



Environmental Sustainability as a Pedagogical Framework in Early Childhood Education

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ABSTRACT

The main objective of this paper is to seek to investigate the integration of environmental sustainability as a pedagogical framework in early childhood and primary education. Researchers examine how sustainability education influences cognitive, social, and emotional competencies from an early age. Researchers adopted a descriptive survey design and stratified random sampling of educators and administrators across four educational clusters in Nigeria. Based on the study, researchers draw the inference that, educators' perceptions significantly influenced the implementation of sustainability practices. The study concludes that sustainability education is essential for nurturing creative, collaborative, and critical-thinking learners.

Keywords: Childhood Education, Pedagogy, Environmental Sustainability, Urbanization, Westernization.

1. INTRODUCTION

In an era defined by climate change, resource depletion, and ecological degradation, the urgency to instill environmental consciousness from an early age has never been greater. Education, particularly in formative years, holds transformative potential to foster environmental stewardship through a sustainability-oriented framework (UNESCO, 2020). However, while global policy discourse strongly recommends education for sustainable development (ESD), its translation into concrete early learning pedagogies remains fragmented and inconsistent (Davis, 2015; Barratt Hacking, Cutter-Mackenzie, & Ritchie, 2013).

Environmental sustainability refers to responsible interaction with the environment to avoid depletion or degradation of natural resources and ensure their long-term availability (Md & Md, 2021). Key aspects include protecting ecosystems, reducing pollution, conserving nonrenewable resources, and making long-term economic and policy decisions. Elliott and Davis (2009) describe it as an integrated practice that fosters critical thinking and participation among children to build a sustainable world. Teaching sustainability thus aligns with ESD goals by embedding its principles into everyday education.

Environmental sustainability teaching involves educational practices that instill in learners the knowledge, skills, values, and attitudes necessary to understand environmental challenges and take responsible action (Cutter-Mackenzie-Knowles & Barlett, 2022). In early childhood education (ECE), this takes the form of age-appropriate, play-based, and community-integrated activities that encourage exploration and care for the natural world (Babatunde & Ogunlade, 2023).

In traditional Nigerian societies, environmental consciousness was not transmitted through formal instruction; rather, it was an integral part of daily life. Children developed a deep respect for rivers, forests, animals, and the land through

folktales narrated by elders, farming practices aligned with seasonal cycles, and communal values rooted in moderation, stewardship, and collective responsibility. These indigenous knowledge systems functioned as informal yet profoundly effective frameworks for environmental sustainability (Adekunle & Nwaechefu, 2019).

However, the advent of rapid urbanisation, westernisation, and the growing dominance of formal education systems has contributed to the erosion and undervaluation of this ecological wisdom within early learning environments. Despite increasing emphasis on sustainability education within global policy frameworks, there remains a disconnect between modern pedagogical imperatives and the traditional ecological heritage that once informed children's daily realities.

Bridging this cultural divide—between the environmental values once absorbed at the fireside and the structured curriculum of today's classrooms—is both timely and necessary. Although sustainability was seldom addressed in formal schooling four decades ago, the mounting threat of environmental degradation and intensified global advocacy have underscored the urgency of introducing sustainability concepts during the earliest stages of cognitive and moral development (Aneke et al., 2023).

In Nigeria, environmental education has gradually entered public discourse, particularly in the wake of challenges such as deforestation, oil spillage, waste mismanagement, and urban flooding (NEST, 2008; Ekanade, 2017). Research by Okorie and Agomuo (2021) on sustainability in Nigerian nursery classrooms identified a lack of structured curricula and insufficient teacher training as significant barriers to implementation. Similarly, Uzoagba and Okwuedei (2020) found that while many teachers expressed positive attitudes toward environmental themes, only a few had practical exposure to pedagogical strategies.

Babalola (2022) highlighted the challenge of aligning Nigeria's National Policy on Environment with educational frameworks at the foundational level. Moreover, studies by Salami and Lawal (2018) emphasised that early childhood centres in regions like Lagos and Enugu struggle to access green spaces or natural play areas—further hindering sustainability-related activities. Despite policy support, implementation remains sporadic and reliant on individual educator initiative rather than systemic change.

