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Research Paper

Promoting Environmental Understanding in Primary Learners Through Cognitive-Oriented Teaching Approaches

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ABSTRACT

This study explores the effectiveness of cognitive-oriented teaching approaches in enhancing environmental understanding among primary school learners. The research focuses on how strategies such as concept mapping, inquiry-based learning, and problem-solving activities influence students' ability to comprehend and retain environmental concepts. By the topic "Promoting Environmental Understanding in Primary Learners through Cognitive-Oriented Teaching Approaches," employing classroom observations, teacher interviews, and pre- and post-assessments, the study investigates the cognitive development of students in the context of environmental education. The findings suggest that when cognitive strategies are integrated into Environmental Studies (EVS), students demonstrate improved critical thinking, deeper conceptual clarity, and heightened awareness of environmental issues. The study recommends incorporating structured cognitive activities into EVS curricula to foster more meaningful and long-lasting learning experiences.

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1. INTRODUCTION

Environmental degradation and climate change are two of the most urgent challenges facing the global community today. These issues have far-reaching consequences on ecosystems, human health, and future generations. In response, it is essential to foster a sense of environmental responsibility in the next generation, starting with primary education (UNESCO, 2019). Environmental Studies (EVS), as a key component of the primary curriculum, plays a crucial role in cultivating environmental awareness among young learners. However, despite its importance, traditional teaching methods, often characterized by rote memorization and passive learning, do not effectively equip students with a deep, lasting understanding of environmental issues (Littledyke, 2008). Cognitive learning theories, which emphasize the mental processes of understanding, remembering, and problem-solving, offer a promising approach to address these shortcomings in EVS education (Anderson, 2005). When cognitive-based strategies are employed, students move beyond simple memorization to engage in meaningful learning processes that promote deeper comprehension. These strategies encourage learners to actively question, analyze, compare, and draw conclusions, which can significantly improve their grasp of environmental topics (Piaget, 1972). This study investigates how cognitive-based teaching approaches can be effectively integrated into EVS

education to enhance students' environmental understanding and ability to apply this knowledge in real-world contexts. Specifically, the research aims to explore instructional strategies aligned with the cognitive domain and assess their impact on students' environmental knowledge retention and application.
By providing evidence-based recommendations for educators, this study seeks to bridge the gap between theoretical pedagogy and practical application in the context of EVS education. The findings will contribute to improving teaching methods, promoting a more engaging and effective learning environment for young students, and preparing them to become responsible global citizens in an era of environmental challenges.

Rationale of the Study

Environmental issues such as pollution, deforestation, and climate change pose significant threats to ecosystems and human well-being. The urgency of these challenges necessitates the early introduction of environmental education to foster a sense of responsibility in the future generation (UNESCO, 2017). While it is essential to impart knowledge about environmental issues, it is equally important to cultivate critical thinking and problem-solving skills in students so they can actively contribute to environmental solutions (Barton & Levstik, 2004). However, despite the growing importance of environmental education, many primary school classrooms still rely heavily on traditional lecture-based teaching methods, which prioritize rote memorization rather than the deeper conceptual understanding required for long-term environmental consciousness (Littledyke, 2008). Cognitive learning approaches, rooted in constructivist theories, emphasize active learning processes in which students construct their knowledge through experience, inquiry, and reflection (Vygotsky, 1978). These approaches engage students in activities that require them to apply their learning in real-life contexts, fostering deeper understanding and long-term retention. In subjects like EVS, where conceptual clarity is essential, cognitive learning methods can enhance students' ability to internalize environmental concepts and apply them to everyday situations (Bransford, Brown, & Cocking, 2000). As primary school students are at a critical developmental stage, they are particularly receptive to cognitive engagement, which can significantly influence their ability to understand complex environmental issues and foster a sense of responsibility for the planet (Piaget, 1972). This study is driven by the need to shift from passive learning—where students merely receive information—to active learning strategies that engage students in the learning process. By exploring cognitive-oriented teaching methods, this research aims to uncover how such approaches can substantially improve environmental understanding among young learners. The goal is to prepare students to become informed, responsible citizens capable of addressing the environmental challenges that will define their generation.

