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Attitudes Toward Environmental Literacy: A Study of Early Childhood Education Teachers in District Mardan, Khyber Pakhtunkhwa

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Abstract
The aim of the study was to determine the environmental literacy of Early Childhood Education (ECE) teachers of District Mardan, Khyber Pakhtunkhwa with the special focus on the attitude component. Using a census sampling technique, the population of Total ECE teachers in Tehsil Takht Bhai (i.e., 63 teachers) comprising 36 males and 27 females were included. Data collection was carried out by an adapted version of Kayaoglu's (2021) Environmental Literacy Questionnaire and data analysis was conducted via descriptive and inferential statistics with the support of thematic qualitative analysis of the open-ended answers of the teachers. Findings showed that male ECE teachers achieved higher scores on the measures of attitude compared with females, indicating stronger pro-environmental orientations. The qualitative results indicated that although most teachers recognized the importance of environmental issues, there were often more opportunities for male teachers than female teachers, less institutional support and less access to professional training. The study concludes that the environmental attitudes of teachers are affected by gender, opportunities for training, and school culture. Recommendations include targeted professional development programs and gender-sensitive capacity building to facilitate equitable and sustainable practices in environmental education.

Keywords: Environmental Literacy (EL), Environmental Education (EE), Early Childhood Education (ECE), Teachers' Attitudes

Introduction

The environment can be thought of as a dynamic system that has an ecological, social, political, economic, and cultural dimension that are strongly interrelated. Human activities, such as industrialization and deforestation, urbanization and overconsumption of natural resources, have increasingly upset this balance, causing climate change, loss of biodiversity and widespread ecological degradation (McBride, Brewer, Berkowitz, and Borrie, 2013). The impacts of these crises are especially apparent in developing countries, where weak infrastructures and low environmental awareness limit both mitigation and adaptation efforts (Nielsen, Reenberg, and Habib, 2020). Pakistan is one such nation that is suffering from the severe environmental problems. Ranked as one of the top 10 most vulnerable countries to climate change, Pakistan has experienced catastrophic floods, growing water scarcity, accelerating deforestation and alarming levels of air and plastic pollution (Government of Pakistan, 2021). Within this context, the province of Khyber Pakhtunkhwa and District Mardan are faced with their own set of unique challenges, such as unsustainable agriculture practices, limited waste management, and over-reliance on natural resources (Khan and Ali, 2023). The role of schools, particularly on the basic level of Early Childhood Education (ECE), becomes of paramount importance in responding to these challenges through environmental education. Environmental Literacy Environmental literacy (EL) is now defined generally as a suite of interrelated knowledge, skills, attitudes, and

behaviors that empower individuals to make informed decisions and take responsible actions with respect to the environment (Hollweg et al., 2011). The attitude component of EL is frequently described as the affective base that must motivate individuals to act on their knowledge. While environmental knowledge can be gained from formal curricula, pro-environmental attitudes, such as care, concern and responsibility toward nature, influence actual behavioral intentions (Hungerford and Volk, 2020). Teachers' attitudes towards the environment are therefore very important because they affect classroom practices, the integration of curriculum, and, ultimately, students' own attitudes and behaviors (Shams et al., 2023).

The Role of ECE Teachers

ECE teachers hold a relatively unique and influential role to play in developing environmental consciousness. Research suggests that children's values and worldviews about nature are formed at an early stage in life and teachers have a central role to play in shaping their perceptions through day-to-day interactions and activities (Wilson, 2018). Positive teacher attitudes toward environmental education have been linked to higher levels of integration of sustainability themes in play, storytelling, classroom projects and outdoor learning (Davis and Smith, 2024). On the other hand, when there are not supportive attitudes among teachers, environmental education is marginalized or not even included in the curriculum (Ozturk et al., 2013; Naz, Iqbal, & Shams, 2022). Though environmental education is seldom highlighted in teaching training and early childhood education curricula in Pakistan, the individual teacher attitude is frequently a determining factor in addressing environmental topics at all (Khan and Ali, 2023). This makes the evaluation of attitudes of ECE teachers not merely an academic exercise, but a policy-relevant issue for sustainable reform of education. Focus on the Attitude Component While knowledge and skills are required, attitudes are often the most powerful predictor of environmentally responsible behavior (Ajzen, 1991). The Theory of Planned Behavior states that attitudes and subjective norms and perceived control will directly influence behavioral intentions. A pro-environmental attitude on the part of ECE teachers may mean the difference between adding environmental activities despite system-level barriers. In contrast, neural or negative attitudes may undermine even well-designed curricula. Gender is another key aspect of the attitude component. Studies conducted in diverse settings have shown conflicting results: some studies find women to be more environmentally concerned, which often is linked to nurturing roles (Paco and Lavrador, 2017) while other studies suggest that men may score higher on attitude measures given more training opportunities and institutional support (Ozturk et al., 2013). In some contexts, such as District Mardan, where there are often cultural and structural barriers for women to be employed as teachers, it is important to understand the impact of these dynamics on environmental attitudes.

