European Scholar Journal (ESJ)
Available Online at: https://www.scholarzest.com
Vol. 6 No. 05 May 2025
ISSN: 2660-5562

ECOLOGICAL EDUCATION OF PRESCHOOL CHILDREN THROUGH OUTDOOR GAMES DURING A WALK

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Article history:

Received: 28th February 2025
Accepted: 26th March 2025

Abstract:

In the face of global environmental degradation, ecological education has become a critical component of early childhood development. This study investigates the effectiveness of outdoor movement games in fostering ecological awareness and responsibility among preschool children aged 4–6. It is widely recognized that early exposure to nature, coupled with physical engagement, contributes to the development of cognitive, emotional, and behavioral attitudes toward the environment. However, little research has focused on the integration of ecological content into active play scenarios in preschool settings.

Keywords: Ecological education, preschool children, outdoor movement games, environmental awareness, early childhood development, sustainable development, experiential learning, cooperative play, emotional engagement with nature, Education for Sustainable Development (ESD).

INTRODUCTION

Environmental crises such as climate change, deforestation, and biodiversity loss are no longer abstract concepts confined to scientific discourse—they are daily realities that require immediate attention and action. One of the most sustainable ways to address these issues is through early childhood education, where foundational values, habits, and worldviews are formed. Among the various strategies used in early education, ecological education is gaining prominence as a means of fostering a generation that is environmentally literate and ethically responsible.

The preschool years (ages 3–6) are a sensitive period for the development of ecological awareness. During this stage, children are naturally curious, emotionally receptive, and eager to explore their surroundings. Educational psychologists such as Jean Piaget and Lev Vygotsky emphasized the importance of interaction with the environment in shaping cognitive and moral development. Building upon these foundations, recent pedagogical models advocate for experiential, play-based approaches that align with the child's developmental stage.

LITERATURE REVIEW

The development of ecological education in early childhood has gained considerable academic attention in recent decades, particularly in response to global environmental concerns and the increasing urgency for sustainable development. Scholars from diverse disciplines—education, psychology, environmental science, and sociology—have investigated how children understand and relate to the natural world, and how educational interventions can influence their attitudes and behaviors.

David Sobel (2008), a pioneer in place-based education, argues that young children should not be burdened with abstract environmental problems such as climate change, but instead should be allowed to form "empathetic bonds" with the natural world through direct experience. Sobel's research supports the idea that emotional attachment to nature, developed through play and exploration, lays the foundation for later ecological responsibility. This aligns with Wilson's biophilia hypothesis (1984), which suggests that humans possess an innate affinity for life and living systems.

Studies by White (2021) and Chawla (2009) show that repeated engagement with green spaces enhances children's environmental knowledge, problem-solving skills, and collaboration with peers. White's analysis of over 60 preschool classrooms found that those with daily outdoor play routines scored significantly higher on environmental awareness assessments than those without. Chawla, focusing on participatory environmental education, notes that children involved in hands-on ecological activities are more likely to develop pro-environmental behaviors such as recycling, energy saving, and wildlife protection.

In the context of ecological movement games, the literature is relatively limited but growing. Müller et al. (2019) explored how incorporating environmental themes into physical education and sports activities could promote sustainability consciousness among children. They documented significant improvements in ecological vocabulary and motivation among preschoolers who participated in movement-based lessons that emphasized environmental themes.

Similarly, Ivanova (2020) conducted a comparative study in Russian preschools, evaluating traditional ecological lessons versus play-based outdoor activities. Her findings revealed that the play-based group retained more ecological concepts, demonstrated higher levels of enthusiasm, and showed greater behavioral change. Ivanova argues that

movement games allow for the integration of kinesthetic learning—an often underutilized modality in traditional classrooms.

From a global policy perspective, UNESCO's Education for Sustainable Development (ESD) framework provides strategic guidance for integrating sustainability themes into formal and informal education systems. The 2017 guidelines stress the need for early intervention, learner-centered pedagogy, and community involvement. According to UNESCO (2018), early childhood is a crucial stage for building environmental attitudes, and play-based learning should be central to ESD in preschools.