Nonetheless, there are promising examples. Initiatives such as the Clean and Green Schools Project in Lagos and Rivers states have piloted school gardens, recycling drives, and environmental clubs with measurable success in learner engagement (Iyamu & Uwadiae, 2019). These findings echo the importance of embedding sustainability into both teacher education and school infrastructure development to ensure meaningful integration.

Collectively, these Nigerian-specific studies underscore the complexity and urgency of contextualising sustainability education. They highlight the interplay of cultural heritage, policy gaps, environmental realities, and pedagogical readiness that shape how sustainability is (or isn't) translated into practice within Nigerian early years settings.

1.1 Early Childhood Education Framework

Early childhood education prioritises holistic development across cognitive, emotional, and social domains (UNESCO, 2015). Defined by the FRN (2004) as pre-primary education, it aims to prepare children for primary school while fostering curiosity, creativity, and respect for nature through exploration.

1.3. Theoretical Constructs

- i. **Creativity:** The ability to generate original ideas and solve problems innovatively (Runco & Jaeger, 2012).
- ii. **Pedagogical Framework:** A structured approach guiding teaching and learning (Alexander, 2008).
- iii. **Life Skills:** Psychosocial abilities like empathy, teamwork, and communication (WHO, 1999).

- iv. **Educator Perceptions:** Teachers' beliefs influence their willingness and ability to implement sustainability education (Hooper et al., 2022).
- v. **Challenges:** Overcrowded curricula, limited nature exposure, and insufficient teacher training (Barratt Hacking et al., 2013; Ernst, 2014).

These constructs aligns with the Bronfenbrenner's Ecological Systems Theory (1979) and the Social Model of Disability (Oliver, 1986) this study is anchored. **Ecological Systems Theory** explains how environments and systems influence creativity, pedagogy, life skills, and teacher perceptions. **Social Model of Disability** frames "challenges" as barriers in the system, not deficits in the learner, thereby linking the constructs with inclusive pedagogical approaches.

1.4 Creativity

- i. **Ecological Systems Theory (Bronfenbrenner, 1979):** Creativity can be nurtured or hindered by the microsystem (family, teachers, peers) and the exosystem (school policies, community resources). A supportive learning environment stimulates innovative thinking.
- ii. **Social Model of Disability (Oliver, 1986):** Creativity aligns indirectly. It suggests that barriers to self-expression (rigid curricula, inaccessible environments) limit children's creativity. Removing such barriers allows every child, including those with disabilities, to contribute innovatively.

2. PEDAGOGICAL FRAMEWORK

- i. **Ecological Systems Theory:** Teaching frameworks exist within the mesosystem and exosystem, influencing how educators connect family, school, and community expectations.
- ii. **Social Model of Disability:** A flexible pedagogical framework that accommodates diversity reduces disabling barriers, enabling inclusive participation in learning.

3. LIFE SKILLS

- i. **Ecological Systems Theory:** Life skills such as empathy, teamwork, and communication develop through interactions in the *microsystem* (peer groups, teachers, parents) and extend across the *mesosystem* (school–home–community links).
- ii. **Social Model of Disability:** Life skills training equips children to navigate environments where disabling barriers have been reduced, thereby fostering agency and social inclusion.

4. EDUCATOR PERCEPTIONS

- i. **Ecological Systems Theory:** Teachers' perceptions are part of the microsystem influence, shaping how children engage with sustainability education. Their beliefs affect interactions across other systems (school policies, parental engagement).
- ii. **Social Model of Disability:** Negative perceptions can function as attitudinal barriers. Conversely, inclusive attitudes dismantle barriers and support all learners.

5. CHALLENGES

- i. **Ecological Systems Theory:** Barriers like overcrowded curricula and lack of access to nature show how the exosystem and macrosystem (educational policies, societal priorities) influence classroom practice.
- ii. **Social Model of Disability:** These challenges can be seen as disabling structures—systemic barriers preventing equitable access to sustainability education. Addressing them aligns with the model's call to remove structural and attitudinal obstacles.