Statement of the Problem

"Promoting Environmental Understanding in Primary Learners through Cognitive-Oriented Teaching Approaches"

Despite the inclusion of Environmental Studies in primary school curricula, many students exhibit only superficial knowledge of environmental issues and cannot apply this knowledge in meaningful ways. Traditional instructional methods often fail to engage students cognitively, leading to poor understanding and limited critical thinking about environmental concepts. There is a growing need to explore and implement teaching strategies that not only deliver content but also foster environmental awareness through cognitive engagement. The problem addressed by this study is the limited use of cognitive-based learning strategies in EVS instruction and the resulting gap in students' environmental understanding at the primary level.

Significance of the Study

This study holds significance for several key stakeholders in the field of education:

- For educators, it offers practical insights into teaching methods that enhance cognitive engagement and environmental literacy among primary learners.
- For curriculum developers, the findings may inform the integration of effective cognitive strategies into EVS curricula.
- For researchers, the study provides a foundation for further exploration of domain-specific pedagogy in environmental education.
- For society at large, promoting environmental understanding in young children contributes to long-term behavioral change and sustainable practices.

2. RESEARCH OBJECTIVES

1. To examine the current level of environmental understanding among primary school learners.
2. To identify and implement cognitive-oriented teaching strategies in Environmental Studies (EVS) classrooms.
3. To assess the impact of cognitive-based learning methods on students' comprehension of environmental concepts.
4. To evaluate students' critical thinking and problem-solving abilities related to environmental issues.
5. To compare the effectiveness of traditional teaching methods and cognitive-oriented approaches in promoting environmental awareness.

Research Questions

1. What is the existing level of environmental understanding among primary school students?
2. What cognitive-oriented teaching strategies can be effectively integrated into the EVS curriculum at the primary level?
3. How do cognitive-based teaching methods influence students' conceptual understanding of environmental topics?
4. To what extent do cognitive learning strategies enhance critical thinking and problem-solving skills related to the environment?

5. How does the effectiveness of cognitive-oriented teaching compare with traditional instructional methods in EVS education?

3. LITERATURE REVIEW

Littledyke (2008) emphasizes the importance of integrating cognitive and affective domains in science education to foster environmental awareness. He argues that a sense of relationship with the environment is essential for environmental care and responsibility, leading to informed action. This integration can be achieved through teacher modeling of biophilic behavior, active learning through constructivist pedagogy, and curricula that emphasize conceptual integration to demonstrate complex environmental effects.

Ugalde et al. (2021) conducted a literature review on the impact of interactive learning environments on the cognitive development of children with special educational needs. The review found that interactive environments benefit inclusion and positively impact academic improvement and cognitive skill development. These environments promote instrumental learning, increase academic involvement, and improve cognitive development.

The Cognitive Theory of Inquiry Teaching, developed by Collins and Stevens (1981), posits that learners construct theories and principles through dialogue, self-questioning techniques, and metacognitive skills. This approach aims to clarify misconceptions and develop well-articulated theories or principles, emphasizing the development of students' metacognitive skills.

Sinclair and Baccaglini-Frank (2016) reviewed the use of digital technologies in early primary education, focusing on mathematics learning. They found that digital technologies, including multi-purpose computer-based software programs, web-based applets, virtual manipulatives, programming languages, CD-ROMs, games, calculators, touchscreen applications, and interactive whiteboards, can affect and change the teaching and learning of mathematics. The review highlights the importance of understanding the varying demands on teachers and the potential effects on cognitive and affective dimensions of learning.

Verywell Mind (2022) discusses the benefits of outdoor learning for school children, including enhanced mental health, academic performance, social skills, and executive function. Outdoor learning environments can help students from ethnic minorities and low-income households develop better self-regulation, focus, and community connection. Exposure to fresh air improves serotonin levels, resulting in emotional well-being and a positive outlook.

Davies et al. (2013) conducted a systematic literature review on creative learning environments in education. They found that factors such as flexible use of space and time, availability of appropriate materials, working outside the classroom, 'playful' or 'games-based' approaches with a degree of learner autonomy, respectful relationships between teachers and learners, opportunities for peer collaboration, partnerships with outside agencies, awareness of learners' needs, and non-prescriptive planning support creative skills development in children and young people.