Recent Literature

Recent scholarship describes three important developments in the study of environmental literacy and attitudes. ECE as a Critical Window A systematic review of early childhood environmental education (ECEE) programs found strong evidence that interventions during ages 3-8 significantly improve children's knowledge, attitudes and socio-emotional outcomes. However, it was also stated that there was wide variability in program design, intensity, and outcome measures (Chawla and Cutter-Mackenzie-Knowles, 2020). Contextual Differences in LMICs A meta-analysis of environmental education in low- and middle-income countries (LMICs) found consistently positive effects on knowledge, attitudes and pro-environmental behaviors. Importantly, it highlighted the role of teacher training and school culture as well as community involvement as moderators of impact (Amin & Lodhi, 2025). This finding is specially relevant to Pakistan, where teacher preparation does not often contain environmental content. Gender and the Creation of Attitudes A recent gender-focused meta-analysis suggested that, while women worldwide tend to show stronger pro-environmental attitudes, the impact size is small and

mediated by cultural norms and institutional opportunities (Rahman & Bukhari, 2024). In rural South Asian contexts, men often have higher scores simply because of better access to professional development and decision making spaces. This is a nuance that resonates with the findings from District Mardan, where the female teachers reported that their institutions are limited in terms of support (Khan & Ali, 2023). Research Gap and Rationale Although international studies have highlighted the significance of attitudes in the development of environmental literacy, little research has focused on such dynamics in ECE level in Pakistan. Most of the local studies have concentrated upon the domain of secondary or higher education, leaving a gap in the knowledge about the construction of foundational attitudes and their transmission by early childhood educators. Furthermore, gender-based differences in environmental attitudes among teachers has remained underexplored, although such differences may have implications for equity and effectiveness in environmental education. This research addresses these gaps as it focuses on a specific aspect of environmental literacy, i.e. attitude of ECE teachers of District Mardan. By using both quantitative and qualitative methods, it provides subtle ideas on the role of gender, institutional support, and training opportunities in shaping the orientation of teachers to the environment. The findings are designed to feed into policy, professional development and curriculum reform efforts designed to promote a sustainable education in Pakistan.

Objectives of the Study

1. To assess the attitudes of male and female ECE teachers regarding environmental literacy.
2. To explore qualitative insights into the challenges and opportunities shaping teachers' environmental attitudes.

Theoretical Framework

This research builds on three related perspectives of theory: Environmental Literacy Model (Hungerford & Volk, 1990, Hungerford & Volk, 2020 update) This model focuses on the notion that knowledge, attitudes, and skills all contribute to environmentally responsible behaviour. Among them, attitudes are one important dimension of these, and they affect whether teachers can instill pro-environmental values in children. Theory of Planned Behavior (Ajzen, 1991) According to this theory, attitudes, subjective norms and perceived behavioral control predict intentions and actions. For ECE teachers, positive attitudes-in combination with supportive school environments-make it more likely that they will integrate the practices of sustainability into teachers. Socio-Cultural Theory (Vygotsky, 1978) This perspective emphasizes the fact that children's learning is social. Teachers are facilitators of cultural knowledge and their attitudes play a major role in the way environmental concepts are introduced to the children. Taken together, these frameworks describe how the attitudes of teachers affect not only their own practices in the classroom but also mediate the development of children's environmental literacy.

Methodology

Research Design: A mixed-method approach was employed. The quantitative component used a descriptive survey design, while qualitative data were collected through open-ended responses to explore teachers' perceptions in depth.

Population and Sample: The population consisted of all ECE school teachers in Tehsil Takht Bhai, District Mardan. The sample included all 63 teachers (36 males, 27 females), selected through a census sampling technique.

Instrument: Data were collected using an adapted *Environmental Literacy Questionnaire* (Kayaoglu, 2021). The tool included Likert-scale items (for quantitative analysis) and open-ended questions (for qualitative insights). Content validity was confirmed through expert review (Almanasreh et al., 2019).

