

Art, Ecopedagogy and Digital Media for Environmental Awareness in Elementary Schools: A Narrative Review

Niswatun Khalim, Nurul Istiq'faroh*, Suryanti

Universitas Negeri Surabaya, Surabaya, Indonesia

*Corresponding author, e-mail: nurulistiqfaroh@unesa.ac.id

Abstract

This narrative literature review examines environmental education in elementary schools, with a particular focus on making learning more contextual, engaging, and connected to students' lived experiences. Climate change is often perceived as an abstract phenomenon, rendering conceptual explanations alone insufficient for fostering meaningful understanding among young learners. This review synthesizes 15 literature sources, comprising 12 empirical studies (including research and development, pre-experimental, classroom action research, and mixed-methods studies), 2 conceptual articles, and 1 global policy report, published between 2017 and 2025. The sources address teaching materials, digital media, ecopedagogy, ecoliteracy, STEAM-PjBL, and arts-based environmental education. Literature selection was conducted through purposive sampling with clearly defined inclusion and exclusion criteria, followed by thematic analysis to identify convergent patterns, divergent findings, and research gaps across the corpus. The findings indicate that supplementary teaching materials, interactive e-modules, game-based E-LKPD, and digital media enhance student engagement by presenting content visually, interactively, and in alignment with elementary learners' developmental characteristics. Ecopedagogical and ecoliteracy approaches further support students in understanding environmental issues, cultivating concern, and translating awareness into tangible actions. Art integration provides expressive and affective entry points, enabling students to engage emotionally with environmental challenges and develop deeper comprehension of climate change. The main contribution of this review is a triadic conceptual framework that integrates art, ecopedagogy, and innovative digital media to foster environmental awareness among elementary school students, a synthesis that addresses a gap in existing literature where these three dimensions have largely been examined in isolation.

Keywords: Ecopedagogy, Art, Elementary school, Climate change



This is an open access article distributed under the Creative Commons Attribution-ShareAlike 4.0 International License.

©2021 by author

Introduction

Environmental education has become one of the important needs in the current learning process. Climate change, the reduction of green spaces, environmental pollution, and low environmental awareness are issues that not only require technical solutions but also a change in mindset and behavior from an early age. Education at the elementary school level holds a strategic position where, at this stage, students begin to build habits, values, and attitudes that can influence their behavior in the future (Rahayu et al., 2023). The learning about environmental care in elementary schools is often still conveyed in an informative manner and revolves around theoretical aspects. Students are introduced to the concept of the environment, but they do not yet have proportional space to provide opportunities for students to experience, observe, express, and take concrete actions related to their surrounding environment. As a result, learning about the environment risks stopping at the knowledge aspect, rather than awareness and behavior (Kemendikdasmen, 2025). It should be noted that ecological awareness is not only formed from memorizing theory but also from direct experience in order to touch on cognitive, affective, and creative aspects.

Previous studies on supplementary teaching materials for elementary education reveal a convergent pattern: the development of contextual and culturally-grounded materials consistently yields high validity and practicality. For instance, Azizah (2019) developed a local culture-based supplementary book for

Art, Ecopedagogy and Digital Media for Environmental Awareness in Elementary Schools: A Narrative Review

Indonesian language using the CIRC model, achieving validation scores above 96% and significant improvements in narrative writing skills. Similarly, Ainia & Handayani (2020) developed a dance art supplementary book for elementary students, while Budiman (2022) developed digital literacy-based supplementary materials for arts and culture (SBdP) subjects, with validation percentages ranging from 93% to 100%. Despite these high validation outcomes, a notable gap emerges: most of these studies focus primarily on cognitive skill development and material feasibility, with limited attention to how such materials might foster environmental awareness or ecological consciousness. Recent research has begun to address this gap by integrating approaches such as e-modules, game-based E-LKPD, STEAM-PjBL, and ecopedagogy in environmental education contexts (Zainil et al., 2025; Arisyanto & Suhermin, 2023). However, the intersection of art, ecopedagogy, and innovative learning media specifically targeting environmental awareness among elementary students remains underexplored, a gap this narrative review seeks to address.

Like the research conducted by Ilmiati, who created an interactive e-module on climate change material for elementary school students and found very good validation and response results (Ilmiati et al., 2025). To enhance students' critical thinking skills, Saputri's research also developed a game-based E-LKPD with a deep learning approach on environmental issues. Meanwhile, Anggraini (2025) found that STEM/STEAM-PjBL-based learning increases students' environmental awareness. In addition to media development, the ecopedagogical approach and ecoliteracy also serve as important foundations in environmental education. Yunansah and Herlambang (2017) emphasize that ecopedagogy not only aims to build environmental knowledge but also to shape ecological literacy, attitudes, skills, participation, and socio-environmental actions. In line with that, Misbahudholam AR, Sama', and Aini (2023) demonstrate that the implementation of ecoliteracy as a learning resource can enhance the environmental awareness of elementary school students.

Art emerges as a significant approach in environmental education, functioning not merely as a communication tool but as a space for dialogue, expression, reflection, and transformative learning experiences (Bentz, 2020). Saraiva & Azevedo (2020) further demonstrate that art-based environmental projects enhance student engagement through interaction and creative production, bridging scientific knowledge with emotional experiences. However, the full potential of art in fostering environmental awareness is realized when integrated with two complementary dimensions: ecopedagogy and innovative digital media.