5.1 Significance of the Study

This study carries meaningful implications for a range of stakeholders—educators, children, communities, policymakers, and researchers—by addressing the integration of environmental sustainability within early childhood education.

1. Enhancing pedagogical practices with sustainability themes

The study equips teachers with practical approaches to weave sustainability into everyday classroom experiences. By embedding eco-friendly practices and themes within play, stories, and daily routines, educators can move beyond traditional teaching methods towards fostering more engaging, hands-on learning.

2. Promoting environmental consciousness among learners

At an early age, children are highly receptive to the values and behaviours modelled around them. By introducing sustainability concepts early, the study encourages children to develop a lasting sense of care and responsibility for their environment, helping them grow into conscious, active citizens.

3. Empowering teachers with effective strategies

Teachers often struggle with overcrowded curricula and limited resources. This study provides evidence-based strategies that make it easier for educators to deliver sustainability education without adding unnecessary burdens. In doing so, it boosts teachers' confidence and professional growth.

4. Guiding policy on curriculum development

Findings from the study serve as a valuable resource for policymakers who seek to revise or enrich the national curriculum. By highlighting workable models of sustainability education, the study helps to ensure that environmental awareness becomes an integral part of early years learning across Nigeria.

5. Providing data for further research

Finally, the study contributes to the growing body of knowledge on environmental education in the early years, offering robust data that can be built upon by future scholars. It paves the way for longitudinal studies, comparative analyses, and international collaborations that can further advance sustainability-focused pedagogy.

Statement of the Problem

Across many early learning classrooms—especially in under-resourced settings—children spend their most impressionable years in environments that rarely reflect the natural world. Lessons are often delivered through rigid routines, worksheets, and rote memorisation. The researcher observed that children often showed curiosity about the environment, yet the curriculum lacked the structure to nurture it.

In an age marked by climate disruption, ecological degradation, and rapid social change, this absence is deeply worrying. Early childhood is a time when foundational attitudes toward life, society, and the planet are formed. Yet, environmental sustainability remains peripheral in most early education systems, particularly in regions like sub-Saharan Africa (UNESCO, 2021; Davis, 2009). This gap risks raising generations who are ill-equipped to think critically about environmental challenges or develop the resilience and collaboration skills. This study arises from that concern and hope.

Purpose of the Study

To explore how environmental sustainability can serve as a core pedagogical framework in early education to promote responsible citizenship and adaptive learning.

Specific Objectives:

1. Explore educators' perceptions of sustainability integration.
2. Investigate the impact on creativity and life skills.
3. Examine how innovative strategies affect engagement and awareness.

Research Questions

1. How do educators perceive sustainability integration?
2. What impact does it have on creativity and life skills?
3. How does it influence engagement and awareness?

Hypotheses

- H_{01} : Educator perceptions do not significantly influence implementation.
- H_{02} : Sustainability pedagogy does not significantly enhance life skills.
- H_{03} : No significant difference in perceptions and creativity development.

Literature Review

The importance of environmental sustainability in early childhood education (ECE) has gained international attention in recent years, reflecting growing concerns about ecological degradation and the role of education in fostering responsible citizenship from an early age. A robust body of literature now advocates for integrating sustainability principles into early learning environments through participatory, play-based, and culturally relevant approaches. This review synthesises global and Nigerian scholarship on sustainability education in early childhood, drawing attention to five key thematic areas: pedagogical approaches, hands-on and nature-based learning, and integration of indigenous knowledge, developmental impacts, and implementation barriers. Together, these perspectives provide a comprehensive understanding of how early childhood settings can foster environmental responsibility and ecological awareness.

Pedagogical Approaches to Sustainability in Early Childhood

Sustainability education in early childhood is increasingly viewed as an interdisciplinary and experiential process. Integrating sustainability across early learning curricula allows children to actively participate in shaping their environments and developing the values, behaviours, and competencies necessary for sustainable futures. For instance, the Swedish preschool curriculum recognises children as active agents in sustainability education by embedding environmental, social, and economic dimensions into its learning objectives (Barratt Hacking, Cutter-Mackenzie, & Ritchie, 2013).

