use careful planning and deliberate resource appropriation (Participant 7).

The recurring theme in the given interview replies is the complex task teachers confront when implementing inclusive pedagogies, especially when it comes to customising lessons for each student in environmental education and lifelong learning. The replies again draw attention to how difficult it is to strike a balance between students' various demands and learning preferences. We can deduce from the responses that planning carefully and using resources strategically are necessary to create an inclusive learning environment that accommodates individual variations, a job many teachers struggle with. The focus on extensive preparation highlights how crucial it is to have a vision and give these obstacles careful attention to overcome them. The theme additionally communicates an agreement that the efficient execution of inclusive pedagogies requires proactive measures that ensure faire resource allocation and individual attention in addition to a commitment to individualised techniques. In all, this issue emphasises how complicated inclusion in education is and how important it is for teachers to navigate these specifics on behalf of different students.

#### **Sub-Theme Nine: Resource Constraints**

Resource limitation was also cited by the participant as one of the problems hampering the successful implementation of EE, particularly climate change. This is echoed in the extract below:

Adopting inclusive pedagogies is frequently hampered by the problem of resource constraints. For example, students lack access to current technology, including laptops or tablets and the Internet. We advise that schools should establish alliances with nearby companies and community groups that can help solve this by offering more resources and assistance. In this case, working with a nearby tech business we can have access to these gadgets, closing the digital gap in lifetime learning and environmental education (Participant 1),

Yes, we have a resource availability challenge. It has to do with a dearth of modern learning resources, such as laboratories and textbooks. Educators can address this limitation in many ways. I believe that making the most use of the resources at hand may be achieved through cooperative lesson preparation and sharing the few available resources within and across schools in the

country. This might be lending out textbooks, lab supplies, or internet access to learning resources (Participant 2).

As we tackle the issue of resource scarcity, we find that the application of inclusive pedagogies is hampered by a dearth of different learning resources, such as instructional aids and textbooks. Utilising digital platforms and freely available instructional materials is a successful way to lessen this difficulty. Expanding access to learning resources may be achieved by utilising digital platforms like Coursera, Khan Academy, or educational applications. My interaction with other teachers has shown that this method will expand the pool of resources at our disposal and promote fluid and participatory learning, especially for students who find it difficult to study using conventional tools (Participant 5).

The evidence points to the complex issues surrounding resource constraints when it comes to implementing inclusive teaching strategies for environmental education and lifetime learning. Every answer identifies one or more particular resources that are missing, from different educational resources like textbooks and laboratories to necessary modern technology like laptops or tablets and the internet. The data indicate how students' participation in and access to inclusive educational experiences are seriously hampered by resource shortages (Loskoto, 2004). But each response's following suggestions for solutions show how to overcome these actively and innovatively. Participant views repeatedly highlight creative and cooperative ways to deal with resource constraints, either by organising community-based initiatives, combining online resources and free educational materials, or cultivating ties with nearby companies. To promote inclusiveness in learning settings, it is critical to identify particular resource deficits and advocate for viable options that make use of technology, community participation, and innovative teaching strategies as highlighted by the collective analysis.

#### **Sub-Theme Ten: Collaboration and Communication**

Three teachers agreed that Collaboration and Communication among the students impede successful environmental education inclusive pedagogies. Participants said that;

The difficulty is about how students with different backgrounds and learning styles can team up and communicate successfully, which presents a difficulty. The problems are caused by different languages and diverse communication styles. So, I have introduced organised group projects as a focused method after realising this. These initiatives aim to promote collaboration, clear communication, and idea sharing. This has assisted the learners to participate in inclusive learning activities that promote a feeling of community and mutual understanding by providing a facilitative atmosphere for cooperation (Participant 4).

I have noticed clearly from addressing the problem of cooperation and communication that conventional teaching approaches cannot always support productive

group projects. In order to get around this, I have included a digital platform for cooperation in the learning process. I did that so that students may collaborate on projects, exchange materials, and interact in real-time using platforms including Slack and Discord. This strategy has at least some of them and also advances diversity by giving a platform to a range of viewpoints (Participant 7). Another problem is teamwork and communication. Some don't prefer participating in group work whereas some too dominate the conversation. They are unable to communicate well because of their differences. As a result, I have started a mentoring programme that matches students according to their areas of strength and growth. In addition to fostering peer support, this improves communication abilities. Presently students are better able to handle group activities when due to the establishment of these mentoring connections, which develop a team-based and inclusive atmosphere in environmental education and lifetime learning (Participant 8).

The combined answers from the interviews illuminated the complex problem of cooperation and communication in the framework of inclusive pedagogies. Every response begins by outlining the problem and highlighting the challenges that students have while collaborating because of their varied backgrounds and learning preferences. They include language barriers, lack of willingness to participate in group activities, and divergence in communication styles. The issues that have been brought to light include the necessity of organised collaborative endeavours, the shortcomings of conventional teaching strategies, and the difficulties in promoting productive cooperation. Consequently, the solutions put forward demonstrate a proactive and customised strategy for conquering these obstacles. Digital engagement platforms (WhatsApp, skype and video conference) as well mentoring initiatives, and technological integration to support in-the-moment communication and project work are examples of interventions recommended by study participants. The proposed interventions stress how critical it is to establish settings that promote cooperation, dialogue, and idea-sharing. All things considered, the answers highlight how complex cooperation and communication are in inclusive teaching methods and call for creative ways to improve these vital components of the educational process.