Ecopedagogy, rooted in critical pedagogy and ecological ethics, provides the philosophical foundation by emphasizing socio-environmental justice, ecological citizenship, and action-oriented learning (Gadotti, 2016; Misiaszek, 2025). It shifts environmental education from mere knowledge transmission toward transformative praxis, where students critically examine human-nature relationships and their role within ecosystems (Kahn, 2010). Meanwhile, innovative learning media, particularly digital tools such as e-modules, gamified E-LKPD, and interactive platforms, serve as the delivery mechanism that makes art-based ecopedagogical experiences accessible, engaging, and developmentally appropriate for elementary students (Zainil et al., 2025; Arisyanto & Suhermin, 2023). Digital media can amplify artistic expression through multimedia formats, enable virtual ecological explorations, and provide immediate feedback that sustains curiosity and participation (He & Jing, 2022).

The conceptual relationship among these three constructs can be understood through the following integrative model: Art (Expressive & Affective Dimension) + Ecopedagogy (Critical & Ethical Dimension) + Digital Media (Technological & Interactive Dimension) → Enhanced Environmental Awareness (Cognitive, Affective, and Behavioral Outcomes). In this model, art provides the affective entry point, evoking empathy, wonder, and emotional connection to nature (Curtis et al., 2014). Ecopedagogy provides the critical analytical framework, guiding students to question environmental injustices and envision sustainable alternatives (Misiaszek, 2025). Digital media provides the interactive scaffolding, facilitating personalized, playful, and multimodal exploration that sustains engagement and deepens understanding (He & Jing, 2022). The synergy among these three dimensions creates a holistic learning ecology where environmental awareness is not merely informed but felt, critiqued, and acted upon, transforming passive learners into ecologically conscious citizens. This triadic framework underpins the present narrative review, which synthesizes existing evidence to examine how the intersection of art, ecopedagogy, and innovative media contributes to environmental awareness formation in elementary school contexts.

While previous literature reviews have examined art-based environmental education and ecopedagogical approaches in K-12 settings, two critical gaps remain. First, existing systematic reviews have predominantly focused on art or ecopedagogy in isolation, with scant attention to how these two dimensions might be systematically integrated with digital or interactive learning media. Second, reviews that do address the intersection of art and nature have primarily targeted adolescent or adult populations, leaving the elementary

Art, Ecopedagogy and Digital Media for Environmental Awareness in Elementary Schools: A Narrative Review

school context, where foundational environmental values and attitudes are most malleable, significantly underexplored. Moreover, the simultaneous integration of art, ecopedagogy, and innovative media in elementary environmental education represents a distinct theoretical and practical contribution. Art provides affective and experiential entry points for young learners, evoking empathy and wonder toward nature; ecopedagogy offers a critical and ethical framework that moves beyond knowledge transmission toward transformative ecological citizenship; and innovative media, such as gamified digital tools and interactive platforms, serves as an age-appropriate delivery mechanism that sustains engagement and facilitates multimodal exploration. The synergy among these three constructs has not been systematically synthesized in previous narrative or systematic reviews, particularly in the context of elementary schooling.

Therefore, the novelty of this narrative review lies in its focused synthesis of how the triadic integration of art, ecopedagogy, and innovative learning media can enhance environmental awareness among elementary school students, a population whose developmental characteristics (e.g., concrete thinking, high imagination, and emotional receptivity) make this integrative approach especially promising. This review not only synthesizes fragmented evidence across disparate fields but also provides a conceptual framework for designing more holistic, contextually-relevant environmental education interventions for young learners.

Method

Type and Design of Research This research uses a qualitative research type with a narrative literature review design. This design was chosen because the research does not aim to statistically test a hypothesis, but to compile a conceptual synthesis of various literatures discussing climate change education, art, ecopedagogy, ecoliteracy, digital media, STEAM-PjBL, deep learning, and environmental awareness. The narrative literature review approach allows researchers to compare previous research findings, identify patterns, pinpoint weaknesses in earlier studies, and formulate directions for developing climate change education based on art and ecopedagogy in elementary schools.

This narrative literature review draws upon scientific articles and previous research findings relevant to the intersection of art, ecopedagogy, innovative learning media, and environmental awareness in elementary education. The narrative literature review approach was chosen for its flexibility in exploring conceptual interconnections and identifying thematic patterns across diverse bodies of literature (Maggio et al., 2018). The primary corpus consists of 15 peer-reviewed articles, encompassing studies on supplementary book development, interactive e-modules, game-based E-LKPD, deep learning approaches in environmental education, dance art supplementary books, digital literacy teaching materials for SBdP (Arts, Culture, and Craftsmanship), STEAM-PjBL, ecopedagogy-based digital teaching materials, ecoliteracy, ecoprint, art-based environmental education, and climate change learning through art. Additional supporting literature was incorporated to strengthen the global context, particularly from sources addressing climate change education, Education for Sustainable Development (ESD), and green curriculum policies (UNESCO, 2024).

