ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 6 (June 2026)

Greening the Future: Cultivating Ecological Consciousness and Praxis in Science Pre-Service Teachers through Photovoice

Anne Lorraine J. Pineda[1, 2], Arlyne C. Marasigan[2]
[1]*Pangasinan State University, Pangasinan, Philippines*
[2]*Philippine Normal University, Manila, Philippines*
[*]*apineda@psu.edu.ph*

Date Submitted:
April 19, 2026

Date Accepted:
May 12, 2026

Date Published:
June 30, 2026

DOI:
10.5281/zenodo.21057086

ABSTRACT

Amid intensifying ecological challenges, teacher education is tasked with cultivating ecological consciousness that goes beyond awareness toward critical and transformative engagement. Grounded in ecopedagogy and critical pedagogy, this study examines how science pre-service teachers perceive, interpret, and respond to environmental issues through Photovoice. This qualitative research engaged 15 third-year science pre-service teachers from a teacher education institution in Pangasinan, Philippines, during the First Semester of SY 2025-2026. Participants documented local environmental realities through Photovoice and engaged in guided reflection using the SHOWED technique. Data were analyzed using reflexive thematic analysis. Five interrelated orientations emerged: affective–instrumental engagement, critical ecological literacy, relational and planetary consciousness, constructive hope and regenerative imagination, and praxis through an emerging eco-teacher identity. These are synthesized in the Ecopedagogical Continuum of Ecological Consciousness (ECEC) Model, which conceptualizes ecological consciousness as a dynamic, recursive, and non-linear process. The study's key contribution lies in demonstrating that ecological consciousness is present but unevenly developed and partially depoliticized. Participants demonstrate strong connection, awareness, and willingness to act, yet their perspectives remain largely individualized and only partially connected to broader ecological and systemic contexts. The ECEC Model is proposed as a conceptual, diagnostic, and pedagogical framework for understanding ecological consciousness as a process in formation and highlights the need to scaffold toward structurally informed and transformative ecological praxis.

Keywords: *ecological consciousness, ecopedagogical continuum; ecopedagogy; photovoice; pre-service teachers; sustainability education, teacher education; transformative praxis*

INTRODUCTION

The twenty-first century is increasingly characterized as a period of planetary emergency. Accelerating climate disruption, biodiversity loss, and ecosystem degradation are no longer distant projections but lived realities (Wheatley, 2022). While education has long been considered a crucial component of the response to such a crisis, the question of what kind of education is adequate to address the scale of this crisis remains unanswered.

Conventional environmental education has often relied on an information-deficit model, assuming that increasing knowledge about ecological systems will lead to pro-environmental attitudes and behaviors (Piras et al., 2022, p. 135469). However, this assumption has proven insufficient (Brock et al., 2023, p. 139399). Awareness

does not consistently translate into care, nor does care guarantee action (Ojala, 2012). What is increasingly needed is an approach that links ecological understanding with critical reflection on the social, economic, and political drivers of environmental harm, and that orients learners toward transformative engagement.

Ecopedagogy provides this orientation. Grounded in Freirean critical pedagogy, it frames environmental education as the development of *conscientização,* critical consciousness that enables learners to read both "the word and the world" and act upon that understanding (Freire, 2000; Misiaszek, 2016). Extending critical pedagogy into the ecological domain, ecopedagogy understands environmental issues not as isolated technical problems but as expressions of broader systems of domination affecting both human and more-than-human worlds. It therefore emphasizes relationality, justice, and planetary citizenship (Gadotti, 2011; Kahn, 2010), and asks not only what learners know, but how they position themselves within an interconnected ecological community and whether they are prepared to act within it.

Teachers play a crucial role in translating this orientation into practice. As mediators of knowledge and values, they shape how future generations understand environmental issues. Pre-service teachers, whose professional identities are still forming, are therefore a particularly consequential group. The ecological consciousness they develop during training will influence both their own pedagogy and the dispositions they cultivate in their students. This is especially significant for science pre-service teachers, who often serve as primary mediators of ecological literacy in formal education.