## **RESULTS AND DISCUSSIONS**

The analysis highlights the united effort of teachers in environmental education to cultivate a varied and inclusive classroom. A common thread running across the conversations is the commitment to fostering an environment in the classroom where each student's uniqueness is valued, regardless of their varied experiences. This dedication includes implementing various inclusive pedagogies designed to meet the needs of learners with a range of abilities, origins, and interests (Lacar, 2021).

Inclusive pedagogy as the analysis suggests emphasises the identification and resolution of persistent obstacles that

some students encounter when acquiring environmental concepts. Instructors emphasise the significance of critical awareness of barriers, which calls for the discovery and removal of systemic barriers that prevent some pupils from fully comprehending environmental issues. To provide an efficient and equitable education, the aim is to establish a friendly classroom environment that actively seeks to lessen enduring issues while also acknowledging students from a variety of backgrounds.

The relationship that exists between inclusive pedagogies in environmental education and fairness and justice is also important. Teachers perceive EE as a transforming power that imbues all pupils, regardless of their social class, with a sense of obligation and care for the environment, transcending conventional boundaries (Sims & Desmarais, 2020). Including inclusive pedagogies emphasises the importance of teaching practices that build an attachment with the student and a duty to environmental stewardship and is viewed as an engine for social transformation. This common viewpoint supports the overarching goal of encouraging children to take accountability and develop an increased awareness of their surroundings (Atuguba, J2019).

One of the study's objectives was to explore the various teaching methods teachers use in environmental education. The findings indicate that teachers use a variety of teaching strategies to accommodate the varied abilities and learning styles of their pupils. They are project-based learning, differentiated instruction, field trips, real-life scenarios, collaborative learning, and online debates with opinions from across the world. An earlier study by Loskota (2004) demonstrates teachers need to blend different teaching strategies in EE. The unifying objective is to accommodate diverse learning preferences and capabilities by offering learners a range of chances to interact with and grasp topics related to climate change. Teachers emphasise cultural inclusion as well, realising how important it is to connect environmental education to students' lives and cultures. This entails combining traditional wisdom, case studies from the area, narratives, and literary works from various ethnic backgrounds. The main goal is to establish an educational setting that is inclusive of all cultures and strengthens students' understanding of climate change concerns by highlighting how environmental challenges are influenced by social, economic, and cultural factors. According to research, infusion, conventional, and unconventional EE programmes have to be employed in conjunction with one another across disciplines to uphold sustainable ideals.

The use of technology and UDL concepts is seen as essential for advancing inclusivity in environmental education. According to Sims and Desmarais (2020), it is crucial to employ a variety of representational, interactive, and expressive media, such as WhatsApp, skype, podcasts, and audiobooks. These tools are purposefully used to accommodate a range of learning styles and guarantee a thorough and user-friendly teaching approach that

accommodates many learning modalities. According to Root-Bernstein *et al.* (2014) people naturally use these tools when they connect with nature. This means that we can use these tools in programs to teach about protecting the environment. By focusing on these skills, we can make education better and check how well it is working. The analysis further reviews the many challenges the execution of environmental education faces. They are resource limitations, difficulties in applying personalized teaching pedagogy and collaboration and communication. Participants all agree that developing innovative and cooperative solutions is crucial. It is advised to use online resources, community-based projects, and collaborations with nearby companies to address the lack of textbooks, labs, technology, and internet connectivity. The group's answers highlight a proactive strategy for resolving resource constraints and advancing inclusivity in educational environments. Loskota (2004) also found other obstacles that primary educators must overcome, such as a shortage of funding for fieldwork, a lack of managerial assistance, and a lack of training in teaching EE. There are difficulties in the areas of collaboration and communication as well. Challenges mentioned by the participants include different communication styles, unwillingness to get involved in group activities, and language limitations. However, suggested remedies including tech integration, mentorship programmes, and digital engagement networks seek to create atmospheres that encourage collaboration, communication, and idea exchange. A consistent commitment to inclusion in EE is revealed in this study. In the face of many obstacles, everyone's dedication by creative thinking, ingenuity, and team effort emphasises how crucial it is to establish an entirely inclusive learning environment that meets the various requirements and backgrounds of all learners.

## CONCLUSION

The study's conclusions show how strongly educators want to provide a welcoming environment for EE. The conversations highlight the complexity of inclusive pedagogies and show how varied pupils are actively and respectfully involved in a community that is addressing issues together. Together with creative teaching techniques and technological insertion, teachers' commitment to fairness, justice, and cultural inclusion shows how hard they work to ensure that EE is useful and available to everyone. The proactive ideas put forth by the participants demonstrate a common will to go over obstacles like resource limitations and communication problems in order to give students a comprehensive and inclusive educational experience.

## Recommendations

The study's suggestions for action highlight the necessity of providing teachers with chances for continuous professional development. Seminars, conferences and training courses can improve their abilities to use inclusive pedagogies, make effective use of technology, and come

up with innovative solutions to resource limitations. Furthermore, encouraging cooperative efforts between companies, communities, and schools can assist address resource constraints and improving the inclusion of EE. To make inclusion a cornerstone of educational policy, legislators should also think about incorporating these inclusive education approaches into the larger curricular framework. By following these suggestions, teachers, administrators and legislators may work together to create an educational climate that is more egalitarian and inclusive and guarantee that EE is a transformational tool that is available to all children.

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