To ensure systematic and transparent literature selection, a purposive sampling strategy was employed with clearly defined inclusion and exclusion criteria. The inclusion criteria were as follows: (a) publication period: articles published between 2019 and 2025 to capture recent developments in environmental education; (b) document type: peer-reviewed journal articles, book chapters, or official conference proceedings; (c) article language: English or Indonesian, given the research context; (d) relevance: studies explicitly addressing at least one of the core constructs (art, ecopedagogy, ecopedagogy-based, or innovative learning media) in environmental education; (e) population focus: studies conducted at elementary school level (grades 1–6) or with clear implications for this age group; and (f) methodology: empirical studies (quantitative, qualitative, or mixed-methods) reporting original data, or theoretical/conceptual articles providing substantive frameworks. The exclusion criteria included: (a) studies published prior to 2019 unless they were seminal works in ecopedagogy or art-based environmental education; (b) non-peer-reviewed sources such as opinion pieces, editorials, or unpublished theses without rigorous methodology; (c) studies focused exclusively on secondary or higher education without transferable implications for elementary learners; (d) articles that mentioned environmental awareness only tangentially without substantive discussion; and (e) studies on environmental education that did not involve art, ecopedagogical, or innovative media dimensions.

This purposive selection process, while inherently interpretive, was guided by theoretical relevance and thematic saturation to minimize subjectivity (Ahmad, 2025). The final corpus of 15 primary studies was reviewed iteratively to identify convergent patterns, divergent findings, and research gaps, consistent with established practices for narrative literature reviews (Byrne, 2016).

Art, Ecopedagogy and Digital Media for Environmental Awareness in Elementary Schools: A Narrative Review

A literature review sheet was employed as the primary data extraction instrument to systematically record key information from each included study, including article identity, research objectives, research type, population/sample, instruments, data collection and analysis techniques, main findings, contributions, and limitations. This sheet also served to assess each study's relevance to the review's thematic focus, namely, the integration of art, ecopedagogy, and innovative learning media in fostering environmental awareness.

To ensure the trustworthiness of the analysis, analogous to validity and reliability in primary research, several rigor-enhancing strategies were implemented. First, an audit trail was maintained throughout the review process, documenting all decisions regarding literature selection, thematic coding, and interpretation. This trail included a chronological record of search strategies, inclusion/exclusion decisions, and evolving analytical themes, enabling retrospective transparency and external scrutiny (Tarlochan et al., 2025). Second, a double-coding procedure was applied to a subset of 5 articles (33% of the corpus), wherein two independent reviewers coded the same articles using a standardized coding framework. Inter-rater agreement was calculated at 89%, indicating substantial consistency in interpretation; discrepancies were resolved through consensus discussion (Templier & Paré, 2015). Third, peer debriefing or expert checking was conducted by consulting two senior researchers in environmental education and elementary pedagogy, who reviewed the coding framework, preliminary thematic findings, and the final synthesis. Their feedback informed refinements to the analytical categories and strengthened the interpretive validity of the review (Green et al., 2025). Finally, triangulation across sources was employed by comparing findings from multiple studies addressing similar constructs (e.g., art-based learning, ecopedagogical interventions, digital media integration), thereby cross-validating convergent patterns and highlighting contradictory evidence (Templier & Paré, 2015). This multi-strategy approach to quality assurance, combining audit trails, double-coding, expert consultation, and source triangulation, enhances the transparency, reproducibility, and credibility of this narrative literature review, consistent with best practices for rigorous review methodologies (Green et al., 2025).

The data collection techniques were carried out in several stages. The first stage is the identification of primary literature based on a predetermined list of articles. The second stage is the search for supporting materials thru journal databases, publisher websites, and open academic sources using keywords such as climate change education, arts-based learning, ecopedagogy, ecoliteracy, STEAM-PjBL, environmental awareness, and primary school. The third stage is the selection of literature based on content relevance, publication year, educational context, and its relation to climate change education or environmental education. The fourth stage is data extraction by noting important information from each article. The fifth stage is the grouping of literature into main themes, namely teaching materials and learning media, art in environmental education, ecopedagogy, ecoliteracy, project-based learning, and climate change education.

The data analysis technique uses thematic analysis. The analysis is conducted by reading, coding, grouping, and interpreting the content of the literature based on emerging themes. The analysis stage begins with data reduction, which involves selecting the most relevant information to the study's focus. Next, the data is presented in the form of narrative descriptions and literature mapping tables. After that, the researchers conducted a synthesis by comparing the similarities, differences, contributions, and weaknesses of each study. The synthesis results are used to identify research gaps and build a conceptual framework regarding art-based climate change education and ecopedagogy in elementary schools. The analysis does not use statistical formulas because this research is not an experimental or quantitative study, but rather a literature review that emphasizes interpretation, conceptual interconnections, and the development of academic arguments.

Table 1. Distribution of Included Studies by Thematic Domain, Research Design, and Educational Level

Category	Number of Studies	Percentage
By Thematic Domain		
Instructional materials and digital media development	6	40.0%
Arts-based climate and environmental learning	4	26.7%
Ecopedagogy, ecoliteracy, and environmental awareness	5	33.3%
Total	15	100.0%
By Research Design		
Research and development	6	40.0%
Review or conceptual study	3	20.0%
Pre-experimental or quasi-experimental	2	13.3%
Mixed methods	1	6.7%
Classroom action research	1	6.7%

Art, Ecopedagogy and Digital Media for Environmental Awareness in Elementary Schools: A Narrative Review

Category	Number of Studies	Percentage
Qualitative or descriptive study	1	6.7%
Project-based study	1	6.7%
Total	15	100.0%

Results and Discussion

Based on this gap, this article offers a conceptual framework that climate change education in elementary schools needs to integrate four elements. The first element is climate literacy, which is a basic understanding of the causes, impacts, mitigation, and adaptation of climate change. The second element is art, which serves as a medium for expression, communication, and reflection. The third element is ecopedagogy, which involves a critical orientation toward the relationship between humans and the environment. The fourth element is project-based action, which consists of real activities that involve students in environmental improvement. These four elements can be arranged in a learning sequence: introduction to climate issues, exploration of the surrounding environment, artistic expression, ecopedagogical reflection, action projects, and evaluation of attitude changes.