The Philippine context intensifies these concerns. As one of the countries most vulnerable to climate-related hazards, the Philippines faces environmental challenges such as typhoons, flooding, drought, and biodiversity loss. National policies recognize the importance of education in addressing these issues. Republic Act No. 9512 mandates the integration of environmental education across the curriculum. However, research indicates that implementation remains uneven and often limited to awareness-level outcomes, with insufficient emphasis on critical and transformative engagement engagement (Bercasio & Remolacio, 2022; Canlas & Karpudewan, 2021). This gap between policy and practice emphasizes the need to examine how ecological consciousness is actually formed among future teachers.

Despite extensive theoretical work on ecopedagogy, empirical research capturing how pre-service teachers construct ecological consciousness in situated contexts remains limited (Korsant, 2022; Misiaszek, 2022). Much of the literature focuses on philosophical or curricular frameworks, while fewer studies foreground learners' lived experiences and interpretive processes. Moreover, research often relies on structured instruments that constrain participant expression. There is therefore a need for approaches that allow participants to represent and critically interrogate their own environmental realities.

As a participatory method grounded in Freirean principles, Photovoice enables participants to document lived experiences through photographs and engage in critical dialogue about their meanings (Liebenberg, 2018; Wang & Burris, 1997). By placing interpretive authority with participants, photovoice allows ecological consciousness to emerge through their own perspectives. Importantly, it functions not only as a method of data generation but also as a dialogic and reflective process that can deepen critical awareness.

Against this background, the present study uses photovoice to examine the critical perspectives of science pre-service teachers on environmental issues through an ecopedagogical lens. Instead of measuring knowledge or attitudes, it seeks to surface the textures of ecological consciousness, what participants notice, how they interpret environmental realities, what meanings they attach to them, and how they begin to imagine action.

The study makes two contributions. First, it provides an empirically grounded account of ecological consciousness as constructed by pre-service teachers in a specific socio-environmental context. Second, it advances the concept of an ecopedagogical continuum, showing how participants' perspectives move across affective, critical, relational, hopeful, and praxis-oriented orientations. This study does not assume ecological consciousness as a given outcome. Instead, it interrogates how it forms, what limits it, and how it may be more critically developed.

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International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 6 (June 2026)

METHODS

Research Design

This study employed a qualitative photovoice design, a participatory approach in which participants document their lived realities through photographs and interpret them through critical dialogue (Wang & Burris, 1997). The design is theoretically grounded in the shared Freirean foundations of photovoice and ecopedagogy, both of which emphasize dialogue, critical consciousness, and praxis (Liebenberg, 2018; Misiaszek, 2016).

Photovoice positions participants as knowledge producers instead of research subjects (Wang & Burris, 1997). It enables ecological consciousness to emerge through participants' own visual and narrative representations. This makes it particularly suited to exploring how pre-service teachers perceive, interpret, and engage with environmental issues within their lived contexts.

Research Locale

The study was conducted in Pangasinan, Philippines. The province is characterized by a variety of environmental landscapes, including coastal areas, agricultural land, rivers, and forested zones (Favor, 2026). These environments are ecologically significant and increasingly vulnerable to degradation.

Participants' photographs captured both iconic locations (e.g., coastal and tourist areas) and everyday spaces (e.g., degraded land and waterways), which enabled engagement with lived environmental realities across contexts of ecological value.

Research Participants

Fifteen third-year science pre-service teachers were selected through purposive sampling. Participants were chosen based on their enrollment in a science teacher education program, their proximity to teaching practice, and their willingness to engage in the photovoice process.

This stage of training is significant, as professional identities are actively forming, including orientations toward environmental teaching (Müller, 2023, p. 6). Participants were organized into five small groups of three to facilitate dialogue and collective interpretation (Wang & Burris, 1997).

While the sample size is limited, it is appropriate for qualitative research emphasizing depth, meaning, and interpretive richness instead of statistical generalization. Data were anonymized, with the participants assigned pseudonyms and the photographs and narratives identified by image title.