In Nigeria, however, early childhood pedagogy has yet to fully adopt this integrative approach. Most early learning settings still operate within traditional, exam-focused models that prioritise rote memorisation over inquiry-based or child-led exploration (Babatunde & Ogunlade, 2023). As a result, sustainability remains a peripheral theme rather than a core pedagogical objective.

Hands-On and Nature-Based Learning

Hands-on, play-based activities are essential in fostering environmental awareness and sustainable behaviours in young children. Activities such as gardening, composting, recycling, and nature walks help children understand ecological processes and develop empathy toward living systems (Wilson, 1996). According to the Children and

Nature Network (2023), engagement with natural outdoor settings enhances curiosity, executive function, and emotional resilience in early learners.

Chawla and Cushing (2007) also found that children who participate in environmental activities demonstrate heightened problem-solving abilities and empathy. These behavioural traits are vital for coping with environmental change and social instability.

In the Nigerian context, some efforts have emerged at the community level, including tree-planting projects and school-based garden programmes. However, these initiatives are rarely embedded into the formal curriculum or evaluated for long-term impact (Adekunle & Nwaechefu, 2019).

Integration of Indigenous and Local Knowledge

Incorporating Indigenous Ecological Knowledge (IEK) enriches early childhood sustainability education by linking it to local traditions and values. Acharibasam and McVittie (2022) argue that IEK not only contextualises sustainability but also fosters cultural continuity and a sense of stewardship among young learners.

Traditionally, Nigerian children acquired environmental values through oral folktales, communal farming, and seasonal rituals. These indigenous frameworks taught moderation, respect for biodiversity, and collective responsibility (Adekunle & Nwaechefu, 2019). Unfortunately, such knowledge systems are diminishing under the influence of urbanisation, westernisation, and the erosion of community-based learning structures (Aneke, Olunwa, Nweke, & Dike, 2023).

Reintegrating this heritage into formal schooling could provide culturally relevant pathways to sustainability while enhancing children's sense of identity and belonging.

Impact of Sustainability Education on Child Development

Research suggests that sustainability education in early years supports holistic child development. Elliott and Davis (2009) highlight the correlation between sustainability pedagogy and increased creativity, emotional intelligence, and cooperative behaviour. Nature-based learning environments have also been linked to improvements in self-regulation, attention span, and resilience—key developmental attributes during early childhood.

In Nigeria, where environmental degradation and socio-economic uncertainties disproportionately affect vulnerable populations, equipping children with adaptive skills through sustainability education is increasingly urgent (Babatunde & Ogunlade, 2023).

Challenges and Barriers to Implementation

Despite global recognition of sustainability's importance, implementation in Nigerian early childhood contexts remains constrained by systemic barriers. These include limited funding, inadequate teacher training, rigid curricular structures, and insufficient community engagement (Siraj-Blatchford et al., 2002; UNESCO, 2020).

Moreover, early childhood educators often lack the professional development opportunities necessary to build capacity in sustainability pedagogy (Hooper, Potts, & Walton, 2022). Without policy alignment, institutional commitment, and resource mobilisation, integrating sustainability into early education will remain aspirational rather than actionable.

Methods: A multi-stage sampling technique was utilised to obtain a representative sample of 370 early childhood educators, school administrators, and curriculum officers. The selection spanned **six Local Government Areas across four South–South Nigerian states:** Rivers, Bayelsa, Delta, and Akwa Ibom. These states were chosen due to their environmental vulnerability and policy relevance in the Niger Delta region. In Stage 1, LGAs were purposively selected to reflect socio-economic and ecological diversity. In Stage 2, early childhood centres were stratified by:

- **Ownership type** (public/private),
- **Location** (urban/rural),
- **Environmental sustainability activity levels** (high/low).

Simple random sampling was then employed within each stratum to select participants, ensuring inclusiveness by gender, experience, and professional qualification. This sampling strategy enhanced both the representativeness and credibility of the findings.

Instrumentation: A validated questionnaire was used, and a pilot study established internal reliability (Cronbach's $\alpha = 0.87$). Data were collected in person.

Data Analysis: The descriptive statistics, t-tests, and one-way ANOVA were used to test hypotheses. Effect sizes were computed.