Tabel 2. Mapping of Reviewed Literature

Author and Year	Focus of Study	Method	Main Finding	Contribution to this Review
Azizah (2019)	Indonesian language supplementary book based on local culture using CIRC	R&D ADDIE	Validation 96.2%, teacher response 91.7%, student response 85%	Reinforces the importance of context-based learning materials
Banks & Taylor (2025)	Arts-based climate change education in primary schools	Review and arts-based methods	Art helps access student voice and analyze curriculum	Supports art as a way to understand children's perspectives
Ilmiati (2025)	Interactive e-module on climate change for primary students	R&D ADDIE	Expert validation 87.5%, student response 91.75%	Strengthens the role of digital media in climate education
Saputri (2025)	Educational game-based E-LKPD on environmental issues	R&D ADDIE	Product validity 88.47%	Reinforces game-based learning as a tool for critical thinking
Nurmadyah (2025)	Deep learning in environmental education	Mixed methods	Deep learning enhances awareness and environmental action	Highlights the importance of reflection and experiential learning
Ainia & Handyaningrum (2020)	Supplementary book on dance arts for primary students	R&D	Student response 70.95%, comprehension 82.86%	Strengthens art as a systematic learning resource
Rofian (2022)	Digital literacy learning material as SBdP supplement	R&D	Material validation 93.3%, media 98.75%, teacher response 98%	Strengthens integration of art and digital literacy
Anggraini et al. (2025)	STEAM-PjBL for environmental awareness	Pre-experiment	Significant increase, $p < 0.001$	Supports art-science project for promoting environmental concern

Art, Ecopedagogy and Digital Media for Environmental Awareness in Elementary Schools: A Narrative Review

Author and Year	Focus of Study	Method	Main Finding	Contribution to this Review
Irianto et al. (2022)	Digital learning materials based on ecopedagogical approach	R&D 4-D	Product suitable for contextual learning	Strengthens digital ecopedagogical foundation
Yunansah & Herlambang (2017)	Ecopedagogical education	Conceptual study	Ecopedagogy builds literacy, attitudes, participation, and actions	Serves as theoretical foundation for the review
Misbahudholam AR et al. (2023)	Ecoliteracy for fostering environmental care attitudes	Two-cycle Classroom Action Research	Environmental care attitudes increased	Reinforces ecoliteracy as a learning resource
Kurniawan et al. (2025)	Ecoprint art using pounding technique	Art-based learning study	Ecoprint stimulates creativity and concrete learning experiences	Strengthens nature-based environmental art learning
Saraiva et al. (2020)	Environmental education through art	Project-based study	Integration of science and art enhances student engagement with environmental issues	Supports arts-based environmental learning
Bentz (2020)	Climate change education through art	Conceptual qualitative study	Art works at in, with, and through art levels	Serves as main framework for art and climate integration
UNESCO & IPCC	Climate education and urgency of climate change	Global report	Education needs to be holistic, scientific, and action-oriented	Reinforces global urgency and policy direction

Analysis of the 15 reviewed studies revealed three overarching thematic clusters that characterize current research on environmental education in elementary schools. Theme 1: Pedagogical Modalities encompasses studies examining various delivery approaches, including art-based learning, project-based learning with STEAM integration, game-based E-LKPD, and deep learning models (O’Gorman, 2014; Fitriani & Dafik, 2025; Widayanti & Dafik, 2025). Theme 2: Media and Technological Scaffolding includes studies on supplementary teaching materials, digital literacy resources, e-modules, and interactive platforms that mediate environmental content delivery (Kalyana et al., 2026). Theme 3: Philosophical and Ethical Frameworks comprises studies grounded in ecopedagogy, ecoliteracy, and ecoprint approaches, which extend environmental education beyond knowledge transmission toward value formation and ecological citizenship (Bengtsson & Andersen, 2020).

Across these thematic clusters, three consistent patterns emerged descriptively from the reviewed literature. First, climate and environmental education that relies solely on verbal or text-based explanations proves insufficient for elementary learners, who exhibit limited abstract reasoning capacity and require concrete, experiential, and emotionally resonant entry points (O’Gorman, 2014). Second, student engagement significantly increases when environmental content is presented through visual media, digital tools, artistic activities, project-based tasks, games, or locally-contextualized activities that connect to students’ immediate surroundings (Keum & Baek, 2025). Third, the ecopedagogical and ecoliteracy frameworks expand learning objectives beyond conceptual mastery to encompass care, environmental character, and pro-environmental behavior, outcomes that are more durable and actionable than knowledge retention alone.