Research Instrument

Data were generated through participant-captured photographs and SHOWED-guided discussions. Participants used accessible digital or smartphone cameras, consistent with photovoice's emphasis on meaning over technical quality (Sutton-Brown, 2014).

The SHOWED technique structured dialogue through five guiding questions: "What do you see here?"; "What is really happening?"; "How does this relate to our lives?"; "Why does this situation exist?"; and "What can we do about it?" (Wang & Burris, 1997). This sequence facilitated movement from description to analysis and potential action, aligning with the study's focus on ecological consciousness.

Data Gathering Procedure

Data collection followed established photovoice procedures (Sutton-Brown, 2014; Wang & Burris, 1997), adapted to the study context. An initial orientation introduced participants to photovoice principles, ethical considerations, and responsibilities when photographing people and environments. Informed consent covered participation, image use, and the right to withdraw any image.

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Participants were then asked to photograph their local environment and their relationship with nature over three months, during the first Semester of S.Y. 2025-2026. The open and guided prompt allowed for diverse and relevant documentation, capturing both environmental strengths and issues.

Following the photography phase, participants engaged in SHOWED discussions to interpret their captured images. These dialogues generated the narratives accompanying each photograph, forming the primary dataset. The process supported both individual reflection and collective meaning-making, consistent with the study's interpretive aims.

Data Analysis

The data were analyzed using reflexive thematic analysis (Braun & Clarke, 2006, 2020) which is appropriate for examining patterns in qualitative and visual data. Analysis proceeded through iterative phases: (1) familiarization with photographs and narratives; (2) coding, capturing both manifest content (e.g., pollution, drought) and latent meanings (e.g., instrumental, relational, or praxis-oriented orientations; (3) theme development, grouping codes into broader patterns; (4) review and refinement against the full dataset; and (5) definition and naming of final themes.

The researcher adopts a reflexive stance, remaining attentive to how commitments to critical pedagogy shape interpretation while prioritizing participants' voices. Reflexivity was maintained throughout coding and theme development.

The analysis was both inductive and theoretically informed. While themes emerged from the data, ecopedagogy served as a sensitizing lens, guiding attention to dimensions such as criticality, relationality, constructive hope, and praxis. The data represent ecological consciousness-in-process, co-constructed through photovoice and dialogue. The researchers remained reflexively aware of their role in the theme (Braun & Clarke, 2019; Versey, 2024).

Ethical Considerations

Photovoice, a method that examines participant-captured images of real places and sometimes of people, necessitated a careful consideration of its specific ethical demands (Groot et al., 2021). Prior to the study, institutional approval was obtained. Participation was voluntary, and participants were free to withdraw or remove any photograph at any point. To address the complexity of the method, consent was sought to cover participation, the photographing of identifiable subjects, and the academic use of the photographs and narratives. In the orientation, participants were reminded of the method's guiding principle, that no photograph is worth taking if it endangers the photographer or anyone else. They were asked to place people's dignity and safety above image content. Confidentiality was protected by identifying photographs and narratives by image title, and pseudonyms were assigned instead of using real names. Throughout, the researcher stayed reflexively attentive to the power relations of the research and to how their own position shaped it, in keeping with the critical-participatory ethic of photovoice (Versey, 2024).

RESULTS AND DISCUSSION

Table 1 summarizes the themes and links each of these to representative photographs and corresponding ecopedagogical concepts. Instead of presenting these themes as isolated findings, the subsequent discussion places them within the broader continuum, highlighting how ecological consciousness is continually reshaped through participants' interactions with their surroundings and the reflective processes of photovoice.

