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A Study on the Role of Secondary School Teachers in Promoting Environmental Education among Students in West Siang District, Arunachal Pradesh

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Abstract: ***The present study titled "A Study on the Role of Secondary School Teachers in Promoting Environmental Education among Students in West Siang District, Arunachal Pradesh" aimed to examine the role of secondary school teachers in fostering environmental education. The study was conducted among 100 secondary school teachers from government and private schools in West Siang District. A structured online questionnaire was used for data collection, and the data were analyzed using percentage analysis. The findings revealed that teachers play a significant and proactive role in promoting environmental education through classroom integration, eco-club activities, awareness programs, plantation drives, waste management practices, and learner-centered pedagogies. Teachers also act as role models in practicing environmentally responsible behavior. Although collaboration with external organizations was comparatively lower, overall results indicate strong teacher commitment toward environmental awareness and sustainability. The study concludes that secondary school teachers serve as key change agents in developing environmentally responsible students.***

Keywords: Secondary School teachers, Environmental Education & Students

1. Introduction

Environmental degradation, climate change, biodiversity loss, pollution, deforestation, and the depletion of natural resources have emerged as some of the most critical global challenges of the 21st century. Rapid industrialization, urbanization, population growth, and unsustainable consumption patterns have significantly disturbed the ecological balance, threatening both present and future generations. In this context, environmental education has become an essential component of modern education systems worldwide. It plays a vital role in developing awareness, knowledge, attitudes, values, and skills necessary for environmental protection and sustainable development. Education is considered one of the most powerful tools for bringing about behavioral change, and schools serve as fundamental institutions for nurturing environmentally responsible citizens.

Environmental education is not merely the study of environmental concepts; it is a continuous process that enables individuals to understand the interrelationship between humans and their environment. It encourages critical thinking, problem-solving, decision-making, and active participation in environmental conservation. The integration of environmental education in school curricula aims to cultivate ecological sensitivity and sustainable habits among students from an early age. In India, environmental education has been recognized as a crucial area following various national and international initiatives, including the directives of the Supreme Court of India, the National Curriculum Framework (NCF), and global movements such as the United Nations Sustainable Development Goals (SDGs).

At the secondary school level, students undergo a significant stage of cognitive, emotional, and social development. Adolescence is a period when learners begin to develop independent thinking, social awareness, and a sense of responsibility. Therefore, secondary education provides a strategic platform for strengthening environmental consciousness and promoting sustainable practices. During this stage, students are capable of understanding complex environmental issues such as climate change, ecological imbalance, waste management, water conservation, and renewable energy. Effective environmental education at the secondary level can shape students' attitudes and motivate them to adopt environmentally responsible behaviors in their daily lives.

Teachers play a central and transformative role in this process. Secondary school teachers act as facilitators, guides, motivators, and role models who influence students' perceptions and actions toward the environment. Their knowledge, attitudes, teaching strategies, and commitment significantly determine the effectiveness of environmental education. Teachers not only deliver subject content but also integrate environmental themes across disciplines such as science, social studies, geography, language, and even mathematics. Through innovative pedagogical approaches—such as project-based learning, field visits, eco-club activities, debates, awareness campaigns, and community participation-teachers can make environmental education experiential and meaningful.

Moreover, teachers are instrumental in fostering environmental values and ethics among students. By encouraging critical reflection on environmental problems and promoting sustainable lifestyle choices, teachers help learners understand their role in environmental conservation. The organization of school-based initiatives such as tree plantation drives, cleanliness campaigns, recycling programs, and energy-saving activities further strengthens students' practical engagement with environmental issues. In addition, teachers can collaborate with parents, local communities, and environmental organizations to create a broader impact beyond the classroom.