While these descriptive patterns are well-supported empirically, several critical observations warrant consideration. First, the reviewed studies predominantly report validation and feasibility outcomes (e.g., expert validation scores above 85%) rather than effectiveness outcomes measuring actual changes in students’ environmental awareness or behavior. This raises questions about whether high validation scores translate meaningfully into classroom impact. Second, most studies are development research (R&D) with limited sample sizes and short intervention periods, constraining the generalizability of findings (Bengtsson & Andersen, 2020). Third, while individual studies address art, ecopedagogy, or digital media in isolation, the

integrated application of all three dimensions simultaneously remains theoretically proposed but empirically under-examined. This gap suggests that current evidence, while promising, has not yet demonstrated how the synergy among these three constructs operates in authentic classroom settings over extended periods. Consequently, the integration model advanced in this review should be understood as a conceptual proposition warranting further empirical investigation, rather than an established pedagogical formula (Templier & Paré, 2015).

Among the reviewed studies, Azizah (2019) developed a supplementary Indonesian language book grounded in local culture using the CIRC (Cooperative Integrated Reading and Composition) model, achieving high validation scores (96.2%), teacher responses (91.7%), and student responses (85%). While this study does not directly address climate change or environmental education, its inclusion in this review is justified on two conceptual grounds. First, it demonstrates the pedagogical viability of culturally-contextualized supplementary materials in elementary classrooms, a principle that is directly transferable to environmental education, where local ecological knowledge and place-based content are increasingly recognized as essential for fostering relevance and student connection (Damopolii et al., 2024). Second, the study illustrates how supplementary materials can bridge literacy development with students' lived experiences, a mechanism that parallels how environmental education materials can connect scientific concepts with students' everyday environmental encounters (Simanjuntak, 2025).

However, because environmental awareness or ecological themes are not the primary focus of Azizah's study, this work is positioned not as a primary source of evidence for environmental outcomes but rather as supporting literature that informs the media development dimension of this review. It provides methodological and design insights, such as validation procedures, teacher-student response patterns, and culturally-responsive content strategies, that are instructive for developing environmental education materials, even though its substantive content remains outside the environmental domain. This distinction is important: the study informs how to design effective supplementary materials, rather than what environmental content to include (Pangsuma et al., 2024). Accordingly, it is synthesized in this review alongside other development studies to identify cross-cutting design principles, while environmental outcomes are drawn exclusively from studies that directly measure ecological awareness, ecoliteracy, or pro-environmental behavior.

Ilmiati et al. (2025) developed an interactive e-module on the topic of climate change for elementary school students using the ADDIE model. The material expert validation results reached 87.5% and student responses reached 91.75%, making the e-module highly feasible and practical. These findings are important because they show that the issue of climate change can be packaged in digital media that aligns with the characteristics of elementary school students. The e-module provides opportunities for students to learn through text, images, activities, and interactions. In climate change education, digital formats can help explain processes that are difficult to observe directly, such as global warming, the greenhouse effect, extreme weather changes, or the relationship between human behavior and environmental damage. Saputri and Wulandari's (2025) research on E-LKPD based on educational games with a deep learning approach to environmental issues reinforces these findings. The developed product achieved an average validity of 88.47%. Although the research only reached the development stage, the results indicate that educational games can be an alternative to enhance the appeal of learning about environmental issues. In the context of students, games can transform complex environmental issues into challenging, participatory, and more easily understood activities. However, this research also highlights a significant gap. The validity of the product is not yet sufficient to prove its effectiveness. Further research is needed to examine the influence of E-LKPD on students' critical thinking, climate literacy, and environmental behavior.

Findings on deep learning also provide a foundation for more reflective environmental education. Nurmadyah and Fuadah (2025) researched the implementation of deep learning in environmental education and ecological awareness among high school students. The results showed that the majority of students agreed and strongly agreed that deep learning can enhance sensitivity to the school environment and encourage conservation actions. Although the context is high school, these findings remain relevant for elementary schools because they show that environmental education needs to engage students in experiencing, observing, reflecting, and acting. At the elementary school level, this principle can be simplified through school environment observations, simple discussions, art projects, and small initiatives like waste reduction or classroom greening.

Art-based literature shows different but complementary contributions. Ainia and Handayani (2020) developed a supplementary dance art book for elementary school students. The product was deemed suitable as a learning support book with a student response rate of 70.95% and a student comprehension rate

Art, Ecopedagogy and Digital Media for Environmental Awareness in Elementary Schools: A Narrative Review

of 82.86%. This research shows that art can be facilitated through systematic teaching materials. In relation to climate change education, the supplementary art book can be further developed to include movement, expression, narration, or performances with an environmental theme. Dance, visual arts, music, drama, and poetry can serve as media for students to express their views on climate and environmental issues.

Rofian et al. (2022) developed digital literacy-based teaching materials as a supplement for SBdP grade 1 with the support of barcodes and links. Material expert validation reached 93.3%, final media expert validation 98.75%, and the average teacher response was 98%. These findings are important because they show that art education in elementary schools can be strengthened through digital literacy. If linked to climate change, a similar model can be used to connect art activities with videos, images, environmental stories, or digital learning resources. In this way, SBdP not only develops creativity but can also serve as an entry point for building environmental literacy from early grades.

Bentz (2020) provides a strong conceptual foundation for understanding the position of art in climate change education. He divides art-based climate change education into three levels: in art, with art, and through art. At the in art level, art becomes a platform for communicating climate issues. At the with art level, art becomes a medium for dialogue and expression. At the through art level, art becomes a transdisciplinary learning method that encourages experiential transformation. This framework is important because it expands the understanding that art is not merely a visual aid. Art can be a pedagogical strategy to build meaning, metaphor, emotion, imagination, and space for climate change solutions.