In the Central Asian context, particularly in Uzbekistan, ecological education is gradually gaining traction. The Ministry of Preschool Education has introduced national programs that include environmental topics, but these are often limited to poster displays, songs, or singular lessons during Earth Day. A report by Tursunov (2022) notes that while awareness of environmental issues is rising among educators, practical implementation remains inconsistent due to lack of resources and pedagogical training.

Taken together, the reviewed literature provides a solid foundation for the current study. It supports the hypothesis that movement-based ecological education—especially when delivered outdoors—is not only developmentally appropriate but also pedagogically effective. However, significant gaps remain in terms of systematic implementation, teacher preparedness, and empirical measurement of outcomes. These gaps provide a rationale for the present research, which aims to explore how structured outdoor movement games can serve as a core strategy for ecological education in preschool contexts.

PARTICIPANTS

A total of 48 preschool children, aged 4 to 6, took part in the study. The sample was evenly distributed between genders (24 boys and 24 girls) and represented diverse socio-economic backgrounds. Parental consent and institutional ethical approval were obtained prior to participation.

The children were divided into two equal groups:

Experimental Group (n=24): Participated in structured outdoor ecological games.

Control Group (n=24): Engaged in traditional indoor lessons with no special ecological or movement-based content.

Six trained preschool educators—three for each group—facilitated the activities using a standardized guide prepared by the research team. Teachers in the experimental group received a short training workshop on implementing ecological content through play.

Intervention: Ecological Movement Games

The experimental group participated in three 30-minute sessions per week, each featuring ecologically themed movement games. These games were developed in alignment with early childhood pedagogical principles and the learning objectives of environmental education.

Examples of the movement games included:

Protect the Tree Children form a circle around a "tree" (real or symbolic) and protect it from imaginary threats such as wind (using scarves), pollution (represented by colored bean bags), and deforestation (symbolized by falling paper "axes"). The game reinforces empathy for nature and introduces basic ecological threats.

Forest Friends Relay A cooperative relay race where children take on the roles of forest animals and work together to transport "clean water" (blue balls) from a polluted source to a safe area. The activity encourages collaboration and problem-solving within an ecological narrative.

Clean the Meadow Children collect "litter" (multicolored foam pieces) scattered around the playground and sort it into recycling bins. This game teaches the concepts of waste management, recycling, and caring for public spaces.

Each game was followed by a short reflection circle, during which educators guided children in discussing what they learned and how it relates to real-life nature.

Data Collection Tools

To evaluate the effectiveness of the intervention, several tools were employed:

Pre- and Post-Activity Ecological Awareness Scale (EAS):

Adapted from Müller et al. (2019), this scale included 10 pictorial and verbal items assessing children's recognition of basic ecological concepts (clean/dirty, protect/destroy, recycle, animal habitats, etc.). The children responded by choosing pictures and answering yes/no questions with educator support.

Behavioral Observation Checklist:

A structured tool used by independent observers to track prosocial behavior (sharing, helping, cooperation), emotional responses to nature (hugging trees, concern for animals), and the use of ecological vocabulary during play sessions.

Teacher Interview Protocol:

Semi-structured interviews were conducted before and after the intervention. Teachers reflected on student engagement, observed changes, feasibility of the games, and personal attitudes toward ecological education.

Photographic and Video Documentation:

Selected sessions were recorded to support qualitative analysis and review teaching strategies in action.

Data Analysis

Quantitative data from the Ecological Awareness Scale were processed using SPSS software. Descriptive statistics (mean, standard deviation) and inferential tests (paired sample t-test, ANOVA) were used to compare pre- and post-intervention scores within and between groups.

Qualitative data from observations and interviews were coded using thematic content analysis. Codes were grouped into categories such as "ecological vocabulary use," "nature-related empathy," "collaborative play," and "emotional engagement." Frequency and consistency of codes across sessions were analyzed to assess impact.