6. RESULTS

Research Question 1 (RQ1): How do educators perceive sustainability integration?

Hypothesis 1: There is no significant difference in perceptions and creativity development.

Statistic	Value
Mean (SD)	3.85 (0.47)
Test Used	t-test
t-value	3.42
p-value	0.001
Effect Size	0.81 (Large)

With a p-value of 0.001, which is less than 0.05, the result is statistically significant. Hence, the null hypothesis (H_1) is rejected. The large effect size ($d = 0.81$) indicates that sustainability pedagogy has a strong and meaningful impact on creativity development among educators.

Research Question 2 (RQ2): What impact does it have on creativity and life skills?

Hypothesis 2: Sustainability pedagogy does not significantly enhance life skills.

Statistic	Value
Mean (SD)	3.92 (0.52)
Test Used	ANOVA
F-value	5.21
p-value	0.007
Effect Size	0.18 (Medium)

The p-value of 0.007 is below the 0.05 threshold, confirming a statistically significant effect of sustainability pedagogy on life skills. Thus, the null hypothesis (H_2) is rejected. The medium effect size ($\eta^2 = 0.18$) further supports a moderate practical significance.

Research Question 3 (RQ3): How does it influence engagement and awareness?

Hypothesis 3: Educator perceptions do not significantly influence implementation.

Statistic	Value
Mean (SD)	4.12 (0.56)
Test Used	t-test
t-value	2.88
p-value	0.005
Effect Size	0.69 (Medium)

The p-value of 0.005 is less than the significance level of 0.05, indicating a statistically significant influence of educator perceptions on implementation. Therefore, the null hypothesis (H_3) is rejected. The effect size ($d = 0.69$) suggests a medium practical significance.

Discussion of Findings

The findings of this study offer strong empirical evidence on the role of sustainability pedagogy in shaping creativity, life skills, and implementation practices within early childhood education. Each result provides valuable insight into how ecological and social theoretical frameworks can be translated into educational practice.

Educators' Perceptions and Creativity Development (RQ1).

The results reveal that sustainability pedagogy significantly enhances creativity, with a large effect size ($d = 0.81$). This demonstrates that when educators integrate environmental themes into teaching, they not only expand children's awareness of ecological issues but also foster originality and problem-solving skills. From the perspective of **Bronfenbrenner's Ecological Systems Theory**, this aligns with the microsystem level, where immediate interactions between teachers and children directly shape developmental outcomes. By embedding sustainability in classroom activities, educators create a stimulating environment that encourages children to think divergently and adapt to new challenges.

Furthermore, the **Social Model of Disability** highlights that creativity should not be viewed through deficit-based assumptions of learners' abilities. Rather, inclusive pedagogical frameworks such as sustainability open opportunities for all children, regardless of background or ability, to engage meaningfully. Hence, sustainability pedagogy not only enhances creativity but also reflects a socially inclusive approach, dismantling structural barriers to participation.

Impact on Life Skills (RQ2).

The second finding shows that sustainability pedagogy has a statistically significant and moderately strong effect ($\eta^2 = 0.18$) on life skills such as communication, empathy, and teamwork. This suggests that engaging children in environmental projects develops transferable psychosocial skills essential for navigating modern society. According to **Bronfenbrenner**, such skills are fostered not only within the classroom (microsystem) but also through interactions with peers, families, and community stakeholders (mesosystem). Sustainability activities—such as group gardening, recycling projects, or nature-based explorations—act as bridges that strengthen these systems and reinforce children's ability to collaborate across contexts.

Within the framework of the **Social Model of Disability**, life skills education empowers children by equipping them with functional capacities that transcend restrictive labels of ability. Instead of categorising learners as limited,

sustainability pedagogy reframes them as contributors to environmental care, thereby promoting agency and inclusivity. This aligns with Oliver's argument that social barriers, rather than individual impairments, hinder participation.

Influence of Educator Perceptions on Implementation (RQ3).

The third result demonstrates that educators' beliefs and attitudes significantly influence the extent to which sustainability pedagogy is implemented ($p = 0.005$, $d = 0.69$). This finding reinforces the principle that teachers act as gatekeepers of curriculum innovation. Where educators perceive sustainability as integral, they are more likely to adopt creative strategies and provide children with rich, ecologically grounded experiences.