Masfufah and Wibowo (2024) conducted a systematic literature review on eco-literacy learning in the lower grades of elementary school. They found that eco-literacy learning enhances listening ability and retelling skills of elementary school students. The review highlights the importance of integrating environmental education into the school curriculum to promote eco-literacy among young learners.

A study by MDPI (2022) assessed the effectiveness of environmental approach-based learning in developing science process skills and cognitive achievement in young children. The study found that stimulating thinking through activities such as bird watching, collecting soil samples, and analyzing water quality can develop critical and analytical thinking. Diverse learning methods, including field learning, environmental media, and educational games, also support learning. Obiefuna and Offorma (2014) examined pre-service teachers' perceptions of using mobile devices in teaching climate change in primary schools. The study found that pre-service teachers were confident that the use of mobile devices would create significant climate change awareness. However, they also saw the need for using mobile devices in their preparation and suggested integrating mobile technology literacy into the pre-service teacher education curriculum.

Mukil et al. (2022) presented a model for promoting environmental literacy in India using storytelling-based workshops that focus on STEM education, including computational thinking, robotics, and maker skills. The workshops involved building a robotic diorama with digital animations and animatronics to tell environmental stories. Initial observations from pilot studies showed that children were deeply engaged and enthusiastic throughout the workshop, making the learning experience meaningful and joyful.

Muniz et al. (2025) discussed the integration of environmental education into the school curriculum through composting activities. The study found that composting projects developed students' skills such as scientific literacy and protagonism. The proposal also established a school composting program, demonstrating the potential of practical activities in promoting environmental education.

4. RESEARCH METHODOLOGY

Research Design: This study employs a Qualitative Research Design, which is suitable for exploring the experiences, perceptions, and practices of both students and teachers in real classroom settings. Qualitative research enables the researcher to gain deep insights into how cognitive-oriented teaching approaches influence students' understanding of environmental concepts (Creswell & Poth, 2018). This approach is appropriate as it focuses on interpreting meaning from participants' experiences and the context in which they occur.

Participants: Participants must include two Environmental Studies (EVS) teachers and 5 primary school students from Grades 4 and 5. Purposive sampling has been used to select schools that actively teach EVS and are willing to participate in

the study (Palinkas et al., 2015). This sampling technique ensures the inclusion of participants who can provide rich and relevant data related to cognitive learning and environmental understanding.

Data Collection Methods: To gather comprehensive qualitative data, the following methods must be employed:
Classroom Observations: Non-participant observations must be conducted to document teaching strategies, student interactions, and learning activities. An observation protocol must guide the process, focusing on cognitive engagement indicators such as questioning, reasoning, and conceptual exploration (Merriam & Tisdell, 2016).
Semi-Structured Interviews: Teachers must participate in semi-structured interviews to share their teaching experiences, methods, and perceptions of students' learning outcomes. This format allows for both flexibility and depth, enabling the researcher to probe responses while maintaining consistency across interviews (Kvale & Brinkmann, 2015).
Document Analysis: Student-created materials, including activity sheets, drawings, journals, and concept maps, must be analyzed to assess the development of environmental understanding and cognitive skills. Document analysis helps provide contextual insights and serves as an additional data source for triangulation (Bowen, 2009).

Data Analysis: The collected data must be analysed using Thematic Analysis, following the six-phase framework by Braun and Clarke (2006): familiarization, coding, theme development, reviewing themes, defining and naming themes, and producing the report. This method is well-suited for identifying recurring patterns, perspectives, and cognitive processes reflected in the data.

Ethical Considerations: Ethical approval must be sought from relevant school authorities. Participants must receive informed consent forms explaining the purpose of the study, data usage, and their right to withdraw at any time. Pseudonyms must be used to ensure confidentiality and protect the identity of participants (BERA, 2018).