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Table 1. *Thematic framework of pre-service teachers' ecological consciousness*

Theme	Description	Representative photographs	Ecopedagogical correspondence
1. Affective–instrumental engagement	Affective and aesthetic appreciation of nature as a source of well-being; largely anthropocentric	Bolo Beach; Seashore; Sunflower; Hundred Islands	Biophilia and place attachment; the affective entry point, yet still anthropocentric.
2. Critical ecological literacy	Problematizing environmental harm and its causes; emerging analytical reasoning	Garbage; Mahogany; Drought; Cutting Down Trees	Reading the world; problem-posing; critique of environmental violence and "green" orthodoxy.
3. Relational and planetary consciousness	Recognition of interconnection and intrinsic ecological value	Trees; Mountains (Mapita); Hundred Islands	Planetarity; Earth as living community; ecological citizenship.
4. Hope and regenerative imagination	Envisioning ecological renewal within contexts of degradation.	Cemetery; Seedling of Hope	Pedagogy of possibility; constructive hope.
5. Praxis and the emerging eco-teacher identity	Translation of reflection into action and pedagogical commitment.	Drought; Aloe Vera; Mountains; Seedling; Cabongaoan	Praxis; socio-environmental civic action; the teacher as multiplier of consciousness.

Reflexive thematic analysis generated five interrelated orientations that collectively characterize participants' ecological consciousness: (1) affective–instrumental engagement, (2) critical ecological literacy, (3) relational and planetary consciousness, (4) constructive hope and regenerative imagination, and (5) praxis in relation to an emerging eco-teacher identity. While analytically distinguishable, these orientations do not operate as discrete categories, but form positions along an ecopedagogical continuum. It reflects how participants' understandings of environmental issues are still in formation and evolving.

Across the dataset, participants frequently moved across multiple orientations within a single narrative. This intra-narrative movement highlights ecological consciousness not as a fixed developmental stage, but as a fluid repertoire of interacting perspectives, shaped through lived experience, dialogue, and reflection. Moments of affective engagement often intersect with critique, relational awareness, or action-oriented thinking, indicating that these orientations are simultaneously present, instead of linearly ordered.

These orientations illustrate that ecological consciousness develops through recursive engagement across affective, cognitive, relational, imaginative, and action-oriented dimensions. The following sections elaborate each orientation while tracing movement along the ecopedagogical continuum.

Theme 1: Affective–Instrumental Engagement with Nature:

Sanctuary, Self, and the Seeds of Ecological Awareness

Participants initially encounter the environment as a restorative and affective space, framing nature as a source of emotional relief, aesthetic appreciation, and personal well-being. Across photographs of beaches, seashores, and flowering landscapes, nature is consistently represented as an experiential refuge, where ecological meaning is grounded in lived, sensory engagement Instead of abstract understanding. This orientation reflects the

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International Journal
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earliest position along the ecopedagogical continuum, where ecological consciousness emerges through felt connection and embodied experience.

Figure 1. *"Bolo Beach"*

(Nature framed as a site of relaxation and restoration.)

Participants' narratives strongly foreground this affective relationship. Daniel described Bolo Beach as "a place to relax and unwind… to wash off stress from the city and take a break from our acads," emphasizing the restorative quality of the landscape. Similarly, Sophia referred to a coastal environment as "my favorite retreat," explaining that it allows her to "release all the stress I carry," and noting that its cleanliness and beauty are "important for my well-being." Emma, reflecting on a sunflower, associated nature with "happiness and optimism," adding that such encounters "boost your mood and lower stress." Across these accounts, nature is positioned as responsive to human emotional needs, offering comfort, calm, and psychological renewal.

From an ecopedagogical perspective, these narratives exemplify biophilia and place attachment, where ecological consciousness is rooted in affective bonds with the environment. These encounters are not trivial, but represent a critical entry point into ecological awareness. Direct, sensory experiences, walking along a shoreline, observing landscapes, engaging with plant life, enable participants to form emotional investments in their surroundings. Such attachments are foundational, as they create the conditions for care, attention, and eventual reflection. In this sense, affective engagement functions as a necessary groundwork upon which more complex ecological understandings may develop.