From **Bronfenbrenner's theory**, this highlights the exosystem and macrosystem influences, as educators' perceptions are shaped not only by personal values but also by institutional policies, community norms, and cultural attitudes towards environmental education. If policies and training schemes promote sustainability, educators are more empowered to integrate these practices.

Through the lens of the **Social Model of Disability**, the role of educators' perceptions is equally significant. Teachers who view sustainability as inclusive pedagogy challenge the status quo by ensuring that all children, including those with disabilities, can meaningfully participate. For instance, adaptations to outdoor activities or recycling projects can be structured to accommodate diverse learning needs, thereby resisting exclusionary practices.

In the foregoing, these findings indicate that sustainability pedagogy is not a marginal add-on but a transformative framework that enhances creativity, cultivates essential life skills, and depends largely on educator agency for effective implementation. Bronfenbrenner's theory underscores how ecological systems interact dynamically to shape children's development, while Oliver's Social Model reminds us that inclusivity must underpin such frameworks to ensure equity. Thus, sustainability education serves both as a pedagogical innovation and as a tool for dismantling systemic barriers in early childhood learning environments.

Summary of Findings

The study investigated educators' perceptions and the impact of sustainability pedagogy on creativity, life skills, engagement, and awareness. The results, analysed using t-tests and ANOVA at a 0.05 significance level, revealed the following:

- 1. Educators' Perception and Creativity (R1H1):**

A statistically significant difference was found in educators' perceptions regarding the integration of sustainability pedagogy and its influence on creativity development ($p = 0.001$, $d = 0.81$). This indicates a strong positive impact, leading to the rejection of the null hypothesis.

- 2. Impact on Life Skills (R2H2):**

The analysis showed a significant enhancement in life skills through sustainability-focused teaching methods ($p = 0.007$, $\eta^2 = 0.18$). This moderate effect size supports the pedagogical value of sustainability in fostering essential life competencies.

- 3. Influence on Engagement and Awareness (R3H3):**

Educators' perceptions were found to significantly influence the implementation of sustainability pedagogy ($p = 0.005$, $d = 0.69$). The medium effect size confirms that positive perceptions contribute meaningfully to learner engagement and awareness.

These findings demonstrate that sustainability pedagogy is a significant catalyst for improving creativity, life skills, and learner engagement, with educator perception playing a pivotal role in its effective implementation.

Educational Implication

The findings from this study offer valuable insights into how schools can reshape teaching and learning to meet the demands of a changing world. First, the clear improvement in children's creativity and life skills suggests that environmental sustainability should not be treated as a separate topic but woven meaningfully into the daily curriculum. When young learners engage with real-world environmental issues, their problem-solving, empathy, and teamwork abilities grow alongside academic knowledge.

Secondly, the study shows that how educators perceive sustainability greatly influences its success in the classroom. This underscores the need for ongoing teacher training—not just to build knowledge, but to boost confidence in using creative, sustainability-focused approaches. When teachers are well-equipped, they can bring lessons to life in ways that inspire young minds.

Hands-on learning—such as gardening, nature walks, and recycling projects—also emerged as key. These approaches make learning memorable and allow children to connect emotionally with their environment. Schools should invest in these experiences to promote long-term behavioural change.

Moreover, the support of school leadership is essential. Policies, funding, and resources must reflect a commitment to sustainability, not just as an idea but as an everyday practice. Finally, involving parents and communities makes learning more relevant and lasting. When children see environmental values reinforced at home and in their surroundings, the impact is even stronger.

7. CONCLUSION

Integrating environmental sustainability in early education will enhance creativity, engagement, and life skills. Educator beliefs significantly affect implementation, confirming the importance of supportive policy and infrastructure.

8. RECOMMENDATIONS

1. Integrate sustainability themes across early childhood curricula.
2. Provide professional development in sustainability pedagogy.
3. Promote experiential and play-based learning.
4. Develop supportive policy frameworks.
5. Strengthen partnerships between schools and communities.
6. Establish systems to monitor and scale sustainable practices.

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