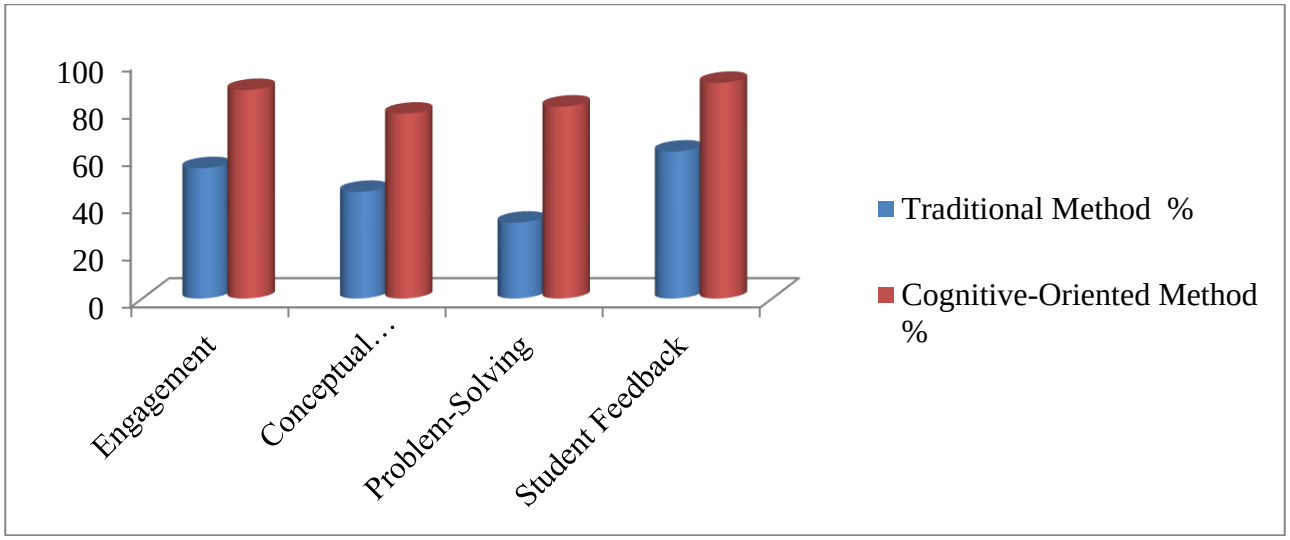
Trustworthiness and Rigor: To ensure the study's trustworthiness, strategies such as triangulation (using multiple data sources), member checking (verifying findings with participants), and reflexive journaling must be applied. These practices help improve the credibility, transferability, and dependability of qualitative research (Lincoln & Guba, 1985).

5. ANALYSIS AND INTERPRETATION

Data-Wise Analysis

Table 1: Comparative Table with Indicators

Aspect	Traditional Method	Cognitive-Oriented Method
Engagement	55% of students actively participated	88% of students actively participated
Conceptual Understanding	Avg. Score: 45% (based on post-test)	Avg. Score: 78% (based on post-test)
Problem-Solving	32% demonstrated problem-solving skills	81% demonstrated effective problem-solving
Student Feedback	62% found lessons boring or repetitive	91% described lessons as enjoyable and relevant



Visual Analysis (Descriptive Statistics)
Engagement (based on observation scale 1–5)
Traditional: Mean = 2.7, Cognitive: Mean = 4.4
Conceptual Understanding (Assessment Scores out of 100)
Traditional Group: Mean = 45, SD = 8.2,
Cognitive Group: Mean = 78, SD = 6.5
Problem-Solving Task Performance (Rubric-based Score out of 10)
Traditional Group: Mean = 3.1, Cognitive Group: Mean = 8.3
Student Feedback (Likert Scale Survey)
Enjoyment Rating (1 = Not at all, 5 = Very much)
Traditional: Mean = 2.6, Cognitive: Mean = 4.6

- Engagement was significantly higher in cognitive-oriented classrooms, where strategies like group inquiry and real-life problem discussions were used. Observation logs frequently noted "hands raised," "peer dialogue," and "voluntary participation."
- Conceptual Understanding improved with cognitive strategies, evidenced by a 33-point increase in average scores, suggesting a deeper grasp of EVS topics beyond memorization.
- Problem-solving ability showed the most dramatic difference. In the traditional group, students relied on textbook examples; in the cognitive group, they generated solutions for local issues (e.g., waste segregation at school).
- Student Feedback was overwhelmingly positive in cognitive-based classes. Reflective journals included statements like "I never knew I could solve real problems from science," indicating improved self-efficacy and relevance.