Banks & Taylor (2025) reinforce this position through a study on climate change education in primary schools using an arts-based method. Their article uses art-based methods to access students' voices and review the English national curriculum. These findings are relevant because students often do not yet have a mature conceptual language to explain climate change. Art provides space for students to express their understanding, concerns, questions, and hopes through images, symbols, or creative works. In the context of elementary school, this approach is important because climate education needs to listen to how children understand the world, not just transfer adult thinking into the classroom.

Saraiva & Azevedo (2020) also show that the integration of environmental science and art can build enjoyable and meaningful learning. Environmental education projects in Portugal combine science, art, and solidarity. The effectiveness of the project is assessed through student engagement, the quality of interactions, and the products generated. The results show that students found the experience engaging and helpful in enhancing their understanding and interest in environmental issues. These findings provide empirical support that art can serve as a bridge between environmental concepts and active learning experiences.

The STEAM-PjBL approach expands the integration of art into project-based learning. Anggraini & Herwin (2025) researched STEAM-PjBL to enhance environmental awareness among elementary school students. The study used a one-group pretest-posttest design with 16 sixth-grade students. The test results showed a significant difference before and after the treatment with $p < 0.001$. These findings show that the integration of science, technology, engineering, arts, mathematics, and real projects can enhance students' environmental awareness. In climate change education, STEAM-PjBL can be used for projects such as creating energy-saving posters, school mini-gardens, plastic reduction campaigns, ecobricks, weather documentation, or art installations from recycled materials.

Ecopedagogy and ecoliteracy provide an ethical foundation for such learning. Yunansah & Herlambang (2017) emphasize that ecopedagogy aims not only to build environmental knowledge but also literacy, attitudes, skills, participation, and socio-environmental actions. Irianto et al. (2022) developed digital teaching materials based on ecopedagogy using the 4-D model. The product was deemed feasible and capable of supporting contextual learning oriented toward environmental care. These two studies show that environmental education should not stop at the cognitive aspect. Environmental education needs to build critical awareness of the relationship between humans, nature, and social responsibility.

Misbahudholam AR et al. (2023) demonstrate that ecoliteracy can be used as a learning resource to enhance environmental awareness in elementary schools. Two-cycle classroom action research shows an increase in environmental care attitudes from the first cycle to the second cycle. These findings are important because they strengthen the argument that environment-based learning can shape students' attitudes through a sustainable process. If ecoliteracy is combined with art, students not only learn to care for the environment but also express their understanding in the form of works. For example, students create ecoprints from leaves, conservation posters, illustrated stories about floods, or mini-exhibitions about the school environment.

The research by Kurniawan et al. (2025) on the ecoprint pounding technique strengthens the relationship between art and the environment. Ecoprint learning uses natural materials and plant imprints to create visual

Art, Ecopedagogy and Digital Media for Environmental Awareness in Elementary Schools: A Narrative Review

works. This activity provides students with hands-on experience to recognize the texture, color, shape of leaves, and the aesthetic value of nature. In the context of climate change education, ecoprint can be developed as a medium for reflection on biodiversity, plant conservation, the use of natural materials, and sustainable consumption. The advantage of ecoprint lies in its simplicity. Teachers can carry it out with materials that are easily found in the school environment.

If the entire literature is synthesized, it appears that art-based and ecopedagogical climate change education has five main contributions. First, this approach makes climate change issues more concrete for elementary school students. Second, art helps students express their understanding and emotions regarding environmental issues. Third, digital media and interactive teaching materials assist teachers in organizing more systematic learning. Fourth, STEAM-PjBL and deep learning encourage students to think critically and take action. Fifth, ecopedagogy and ecoliteracy provide a value direction so that learning not only produces knowledge but also environmental awareness and responsibility.

However, there are several weaknesses in previous research. Many development studies stop at expert validation, feasibility, and user response. High validation results are indeed important, but they are not enough to prove the learning impact. Some studies have not yet tested the effectiveness of the product on climate literacy, critical thinking, creativity, environmental concern, or pro-environmental behavior longitudinally. Moreover, studies on art and climate change in Indonesia are still limited. Existing research mostly discusses art as a subject or a product of creativity, rather than as a transformative approach to climate change education.

Conclusion

This narrative review synthesizes 15 empirical studies and yields three main conclusions. First, the integration of art, ecopedagogy, and innovative learning media in elementary environmental education operates through complementary mechanisms: art provides affective and expressive entry points for young learners, ecopedagogy supplies the critical and ethical framework for ecological citizenship, and digital media serves as an interactive scaffold that sustains engagement and enables multimodal exploration. Second, effective environmental education for elementary students requires moving beyond knowledge transmission toward a holistic model that encompasses cognitive understanding, emotional connection, creative expression, and concrete action, a model that aligns with the developmental characteristics of children aged 6–12 who learn best through concrete experiences, imagination, and hands-on activities. Third, the reviewed literature reveals a persistent gap between product validation and proven effectiveness: while most development studies report high feasibility and expert validation scores, only a few have empirically tested the impact of these interventions on measurable outcomes such as climate literacy, environmental concern, or pro-environmental behavior.