At the same time, participants' representations of nature remain largely anthropocentric and instrumental. Environmental value is frequently articulated in terms of what nature provides, relaxation, beauty, stress relief, positioning the environment as a resource for human well-being. Even if participants emphasize the importance of preserving natural spaces, these concerns are often framed through their implications for continued human enjoyment. Nature, in this sense, is not yet conceptualized as a system with intrinsic value independent of human use, but as a supportive backdrop to human experience.

Importantly, this anthropocentric framing is not entirely fixed. Within some narratives, subtle tensions begin to emerge as participants move from appreciation toward early forms of questioning. Descriptions of clean and beautiful environments are occasionally accompanied by concerns about pollution or degradation, suggesting an awareness that these spaces are not simply given but vulnerable and subject to change. These moments indicate that affective engagement may serve as a generative starting point, opening space for deeper ecological reflection as participants are prompted to consider why such conditions exist and how they might be sustained or threatened.

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The photovoice process play an important role in enabling this shift. Through the SHOWED guide questions, particularly "Why does this exist?" and "What can we do?", participants are encouraged to move beyond description toward reflection. While the dominant orientation in this theme remains experiential and personal, this dialogic engagement begins to disrupt purely aesthetic viewing, inviting participants to reconsider their initial perceptions and situate them within broader environmental contexts.

Within the Ecopedagogical Continuum of Ecological Consciousness, this theme represents the affective foundation of ecological awareness. It is both a strength and a boundary: participants demonstrate deep emotional connection to nature, yet their understanding remains primarily human-centered. This reflects a developmental condition, where ecological consciousness begins in lived experience and gradually expands toward more critical, relational, and action-oriented forms.

Theme 2: Emergent Critical Ecological Literacy:

Problematizing Environmental Harm Between Moral Reasoning and Partial Systemic Awareness

Extending beyond affective engagement, participants begin to develop an emergent form of critical ecological literacy, shifting from experiential appreciation to actively identifying, interpreting, and questioning environmental problems. This orientation represents a crucial movement along the ecopedagogical continuum, from viewing nature as a site of personal meaning to engaging with it as a problematic and socially mediated ecological reality. Participants begin to "read the world" (Freire, 2000), moving from description toward explanation, critique, and tentative evaluation.

Figure 2. *Left: "Garbage"; Right: "Mahogany"*

(Criticality of degradation and of well-intentioned but ecologically harmful practice.)

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This shift is evident in how participants engage with environmental degradation. The polluted ground with scattered waste near vegetation reveals a landscape no longer framed solely in terms of aesthetic value but as a visible manifestation of ecological harm. Liam described such a site as "a jumble of trash, plastic bags, bottles, cans… scattered around despite the rules," interpreting the scene as reflective of "our community's careless attitude toward the environment." This narrative illustrates an important step toward causal reasoning, as environmental damage is linked to human action Instead of treated as incidental.

Similarly, Noah's reflection on mahogany trees demonstrates a more layered analytical engagement. While initially drawn to their appearance, he recognized that these trees "are not native to the Philippines" and "pose a threat to our local ecosystems" by overshadowing indigenous flora. His conclusion, "good intentions aren't sufficient; we must choose wisely", signals a growing capacity to evaluate environmental practices critically, particularly those that may appear beneficial but generate unintended ecological consequences. This reflects an emerging awareness of ecological complexity, aligning with ecopedagogical critiques of superficial or instrumental sustainability.

Other participants likewise demonstrate developing analytical perspectives. Ethan linked drought conditions to human intervention, asserting that "our actions are making it worse," particularly through deforestation, which "contribute[s] to climate change, making droughts more frequent." Olivia, reflecting on cleared land, acknowledged competing demands, noting the necessity of agriculture while advocating for "responsibly sourced products." These accounts illustrate participants' attempts to navigate environmental issues as interconnected and multifaceted, instead of as isolated problems.

Within an ecopedagogical framework, these narratives reflect the emergence of problem-posing ecological consciousness, where environmental realities are interrogated Instead of accepted. Participants increasingly move between observation, explanation, and evaluation within a single reflection, demonstrating the recursive and non-linear nature of ecological thinking. This intra-narrative movement indicates that ecological consciousness is not accumulated in stages but develops through ongoing cycles of interpretation and reconsideration.