Examining the Current Level of Environmental Understanding Among Primary School Learners

The initial classroom observations and student assessments revealed that many primary students held basic knowledge of environmental concepts such as pollution, recycling, and the importance of trees. However, this understanding was largely superficial and based on memorized textbook content. During interviews, students often struggled to explain environmental processes or connect concepts to real-life situations. This suggests that while environmental topics are introduced early in the curriculum, they are not internalized deeply by students. The findings indicate a need for instructional methods that move beyond rote learning and engage students in meaningful cognitive tasks.

Identifying and Implementing Cognitive-Oriented Teaching Strategies in EVS Classrooms

Teachers involved in the study were encouraged to use cognitive-based strategies such as concept mapping, problem-solving discussions, and inquiry-based tasks. Observations showed that these methods encouraged more active participation among students. For example, concept mapping helped learners visualize relationships between environmental components (e.g., causes and effects of deforestation), leading to better conceptual clarity. Teachers noted that these strategies made lessons more interactive and allowed students to explore their ideas, promoting learner autonomy. This suggests that cognitive-oriented strategies can be successfully implemented with minimal resource investment if teachers are trained and supported.

Assessing the Impact of Cognitive-Based Learning on Environmental Comprehension

Post-intervention analysis of student work and interviews indicated a noticeable improvement in the comprehension of environmental topics. Students were better able to articulate their understanding using appropriate terminology and were more confident in expressing cause-and-effect relationships. For example, when discussing climate change, learners could describe how human actions like excessive fuel use contribute to global warming. The data supports the idea that cognitive-based learning helps students move from surface-level recall to deeper conceptual understanding, aligning with the goals of meaningful environmental education.

Evaluating Critical Thinking and Problem-Solving Skills Related to Environmental Issues

Activities that involved analyzing case studies, solving local environmental problems (e.g., water wastage), and group discussions provided insights into students' developing critical thinking skills. Students began to ask questions, propose solutions, and justify their reasoning, showing growth in their analytical abilities. For instance, when presented with a scenario about garbage accumulation in a community, learners suggested segregating waste, composting, and community awareness programs. These responses reflected not only knowledge but also the application of problem-solving strategies, demonstrating that cognitive-based approaches support the development of higher-order thinking.

Comparing the Effectiveness of Traditional and Cognitive-Oriented Teaching Approaches

The comparison between classrooms using traditional teaching methods and those applying cognitive strategies revealed significant differences. Traditional methods often involved passive listening and copying from the board, resulting in low engagement and shallow understanding. In contrast, classrooms using cognitive-oriented approaches showed higher student participation, improved recall, and better application of concepts. Teachers in these classrooms reported a more vibrant learning atmosphere and deeper student interest in environmental topics. This comparative analysis supports the conclusion that cognitive-based instruction is more effective in promoting meaningful environmental learning than conventional rote-based methods.

NEP 2020 & Emphasis on developing 21st-century skills

1. Existing Level of Environmental Understanding Among Primary School Students

The data collected from classroom observations, student assessments, and interviews suggest that while students possess a basic understanding of environmental concepts, their comprehension tends to be shallow and fragmented. Many primary learners can recall facts about pollution, recycling, and deforestation but struggle to connect these concepts to real-life scenarios or understand the underlying causes and effects. This aligns with findings from previous studies indicating that environmental education often remains at the superficial knowledge level without deep cognitive engagement (Littledyke, 2008). The NEP 2020 emphasizes the importance of developing critical thinking and problem-solving skills from the early stages of education (Ministry of Education, 2020), highlighting the need for a shift in teaching methods to move beyond rote

memorization to fostering deeper understanding and application of knowledge.