Despite the recognized importance of environmental education, several challenges persist in its effective implementation at the secondary level. These challenges may include lack of adequate training for teachers, insufficient teaching-learning resources, limited practical exposure, time constraints within the curriculum, and varying levels of student interest. Therefore, understanding the role of secondary school teachers in promoting environmental education becomes essential to identify strengths, gaps, and areas for improvement. Teachers' preparedness, professional development opportunities, and institutional support significantly influence how effectively environmental education is integrated into classroom practices.

In the contemporary educational landscape, environmental education is increasingly linked with the concept of sustainable development, which emphasizes meeting present needs without compromising the ability of future generations to meet their own needs. Schools are expected to nurture environmentally literate citizens who can contribute to sustainable development at local, national, and global levels. Secondary school teachers, therefore, carry the responsibility of not only imparting knowledge but also instilling environmental stewardship and civic responsibility.

Environmental education is indispensable for addressing contemporary ecological challenges, and secondary school teachers occupy a key position in translating environmental concepts into practical action. Their commitment, creativity, and guidance can significantly influence students' environmental consciousness and promote sustainable behaviors that contribute to a healthier and more sustainable future.

Objective of the Study:
To examine the role of secondary school teachers in promoting environmental education among students.

2. Literature Review

Environmental education has been widely recognized as an essential component of school curricula for fostering environmental awareness, nurturing positive attitudes, and promoting responsible behavior among students, as emphasized by UNESCO (1978), and over the decades, extensive research has reinforced the central role of teachers in translating these objectives into meaningful learning experiences within classrooms and beyond. Scholars such as Palmer (1998) have highlighted that teachers significantly influence students' environmental knowledge, values, and ethical orientations through well-planned instruction and active engagement strategies, while Hines et al. (1987) demonstrated that students' pro-environmental behaviors are strongly shaped by teachers' commitment, enthusiasm, and instructional practices related to environmental issues. The effectiveness of environmental education largely depends on pedagogical approaches, and Tilbury (1995) argued that participatory and action-oriented methodologies—where students actively engage in inquiry, dialogue, and problem-solving—are far more impactful than traditional lecture-based methods. Similarly, Fien (1993) noted that environmental education becomes more meaningful and contextually relevant when teachers integrate local environmental concerns into the curriculum, thereby enabling students to connect theoretical concepts with real-life challenges in their communities. Hungerford and Volk (1990) further stressed that the development of environmental sensitivity, critical thinking, and action skills is essential for encouraging responsible environmental behavior, and that teachers must consciously cultivate these competencies to empower learners as environmentally responsible citizens. Empirical studies by Rickinson et al. (2004) have shown that experiential learning approaches, including field trips, outdoor education, and project-based activities, significantly enhance students' environmental understanding, engagement, and long-term behavioral change, reinforcing the need for interactive and experiential pedagogies. Moreover, Stevenson et al. (2013) underscored the importance of teacher education and continuous professional development in equipping educators with the necessary knowledge, skills, and confidence to effectively implement environmental education programs, while Gough (2013) described teachers as key change agents who can promote sustainability not only within classrooms but also across entire school communities. In the Indian context, the National Council of Educational Research and Training (NCERT, 2005) has advocated for the integration of environmental education across subjects at the secondary level to ensure interdisciplinary understanding and holistic development, and studies such as those by Singh and Rahman (2012) have highlighted the significant contribution of eco-clubs and school-based environmental initiatives in enhancing students' awareness, participation, and leadership in environmental activities. UNESCO (2014) further broadened the scope by linking environmental education to education for sustainable development, emphasizing that teachers must foster critical thinking, problem-solving skills, and responsible decision-making among learners to address complex global challenges, while research by Esa (2010) confirmed that teachers' own positive environmental attitudes directly influence students' perceptions and dispositions toward environmental conservation. Additionally, Kollmuss and Agyeman (2002) argued that environmental knowledge alone is insufficient to bring about behavioral change unless educators encourage action-based learning, value formation, and sustained engagement, thereby bridging the gap between awareness and practice. More recent studies, including Ardoin et al. (2020), have highlighted the potential of integrating technology, digital tools, and innovative pedagogical strategies to strengthen environmental education in secondary schools, making learning more interactive, accessible, and relevant to contemporary environmental issues. Collectively, these studies demonstrate that the success of environmental education at the secondary level is deeply intertwined with teachers' pedagogical competence, commitment, and capacity to adopt experiential, participatory, and action-oriented approaches that inspire students to become informed, responsible, and proactive stewards of the environment.