The role of photovoice is particularly significant in this development. Through the SHOWED guide questions, especially "Why does this exist?" and "What can we do?", participants are guided toward deeper analysis, encouraging them to explore causality and imagine responses. This dialogic process supports the transition from passive observation to active inquiry, positioning photovoice as both a research method and a pedagogical mechanism that promotes critical engagement.

Despite these advances, participants' critical ecological literacy remains partial and uneven. Many explanations rely on moralized framings, attributing environmental harm to carelessness, lack of awareness, or individual behavior. While such interpretations reflect genuine concern, they tend to localize responsibility, with limited attention to broader structural dynamics such as governance, economic systems, or institutional accountability. Proposed solutions similarly emphasize education, awareness campaigns, and behavioral change, reflecting participants' emerging identities as educators but remaining largely within micro-level action.

These patterns highlight the developmental character of ecological consciousness at this stage. Participants demonstrate meaningful analytical engagement, yet their critique has not fully extended into systemic or structural domains. Instead of a limitation to be dismissed, this unevenness reflects the transitional nature of critical ecological literacy, where insight and constraint coexist.

Within the Ecopedagogical Continuum of Ecological Consciousness, this theme represents a critical bridge between affective engagement and deeper relational understanding. It expands ecological consciousness by introducing analysis and critique, while simultaneously revealing the need for further development toward more integrated, relational, and transformative ecological perspectives.

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Theme 3: Emerging Relational and Planetary Consciousness:

Reconfiguring Human–Nature Relations Amid Persistent Anthropocentric Traces

Building on the development of critical ecological literacy, participants begin to demonstrate an emerging relational and planetary consciousness, marked by a shift from analyzing environmental problems to rethinking the human–nature relationship itself. Instead of viewing nature primarily as an object of appreciation or concern, participants increasingly articulate a perspective of interconnection and embeddedness, recognizing that humans are part of a broader ecological web. This orientation reflects a deeper movement along the ecopedagogical continuum toward ontological and relational awareness.

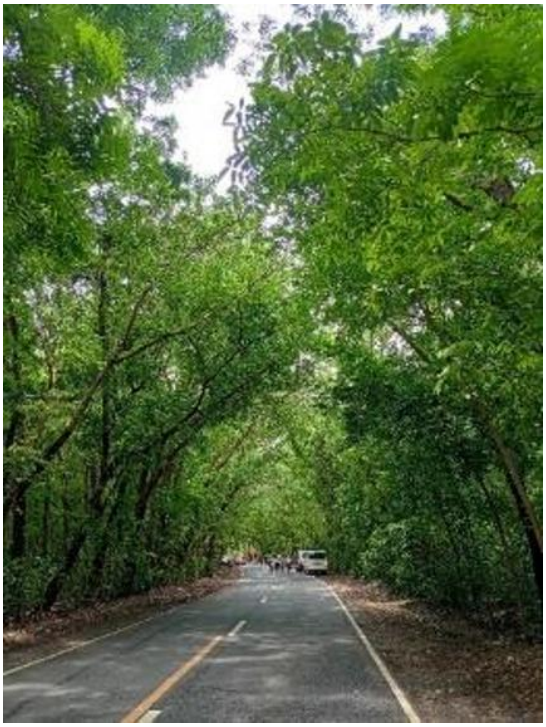

Figure 3. "Trees"

(A tree-canopied road as an emblem of ecological interconnection.)

This shift is vividly captured in participants' visual representations of environmental spaces. A tree-canopied road with dense green foliage presents a landscape framed as an interconnected ecosystem Instead of a passive backdrop. Lucas, who photographed this scene, described how in such environments "you really notice how many different kinds of life there are," concluding that "everything in nature is just really connected." He further emphasized that trees are "more than just shade," noting that they "teach us how everything works together" and that their roots "remind me to stay connected with nature." His narrative reflects a significant reorientation, from perceiving nature in terms of utility (Theme 1) or problem (Theme 2) toward understanding it as a living system of relationships.