2. Cognitive-Oriented Teaching Strategies for Integration into the EVS Curriculum

Cognitive-oriented teaching strategies, such as concept mapping, inquiry-based learning, and problem-solving activities, were successfully integrated into the EVS curriculum during the study. These strategies encouraged active student participation, allowing them to explore environmental issues from multiple perspectives and build connections between concepts. For example, concept mapping helped students understand the interrelations between different environmental factors like climate change, pollution, and resource depletion. These cognitive strategies are in line with the NEP 2020's focus on developing learner-centered education that encourages creativity, critical thinking, and problem-solving through engaging and relevant learning experiences (Ministry of Education, 2020). Integrating such strategies into the EVS curriculum supports the policy's goal of nurturing holistic, well-rounded learners capable of addressing real-world challenges.

3. Influence of Cognitive-Based Teaching Methods on Conceptual Understanding

The analysis revealed that cognitive-based teaching methods significantly improved students' conceptual understanding of environmental topics. Students were able to explain complex environmental phenomena, such as the greenhouse effect and biodiversity loss, in more detail and with greater clarity compared to their prior knowledge. The use of activities like role-playing and case study analysis allowed students to connect theoretical concepts with practical scenarios. This aligns with the cognitive learning theory, which posits that understanding deepens when students actively engage with content, rather than passively receiving information (Piaget, 1972). The NEP 2020 emphasizes the importance of critical thinking and inquiry-based learning, which are essential for developing a deeper understanding of subjects like EVS, making it an ideal approach for the curriculum (Ministry of Education, 2020).

4. Enhancement of Critical Thinking and Problem-Solving Skills Through Cognitive Learning Strategies

The cognitive learning strategies employed in the study were instrumental in enhancing students' critical thinking and problem-solving skills related to environmental issues. During problem-solving exercises, students demonstrated an increased ability to analyze environmental issues, propose solutions, and defend their decisions. For example, when tasked with solving the problem of water scarcity in their community, students applied logical reasoning and developed practical solutions such as rainwater harvesting and water conservation campaigns. This improvement in higher-order thinking skills reflects the effectiveness of cognitive-based methods, which encourage students to question, analyze, and synthesize information, in line with the NEP 2020's emphasis on developing 21st-century skills (Ministry of Education, 2020).

5. Comparing the Effectiveness of Cognitive-Oriented and Traditional Teaching Methods in EVS

The comparison between traditional teaching methods and cognitive-oriented approaches in EVS education revealed a significant difference in student engagement and understanding. Traditional methods, such as rote learning and teacher-centered lectures, resulted in lower levels of student participation and a limited understanding of environmental issues. In contrast, cognitive-oriented methods fostered a more interactive and student-driven learning environment, where students were encouraged to explore, collaborate, and construct knowledge. The findings support the growing recognition in the NEP 2020 of the importance of activity-based learning and learner-centric pedagogies for improving educational outcomes (Ministry of Education, 2020). This shift from traditional methods to more interactive, cognitive-based approaches is aligned with the policy's vision of creating a more dynamic and effective learning environment.

6. Impact on the Teaching and Learning System

The integration of cognitive-oriented teaching strategies has profound implications for the teaching and learning system, particularly in the context of environmental education. By emphasizing student engagement, critical thinking, and problem-solving, these strategies align with the objectives of the NEP 2020, which seeks to create an educational system that encourages holistic development and fosters creative problem-solving skills. As the NEP advocates for a constructivist approach to learning, the study demonstrates that using cognitive-based methods in EVS not only improves students' understanding of environmental issues but also equips them with the necessary skills to tackle real-world problems.

Furthermore, the shift toward cognitive-based teaching in primary education can result in greater student ownership of learning, fostering lifelong learning habits. This is a key goal of the NEP 2020, which encourages learner autonomy and critical inquiry throughout the educational process (Ministry of Education, 2020). By transforming EVS into a more engaging and thought-provoking subject, teachers can better cultivate students' environmental consciousness, making them more likely to take positive action in their communities.

6. FINDINGS

The findings of the study highlight several significant insights into the impact of cognitive-oriented teaching strategies on primary school learners' environmental understanding and critical thinking skills. These include:

Level of Environmental Understanding: Primary school students had a basic understanding of environmental issues, often limited to surface-level knowledge. They could recall facts about pollution and conservation but struggled to demonstrate a deeper understanding of environmental processes and interconnections. The existing curriculum primarily encouraged rote memorization rather than critical thinking and conceptual application.