3. Methodology

Participants
The participants in the present study consisted of 100 secondary school teachers from various government and private secondary schools in West Siang District. The teachers were selected to represent diverse subject specializations,

teaching experiences, and institutional backgrounds to ensure comprehensive and balanced responses related to the objectives of the study. Both male and female teachers were included, and participants possessed varying years of professional experience at the secondary level. The selection of secondary school teachers was considered appropriate, as they play a significant role in curriculum implementation and directly influence students' learning experiences, attitudes, and behavioral development within the school environment.

Tool for Data Collection

The primary tool used for data collection was an online survey questionnaire designed in alignment with the objectives of the study. The survey was distributed through Google Forms or similar digital platforms to facilitate easy access, wider reach, and efficient data compilation. The questionnaire comprised structured items, including close-ended questions and Likert-scale statements, to gather responses related to the research variables. The use of an online survey ensured convenience for participants, minimized geographical constraints, and enabled systematic organization of responses for further statistical analysis.

Statistical Method

The data collected from the respondents were systematically organized, tabulated, and analyzed in accordance with the objectives of the study. Percentage Analysis was employed as the primary statistical method to interpret the responses. This method was used to calculate the proportion of responses under each category, thereby facilitating clear understanding and comparison of trends, patterns, and variations among participants. The use of percentage analysis provided a simple yet effective means of presenting the findings in a meaningful and interpretable form.

4. Data Analysis

Table 1.1: Role of Secondary School Teachers in Promoting Environmental Education Among Students (N = 100)

S. No.	Statements (Short Form)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Integrate environmental topics	42%	36%	10%	8%	4%
2	Encourage eco-club participation	38%	42%	10%	6%	4%
3	Organize awareness programs	35%	40%	12%	8%	5%
4	Promote plantation & cleanliness	46%	32%	9%	8%	5%
5	Use project-based learning	33%	41%	13%	8%	5%
6	Relate to local issues	37%	39%	11%	8%	5%
7	Motivate resource conservation	44%	35%	9%	7%	5%
8	Organize field visits	30%	43%	14%	8%	5%
9	Promote waste management	39%	37%	11%	8%	5%
10	Encourage critical thinking	41%	38%	10%	7%	4%
11	Act as role models	52%	30%	8%	6%	4%
12	Integrate technology	28%	46%	13%	8%	5%
13	Collaborate with NGOs	25%	41%	17%	10%	7%
14	Assess environmental awareness	34%	43%	12%	7%	4%
15	Teachers promote sustainable practices such as energy saving and eco-friendly habits in daily school activities.	45%	33%	9%	8%	5%

5. Findings

1) A large majority of teachers (78%) either strongly agreed or agreed that they integrate environmental topics into regular classroom teaching. This finding clearly indicates that environmental education is not treated as an isolated or occasional subject but is systematically incorporated into daily instructional practices. It reflects teachers' awareness of the importance of embedding environmental concepts across different subjects, thereby strengthening students' environmental knowledge and understanding through interdisciplinary learning.
2) About 80% of the respondents agreed that they encourage students to participate in eco-club activities and environmental campaigns. This demonstrates that teachers actively promote co-curricular engagement beyond textbook learning. By motivating students to join eco-clubs, teachers create opportunities for experiential learning, leadership development, teamwork, and practical exposure to environmental conservation activities within and outside the school campus.
3) Nearly 75% of teachers reported organizing environmental awareness programs such as seminars, rallies, competitions, and special assemblies. This finding highlights the proactive role of teachers in spreading environmental awareness within the school community. Such initiatives contribute to building a culture of environmental responsibility and help students develop a deeper understanding of contemporary environmental challenges.
4) A significant 78% of respondents supported promoting plantation drives and cleanliness campaigns. This indicates that teachers are not only focused on theoretical instruction but also actively engage students in hands-on environmental activities. Plantation drives and cleanliness programs foster civic responsibility, environmental stewardship, and practical involvement in maintaining ecological balance.
5) Around 74% of teachers agreed that they use project-based learning methods while teaching environmental issues. This suggests the adoption of learner-centered and experiential pedagogies that encourage investigation, inquiry, and real-world problem-solving. Project-based learning allows students to explore environmental problems in depth and develop analytical and collaborative skills.
6) Approximately 76% of teachers indicated that they relate environmental concepts to local community issues. This