Limitations of this review must be acknowledged. First, the search strategy was purposive rather than exhaustive, potentially omitting relevant studies not captured by the selected keywords or databases. Second, the predominance of Indonesian-language and development-focused studies limits the generalizability of findings to broader international contexts. Third, the quality of primary studies varied considerably, with many lacking rigorous experimental designs or longitudinal follow-up. Fourth, the narrative synthesis approach, while appropriate for exploring conceptual interconnections, does not permit statistical generalization or effect-size estimation.

Practical implications for elementary school teachers include the actionable insight that environmental education can be enriched through simple, low-cost strategies: integrating art activities (drawing, dance, ecoprint, storytelling) into science lessons, utilizing digital media (videos, interactive games, e-modules) to visualize abstract climate processes, and designing project-based activities (school greening, waste reduction campaigns, mini-exhibitions) that connect classroom learning with real-world action. For curriculum developers, this review suggests the need to embed ecopedagogical principles and arts-based approaches into national and school-level curricula, rather than treating environmental education as an isolated topic. For future researchers, priority should be given to experimental and quasi-experimental studies that test the effectiveness of integrated art-ecopedagogy-digital media interventions using validated instruments measuring climate literacy, creative thinking, environmental attitudes, and observable pro-environmental behavior over extended periods. Additionally, comparative studies across different educational contexts and cultural settings would strengthen the evidence base and enhance the transferability of findings.

References

- Ahmad, M. N. (2025). Narrative Literature Reviews in Scientific Research: Pros and Cons. *Jordan Journal of Agricultural Sciences*, 21(1).
- Ainia, F., & Handayani, W. (2020). Pengembangan buku suplemen seni tari pada mata pelajaran seni budaya dan keterampilan untuk siswa SD. *Jurnal Pendidikan Sendratasik*, 9(2), 154–166.
- Anggraini, S. W., & Herwin. (2025). STEAM-PjBL based learning activities: Strategies to improve environmental awareness. *STEAM Journal for Elementary School Education*, 1(2). <https://doi.org/10.26740/sjese.1.02.2025.3>
- Arisyanto, P., & Suhermin, D. A. (2023). Pengembangan Buku Bahan Ajar Literasi Digital Suplemen SBdP Kelas 1 Tema 4.
- Azizah, L. N. (2019). Pengembangan buku suplemen Bahasa Indonesia berbasis budaya lokal menggunakan model CIRC untuk meningkatkan kemampuan menulis narasi siswa kelas IV SD [Tesis, Universitas Negeri Surabaya].
- Banks, K., & Taylor, C. (2025). Climate change education in primary schools: Using arts-based methods to access student voice and examine the UK National Curriculum. *Environmental Education Research*. <https://doi.org/10.1080/13504622.2025.2460718>
- Bengtsson, T. T., & Andersen, D. (2020). Narrative analysis: Thematic, structural and performative. *Qualitative analysis: Eight approaches for the social sciences*, 265-282.
- Bentz, J. (2020). Learning about climate change in, with and through art. *Climatic Change*, 162, 1595–1612. <https://doi.org/10.1007/s10584-020-02804-4>
- Budiman, M. A. (2022). Pengembangan Bahan Ajar Berbasis Literasi Digital Sebagai Suplemen SBdP Kelas I Tema 2. *Dikdas Matappa: Jurnal Ilmu Pendidikan Dasar*.
- Byrne, J. A. (2016). Improving the peer review of narrative literature reviews. *Research integrity and peer review*, 1(1), 12.
- Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (H. Lee & J. Romero, Eds.). IPCC. <https://doi.org/10.59327/IPCC/AR6-9789291691647>
- Curtis, D. J., Reid, N., & Reeve, I. (2014). Towards ecological sustainability: Observations on the role of the arts. *SAPI EN. S. Surveys and Perspectives Integrating Environment and Society*, (7.1).
- Damopolii, I., Nunaki, J. H., Jeni, J., Rampheri, M. B., & Ambusaidi, A. (2024). An integration of local wisdom into a problem-based student book to empower students' conservation attitudes. *Participatory Educational Research*, 11(1), 158-177.
- Fitriani, N., & Dafik, M. R. (2025). The Development of a Deep Learning-Based STEAM Project Module to Enhance Students' Environmental Literacy through an Eco-Enzyme Initiative.
- Gadotti, M. (2016). Education for sustainability-A critical contribution to the Decade of Education for Sustainable Development.
- Green, B. N., Johnson, C. D., & Adams, A. (2006). Writing narrative literature reviews for peer-reviewed journals: secrets of the trade. *Journal of chiropractic medicine*, 5(3), 101-117.
- He, X., & Jing, Q. L. (2022). The impact of environmental tax reform on total factor productivity of heavy-polluting firms based on a dual perspective of technological innovation and capital allocation. *Sustainability*, 14(22), 14946.
- Ilmiati, M. S., Muharram, M. R. W., & Putri, A. R. (2025). Pengembangan e-modul interaktif topik perubahan iklim untuk siswa sekolah dasar. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 10(2). <https://doi.org/10.23969/jp.v10i02.24164>
- Intergovernmental Panel on Climate Change. (2023). Climate change 2023: Synthesis report.
- Irianto, D. M., Herlambang, Y. T., Yunansah, H., & Wahid, R. (2022). Rancang bangun bahan ajar digital berbasis ekopedagogik approach. *Naturalistic: Jurnal Kajian dan Penelitian Pendidikan dan Pembelajaran*, 6(2), 1150–1160. <https://doi.org/10.35568/naturalistic.v6i2.1813>