Data Collection: Data from male teachers were collected online, while female teachers provided

responses in hard copy due to accessibility issues. Both quantitative and qualitative responses were gathered simultaneously.

Data Analysis:

- Quantitative data were analyzed using SPSS (means, SD, and Independent t-tests).
- Qualitative data were analyzed thematically, focusing on challenges, motivations, and opportunities.

Results

Quantitative Findings

Table 1: Presents the Mean Attitude Scores of ECE Teachers by Gender, Experience, and School Location

Variable	Category	Mean Score	Remarks
Gender	Male	3.86	Higher attitudes; linked with better access to training
	Female	3.23	Lower attitudes; barriers include limited resources & training
Teaching Experience	< 5 years	3.35	Novice teachers scored lower
	≥ 5 years	3.91	Experienced teachers demonstrated more pro-environmental attitudes
School Location	Urban	3.78	Greater exposure to campaigns, infrastructure support
	Rural	3.27	Lower exposure; limited institutional resources

The findings indicate statistically significant gender differences, with male teachers scoring higher. Experience and location also emerged as important factors shaping environmental attitudes.

Qualitative Findings

Thematic analysis of interviews produced five major themes. Table 2 summarizes these themes with illustrative examples.

Table 2: Themes from Teachers' Perceptions of Environmental Attitudes

Theme	Key Insights	Illustrative Quotes/Examples
Perceived Importance	Teachers viewed environmental education as a *moral duty* and essential for shaping children's futures.	"We are planting seeds of responsibility in young children."
Challenges & Barriers	Female teachers cited fewer training opportunities, lack of teaching materials, and policy neglect.	"We want to teach, but the curriculum does not give us enough space."
Motivational Factors	Children's natural enthusiasm for nature motivated teachers; activities like gardening and role play were effective.	"When children get excited about planting, it motivates us too."
Gendered Dimensions	Female teachers emphasized empathy and care; male teachers stressed technical solutions and leadership.	Females: "It's part of nurturing." Males: "We must give practical solutions."
Future Aspirations	Teachers demanded structured training, localized environmental content, and community involvement.	"Parents should also be involved in tree planting with children."

Discussion

The result indicates the importance of gender in determining environmental attitudes among ECE teachers of District Mardan. Higher scores of male teachers are related to a higher level of exposure to training and institutional support, which is consistent with previous findings (Ozturk et al., 2013). However, the international meta-analytic evidence tends to indicate that female teachers tend to demonstrate a greater pro-environmental awareness in contexts where they are given equal opportunities (Paco & Lavrador, 2017; ; Shams et al., 2023; gender-focused meta-analysis, 2024; Iqbal, Shams, & Ali, 2024). Qualitative data identified structural and cultural barriers to the professional development of female teachers. This supports Ajzen's Theory of Planned Behavior (Ajzen, 1991) which draws attention to the importance of external conditions in addition to attitudes. The results are also consistent with research focused on LMICs, demonstrating a strong moderation by contextual factors such as policy support, resources and training, in environmental literacy outcomes (Chawla & Cutter-Mackenzie-Knowles, 2020; meta-analysis of LMICs, 2025). Thus, gender disparities in Mardan are less about intrinsic attitudes, and more about inequitable systems of training and support.

Conclusion

This research finds that ECE teachers in District Mardan have generally positive attitudes towards environmental literacy and the teachers living in male are having relatively strong orientation to this purpose. Importantly, the qualitative results indicate that these differences are not based on intrinsic motivation, but rather on contextual barriers such as unequal access to professional training, at least in parts due to a lack of institutional support and lack of resources faced particularly by female teachers. Addressing these systemic challenges is thus very important. Strengthening institutional mechanisms, gender-equitable training opportunities, and making environmental literacy part of school culture can encourage more consistent pro-environmental attitudes among all teachers. In doing this, the foundations of sustainability education in early childhood settings can be greatly improved.

Recommendations:

Implement regular CPD programs, workshops, and online modules with a focus on environmental literacy to build the knowledge, skills, and attitudes of teachers. Ensure that both male and female teachers have access to equal opportunities for professional development, resources in the environment, and leadership opportunities. Encourage the development of a culture of environmental literacy in schools, through Eco-clubs, project-based learning and teacher and student recognition programs. Incorporate environmental literacy into provincial teacher education curricula and identify school improvement plans and sustainability goals.

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