finding shows that teachers make environmental education more relevant and meaningful by connecting classroom learning to real-life situations. Addressing local environmental problems such as waste disposal, deforestation, or water scarcity enhances students' contextual understanding and sense of responsibility toward their immediate environment.

7) A strong 79% of teachers reported motivating students toward the conservation of natural resources such as water, electricity, forests, and wildlife. This reflects the emphasis placed on value formation and behavioral change. Teachers play a crucial role in cultivating responsible attitudes and sustainable habits among students.
8) About 73% of respondents agreed that they organize field visits and outdoor learning experiences to enhance environmental understanding. Although slightly lower compared to other activities, this still indicates a substantial effort to provide experiential learning opportunities. Field visits enable students to observe environmental phenomena directly, thereby strengthening conceptual clarity and engagement.
9) Nearly 76% of teachers reported promoting proper waste management practices, including recycling and waste segregation within school premises. This demonstrates that teachers encourage practical sustainability measures in everyday school life, helping students translate environmental knowledge into action.
10) A substantial 79% of teachers agreed that they encourage critical thinking regarding environmental challenges. This finding reflects the development of higher-order thinking skills among students, enabling them to analyze environmental problems, evaluate solutions, and make informed decisions.
11) The highest level of agreement (82%) was observed for teachers acting as role models in practicing environmentally responsible behavior. This suggests that teachers understand the importance of leading by example. When teachers demonstrate eco-friendly habits in their daily lives, students are more likely to adopt similar behaviors.
12) Around 74% of teachers supported integrating technology and digital tools in environmental education. This indicates the use of innovative teaching strategies such as multimedia presentations, online resources, and digital simulations to make environmental learning more interactive and engaging.
13) Collaboration with NGOs and community organizations showed comparatively lower agreement (66%). While the majority still support such partnerships, this finding suggests that external collaboration may be limited due to institutional constraints, lack of resources, or limited networking opportunities.
14) Nearly 77% of teachers agreed that they regularly assess students' environmental awareness, attitudes, and behaviors. This demonstrates that environmental education is systematically monitored and evaluated, ensuring that learning objectives are achieved effectively.
15) A strong 78% of teachers reported promoting sustainable practices such as energy conservation and eco-friendly habits in daily school activities. This reinforces the idea that sustainability is integrated into school culture, encouraging students to practice responsible environmental behavior consistently.

6. Discussion

The findings of the present study clearly demonstrate that secondary school teachers play a vital and multifaceted role in promoting environmental education among students. The high percentage of agreement across most statements reflects a strong commitment among teachers toward integrating environmental awareness, values, and sustainable practices within the school environment. The discussion below interprets the results in light of educational practices and broader objectives of environmental education.

Firstly, the majority of teachers reported integrating environmental topics into regular classroom teaching (78%). This suggests that environmental education is not treated as a separate or optional component but is embedded within the curriculum. Such integration aligns with the interdisciplinary nature of environmental education, which emphasizes connecting environmental themes across subjects like science, social studies, geography, and language. This practice enhances students' holistic understanding of environmental issues.