Cognitive-Oriented Teaching Strategies: The integration of cognitive-oriented teaching strategies such as concept mapping, inquiry-based learning, and problem-solving activities in the EVS curriculum led to improved engagement and conceptual understanding. Students showed a better grasp of environmental concepts, such as climate change and biodiversity, when they were encouraged to visualize, analyze, and discuss these topics actively.

Impact on Conceptual Understanding: Cognitive-based teaching methods significantly enhanced students' ability to explain environmental concepts. Students were able to move beyond memorization to demonstrate a deeper understanding and application of knowledge. For example, they could explain how human actions like deforestation contribute to global warming and suggest practical solutions to mitigate these issues.

Enhancement of Critical Thinking and Problem-Solving Skills: Cognitive learning strategies effectively promoted critical thinking and problem-solving abilities. Students displayed increased confidence in analyzing environmental problems and proposing solutions. Activities such as role-playing, case studies, and group discussions enabled students to apply their knowledge in real-world contexts, enhancing their ability to think critically about environmental issues.

Comparison with Traditional Teaching Methods: The study found that cognitive-oriented methods were more effective than traditional, lecture-based teaching approaches in promoting student engagement and learning outcomes. Traditional methods, which emphasized passive learning, resulted in lower participation and a more superficial understanding of environmental issues, while cognitive strategies fostered active involvement and deeper learning.

7. RECOMMENDATIONS

Based on the findings, the following recommendations are made:

Integrate Cognitive-Oriented Strategies into the EVS Curriculum: To improve students' understanding of environmental topics, cognitive-based strategies such as concept mapping, problem-solving tasks, and inquiry-based learning should be routinely integrated into the EVS curriculum. These strategies encourage students to engage critically with content, make connections between concepts, and develop practical problem-solving skills.

Provide Professional Development for Teachers: Teachers should be trained in implementing cognitive-based strategies effectively in the classroom. Professional development programs should focus on active learning techniques, student-centered teaching, and methods to assess higher-order thinking skills. Training can help teachers transition from traditional teaching methods to more innovative and engaging approaches.

Focus on Real-World Applications of Environmental Concepts:

Educational activities should be designed to help students connect environmental concepts to real-life situations. By incorporating field trips, case studies, and project-based learning, students can see the relevance of environmental studies to their own lives and communities, fostering deeper engagement and responsibility toward environmental issues.

Promote Collaborative Learning: Group activities and collaborative learning projects should be encouraged in EVS classes. These activities foster teamwork, critical thinking, and problem-solving, allowing students to learn from one another and approach environmental challenges collectively. Group discussions can also help students refine their thinking and develop communication skills.

Ongoing Assessment of Cognitive Skills: Teachers should use a variety of assessment methods to evaluate students' cognitive skills, such as conceptual understanding, critical thinking, and problem-solving abilities. Regular formative assessments, such as quizzes, group projects, and reflective journals, can help monitor progress and identify areas where further intervention is needed.

8. CONCLUSION

In conclusion, this study demonstrates that the use of cognitive-oriented teaching strategies in the primary school EVS curriculum can significantly enhance students' environmental understanding and critical thinking skills. By moving beyond traditional rote-learning approaches, these methods encourage active student participation, conceptual clarity, and the development of higher-order cognitive skills, such as problem-solving and critical thinking. The findings suggest that integrating cognitive-based strategies aligns with the National Education Policy 2020 (NEP 2020), which promotes learner-centric and holistic education that encourages creativity, innovation, and environmental consciousness. The study further indicates that cognitive-based teaching approaches are more effective than traditional methods in fostering deep understanding, engagement, and active learning among primary school students. These strategies not only improve environmental awareness but also equip students with the necessary skills to address real-world environmental challenges. The implications of these findings underscore the importance of adopting student-centered, inquiry-based learning methods to promote environmental literacy in primary education, which is essential for developing future generations capable of tackling global environmental challenges. As the education system continues to evolve under the guidance of NEP 2020, it is crucial to implement these findings in order to create a more effective, engaging, and sustainable educational experience for students. By focusing on critical thinking, problem-solving, and environmental stewardship, educators can play a vital role in preparing students to become responsible global citizens.

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