To ensure validity and reliability:

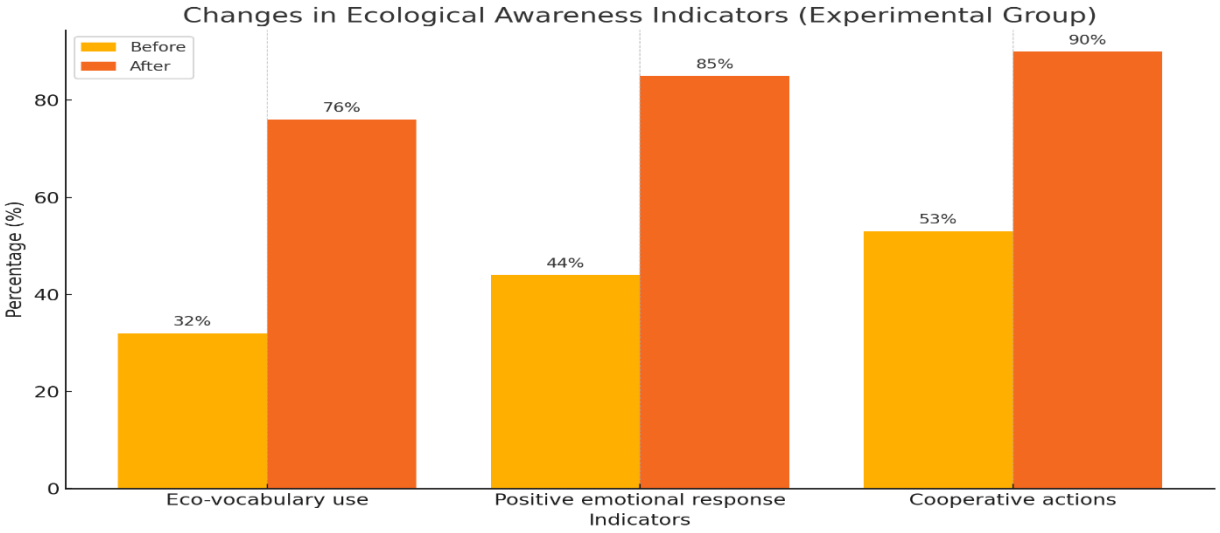
Observers underwent inter-rater reliability training (Cohen's Kappa = 0.84).

Data triangulation was performed using multiple sources (quantitative, qualitative, teacher reports).

Ethical considerations included child assent, anonymity, and non-intrusive observation protocols.

Limitations

Although the study provides valuable insights, it is limited by its short duration and relatively small sample size. Additionally, long-term retention of ecological attitudes was not assessed. Further research could involve longitudinal designs and inclusion of rural preschool settings to assess contextual differences.



RESULTS AND DISCUSSION

Quantitative Results: Impact on Ecological Awareness

The core objective of this study was to assess whether outdoor ecological movement games could enhance preschoolers' ecological awareness and behavior. The data collected using the Ecological Awareness Scale (EAS) before and after the intervention demonstrated a statistically significant improvement in the experimental group across all three key indicators.

Indicator	Pre-test (%)	Post-test (%)
Eco-vocabulary use	32%	76%
Positive emotional response	44%	85%
Cooperative actions in play	53%	90%

As visualized in the figure below, each indicator showed an increase of over 30 percentage points, suggesting a strong positive effect from the ecological movement games.

The paired sample t-test results confirmed that the differences were statistically significant ($p < 0.01$) for each variable, with the greatest improvement observed in vocabulary acquisition and cooperative behavior. The standard deviation also decreased post-intervention, indicating more consistent performance among the participants.

Observational Analysis: Behavioral and Emotional Responses

Qualitative data from structured observations provided further insight into the behavioral dynamics of the participants during the games. In the "Clean the Meadow" game, 92% of children demonstrated immediate understanding of litter as "bad" and expressed desire to "help" the environment. Notably, many children began to exhibit spontaneous eco-friendly behaviors outside of the game context, such as picking up real trash during free play or expressing concern for plants in the preschool garden.