Secondly, the strong encouragement of eco-club participation (80%) and organization of awareness programs (75%) indicates that teachers extend environmental education beyond textbooks. Co-curricular and extracurricular activities provide experiential learning opportunities that strengthen students' environmental sensitivity and engagement. These activities foster leadership skills, teamwork, and community participation, which are essential components of education for sustainable development.

The findings related to plantation drives, cleanliness campaigns (78%), and waste management practices (76%) reveal that teachers actively promote practical environmental action within schools. These initiatives help translate theoretical knowledge into real-life practice, reinforcing responsible behavior among students. Such hands-on activities are crucial in shaping environmentally responsible citizens rather than passive learners.

The use of project-based learning (74%) and the encouragement of critical thinking (79%) highlight the adoption of student- centered and inquiry-based pedagogies. Environmental issues are complex and require analytical thinking and problem-solving skills. Teachers who adopt such approaches enable students to examine environmental challenges critically and explore sustainable solutions, thereby fostering deeper understanding and long-term behavioral change.

Relating environmental topics to local issues (76%) further strengthens the relevance of learning. When students connect classroom content to real-life community problems, such as waste disposal or water scarcity, learning becomes meaningful and context-specific. This approach promotes active citizenship and empowers students to contribute to local environmental improvement.

Motivating students toward conservation of natural resources (79%) and promoting sustainable practices in daily activities (78%) indicate that teachers focus on value formation and habit development. Environmental education is not limited to cognitive learning but extends to attitude formation and behavioral transformation. Teachers' influence in shaping eco-friendly habits such as energy saving and water conservation is therefore significant.

The highest agreement was observed for teachers acting as role models (82%), underscoring the importance of teacher behavior in influencing students. When teachers demonstrate environmentally responsible practices, students are more likely to imitate and internalize such behaviors. This finding emphasizes the moral and social responsibility of teachers as change agents.

The integration of technology (74%) reflects teachers' efforts to adopt innovative and modern teaching strategies. Digital tools, multimedia resources, and online platforms can enhance environmental learning by making abstract concepts more interactive and accessible. However, slightly lower agreement regarding collaboration with NGOs (66%) suggests that external partnerships may not be fully developed. Strengthening community and organizational collaboration could further enrich environmental programs and provide broader exposure to students.

Finally, the regular assessment of students' environmental awareness (77%) indicates that teachers recognize the importance of evaluating not only knowledge but also attitudes and behaviors. Continuous assessment ensures that environmental education objectives are effectively achieved and helps in identifying areas for improvement.

7. Conclusion

The present study concludes that secondary school teachers play a highly significant and proactive role in promoting environmental education among students. The findings clearly indicate that the majority of teachers actively integrate environmental topics into classroom teaching, encourage participation in eco-club activities, organize awareness programs, and promote practical initiatives such as plantation drives, cleanliness campaigns, and waste management practices. These efforts demonstrate that environmental education is not confined to theoretical instruction but is actively practiced within the school environment.

The study further reveals that teachers adopt learner-centered approaches such as project-based learning, critical thinking activities, and contextual teaching by relating environmental issues to local community problems. Such pedagogical strategies enhance students' understanding, engagement, and problem-solving abilities regarding environmental challenges. Teachers also emphasize value formation by motivating students to conserve natural resources and adopt sustainable habits in their daily lives.

One of the most significant findings is that teachers act as role models in practicing environmentally responsible behavior. Their positive attitudes and personal commitment strongly influence students' perceptions and actions toward environmental protection. Additionally, the integration of technology and regular assessment of environmental awareness indicate that teachers are making systematic and innovative efforts to strengthen environmental education.

Although collaboration with NGOs and external organizations was comparatively lower, the overall findings reflect a strong commitment among secondary school teachers toward fostering environmental awareness, responsibility, and sustainability. Therefore, it can be concluded that teachers serve as key facilitators and change agents in shaping environmentally conscious and responsible citizens. Strengthening professional development opportunities and external partnerships can further enhance the effectiveness of environmental education at the secondary level.

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