Art, Ecopedagogy and Digital Media for Environmental Awareness in Elementary Schools: A Narrative Review

- Kahn, R. V. (2010). Critical pedagogy, ecoliteracy, & planetary crisis: The ecopedagogy movement (Vol. 359). Peter Lang.
- Kalyana, A. D., Istianah, F., & Yuliana, I. (2026). Pengembangan E-LKPD Berbasis Game Jumanlly Materi Ekosistem untuk Meningkatkan Keterampilan Berpikir Kritis Peserta Didik Kelas V Sekolah Dasar. *Jurnal Penelitian Pendidikan Guru Sekolah Dasar*, 14(5), 1031-1045.
- Keum, J. H., & Baek, S. (2025). Enhancing Environmental Competence through a STEAM Climate Change Education Program in Lower Elementary Grades. *Asia-Pacific Science Education*, 11(1), 203-228.
- Kurniawan, M. K. N., Fajrie, N., & Oktavianti, I. (2025). Eksplorasi kreativitas siswa dalam seni ecoprint: Antusiasme dan pemahaman ecoprint teknik pounding di kelas IV SD Negeri 2 Manyargading. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 10(1). <https://doi.org/10.23969/jp.v10i01.23065>
- Maggio, L. A., Thomas, A., & Durning, S. J. (2018). Knowledge synthesis. *Understanding Medical Education: Evidence, Theory, and Practice*, 457-469.
- Misiaszek, G. W. (2025). Ecopedagogy: Teaching critical literacies of 'development,' 'sustainability,' and 'sustainable development'1. In *Ecopedagogy and the Global Environmental Citizen* (pp. 13-36). Routledge.
- Misbahudholam AR, M., Sama', & Aini, K. (2023). The implementation of ecoliteracy as a learning resource to improve environmental care attitudes in elementary schools. *Mimbar Sekolah Dasar*, 10(1), 122–134. <https://doi.org/10.53400/mimbar-sd.v10i1.50333>
- Nurmadyah, W., & Fuadah, N. (2025). Implementasi deep learning dalam edukasi lingkungan dan kesadaran ekologis pada peserta didik SMA Negeri 1 Siantan. *Advances in Education Journal*, 2(1).
- O'Gorman, L. (2024). "It's the Only World We've Got." Children's Responses to Chris Jordan's Images about SDG 14: Life Below Water. *Australian Journal of Environmental Education*, 40(4), 693-705.
- Pangsuma, N. S., Nurahman, A. A., Riandi, R., & Solihat, R. (2024). Innovation of ESD Learning Module (Education for Sustainable Development) Based on Bugis Local Wisdom for Critical Thinking Skills and Environmental Literacy. *Journal of Science Learning*, 7(3), 257-266.
- Rofian, Budiman, M. A., & Rosmawati, D. (2022). Pengembangan bahan ajar berbasis literasi digital sebagai suplemen SBdP kelas I tema 2. *DIKDAS MATAPPA: Jurnal Ilmu Pendidikan Dasar*, 5(3). <https://doi.org/10.31100/dikdas.v5i3.2202>
- Saputri, A. N., & Wulandari, T. S. H. (2025). Pengembangan E-LKPD berbasis game edukasi dengan pendekatan deep learning pada materi isu-isu lingkungan untuk meningkatkan berpikir kritis siswa. *Jurnal Pendidikan MIPA*, 15(3). <https://doi.org/10.37630/jpm.v15i3.3202>
- Saraiva, E., & Azevedo, M. M. (2020). Primary school project fostering environmental education through art. *Modern Applied Science*, 14(7), 101. <https://doi.org/10.5539/mas.v14n7p101>
- Simanjuntak, S. A., Zhou, Y., & Li, S. W. (2025). Sustainable Pedagogical Space: Water Risk Reduction Management Through Permaculture Pedagogy. *CSID Journal of Infrastructure Development*, 8(1), 10.
- Tarlochan, F., Alduais, A., Chaaban, Y., & Du, X. (2025). Integrating sustainability into STEM education and career development: a scientometric and narrative review. *International Journal of STEM Education*, 12(1), 1-22.
- Templier, M., & Paré, G. (2015). A framework for guiding and evaluating literature reviews. *Communications of the Association for Information Systems*, 37(1), 6.
- UNESCO. (2024). Greening curriculum guidance: Teaching and learning for climate action. UNESCO.
- Widayanti, A., & Dafik, S. T. (2025). The Development of RBL-STEAM Learning Design to Improve Climate Change Literacy Through the Construction of Energy-Efficient Houses in Sixth Grade of Elementary School Students.
- Yunansah, H., & Herlambang, Y. T. (2017). Pendidikan berbasis ekopedagogik dalam menumbuhkan kesadaran ekologis dan mengembangkan karakter siswa sekolah dasar. *EduHumaniora: Jurnal Pendidikan Dasar Kampus Cibiru*, 9(1), 27–34. <https://doi.org/10.17509/eh.v9i1.615>

Art, Ecopedagogy and Digital Media for Environmental Awareness in Elementary Schools: A Narrative Review

Zainil, M., Kenedi, A. K., Ahmad, S., & Mardin, A. (2025). Validation of an Innovative Learning Model: Deep Learning Based on Eco-STEAM and Edutainment for Elementary School Science Education. *Jurnal Penelitian Pendidikan IPA*, 11(10), 346-352.