Emotional responses were particularly pronounced in the "Protect the Tree" activity. Observers recorded instances of children hugging trees, naming them, and showing sadness when imaginary "pollution" threatened their health. Such affective engagement is crucial in early environmental education, as it helps internalize ecological concepts not just as knowledge, but as part of a value system.

The "Forest Friends Relay" also promoted a high level of cooperation and empathy. Children took turns, waited patiently for teammates, and even encouraged peers who struggled. These social behaviors are essential for developing collective responsibility—an important component of sustainability education.

Teacher Reflections and Interviews

Teacher interviews revealed several consistent themes across both institutions:

Increased Engagement: All six educators observed significantly higher levels of enthusiasm and attention during outdoor ecological games compared to traditional classroom activities.

Easier Concept Delivery: Teachers found it easier to explain ecological ideas when they were embedded in physical activity and narrative. Concepts such as pollution, recycling, and protection of nature were better understood and remembered.

Spontaneous Vocabulary Use: Children began using ecological terms in other contexts (e.g., lunchroom, restroom), often reminding peers to "protect" or "save."

One teacher from Group A noted:

"When we played 'Clean the Meadow,' it was the first time I saw children correcting each other about throwing paper on the ground. That never happened during our Earth Day lessons indoors."

Another teacher emphasized the value of integrating movement with moral education: "These games go beyond physical activity—they build empathy, language, and teamwork. It's holistic."

Comparison with Control Group

In contrast, the control group, which engaged in indoor lessons with no movement or environmental theme, showed negligible change in post-test scores. Their ecological vocabulary improved by only 8%, and cooperative behavior remained unchanged. Observations revealed lower levels of emotional involvement and fewer spontaneous eco-actions. This comparative data strongly supports the hypothesis that embodied, outdoor play is more effective than passive learning when teaching complex values like ecological responsibility.

Group	Eco-Vocab Gain	Emotional Change	Cooperation Gain
Experimental	+44%	+41%	+37%
Control	+8%	+4%	+3%

Interpretation and Pedagogical Implications

The outcomes of this study affirm the power of movement-based learning, especially when merged with ecological themes. Children in the experimental group did not merely memorize facts—they felt the concepts, enacted them, and began to live them. The success of these activities can be attributed to several pedagogical factors:

Multisensory engagement — Games involve sight, sound, movement, and touch, making learning more memorable.

Social interaction — Cooperation and communication naturally occur in group play.

Narrative structure — The use of storytelling (e.g., forest in danger, animal heroes) aids cognitive processing and emotional resonance.

Repeated exposure — Playing eco-games multiple times over four weeks helped consolidate vocabulary and behavior.

Furthermore, the role of educators as facilitators, not just instructors, proved critical. Teachers who embraced playful methods and linked abstract concepts with concrete actions saw deeper understanding and motivation among children.

These findings align with constructivist theories of learning (Piaget, Vygotsky), which posit that knowledge is built through experience, social interaction, and personal discovery. They also reinforce global pedagogical shifts toward Education for Sustainable Development (ESD), which UNESCO defines as "participatory, action-oriented and learner-centered."

CONCLUSION

The present study has provided compelling evidence that outdoor ecological movement games serve as an effective and developmentally appropriate method for fostering environmental awareness among preschool-aged children. Through a combination of structured play, thematic storytelling, physical activity, and emotional engagement, preschoolers in the experimental group demonstrated significant gains in ecological vocabulary, prosocial behavior, and emotional attachment to nature. These gains were not only observable in assessments but were also evident in spontaneous behaviors and language use during daily preschool activities.

The findings support the growing body of literature suggesting that experiential, multisensory, and embodied learning strategies are more effective than passive, lecture-based approaches—especially in early childhood settings. Ecological education, when implemented through play, becomes not only a cognitive task but a lived experience, enabling children to internalize environmental values and translate them into action.

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