This relational framing is echoed across participants' reflections. Ava explicitly challenges instrumental perspectives, asserting that mountains are "more than just a backdrop for recreation or a resource for water and timber," and instead highlighting their role as "home to diverse plants and animals" and as systems that "help regulate our climate." Similarly, Mia describes the Hundred Islands as a space of "deep connection," emphasizing preservation so that "future generations can cherish and learn from it." These accounts reflect an expanding

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ecological imagination where value is articulated not only in personal or functional terms, but in relation to ecological interdependence and continuity across time.

These narratives indicate an emerging ontological shift, where nature is perceived not as a separate entity from humans, but as a community of life in which humans are an integral part. This aligns with ecopedagogical notions of planetarity, where ecological consciousness recognizes interconnectedness across human and more-than-human systems. Participants begin to perceive ecological systems as dynamic networks, indicating a deepening of awareness beyond earlier themes. At the same time, this relational consciousness remains partial and internally negotiated. Elements of anthropocentric reasoning continue to surface within participants' accounts. For instance, Mia frames environmental preservation partly through its value for future human learning and appreciation, while Ava's reference to climate regulation, though scientifically grounded, still situates ecological value in terms understandable within human-centered frameworks. These examples suggest that participants are not fully rejecting anthropocentrism, but are reworking and expanding it, integrating relational insights into previously established perspectives.

This hybridity is further illustrated in the fluid movement observed within individual narratives. Participants often shift from appreciation (Theme 1) to critique (Theme 2) and into relational understanding (Theme 3) within a single reflection. Lucas's narrative, for instance, begins with sensory appreciation of the forest and evolves into a conceptual recognition of interconnected systems. Such intra-narrative transitions reinforce the idea that ecological consciousness develops as a recursive and layered process, instead of through linear progression.

The photovoice process plays a significant role in supporting this shift. The SHOWED guide question "How does this relate to our lives?" encourages participants to move beyond isolated observations toward recognizing broader patterns of connection. The repeated use of relational language, "connected," "works together," "home to diverse life", indicates that participants are beginning to internalize ecological concepts through reflective dialogue. In this sense, photovoice functions as a pedagogical catalyst, expanding participants' perception of their relationship with the environment. However, this relational awareness remains largely confined to ecological interdependence, with limited extension into socio-political domains. While participants recognize that "everything in nature is connected," they rarely articulate how these connections are shaped by systems of power, governance, or inequality. This indicates that relational consciousness remains ecologically grounded but not yet fully socio-politically integrated.

Within the Ecopedagogical Continuum of Ecological Consciousness, this theme represents a deepening toward relational and ontological awareness. It provides a foundation for subsequent orientations of hope and praxis, while also revealing that ecological consciousness at this stage remains in formation, an evolving synthesis of perspectives shaped by ongoing reflection, experience, and dialogic engagement.

Theme 4: Constructive Hope and Regenerative Imagination:

Envisioning Ecological Futures Between Possibility and Constraint

Extending beyond relational awareness, participants begin to articulate a constructive form of ecological hope, expressing the capacity to imagine renewal even within contexts of environmental degradation. This theme introduces a crucial future-oriented dimension to ecological consciousness, where participants move from understanding "what is" to envisioning what could be. Within the ecopedagogical continuum, this represents a shift toward imaginative and anticipatory engagement, where critique is coupled with the possibility of transformation.

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Figure 4. *Left: "Cemetery; Right: "Seedling of Hope"*

(Visualizing renewal and ecological resilience.)

This orientation is vividly reflected in participants' visual and narrative interpretations of transitional landscapes. Instead of viewing such spaces solely as degraded or diminished, participants reinterpret them as sites of regeneration. Ethan, reflecting on a cemetery, described it as "an opportunity to turn loss into growth, to transform grief into renewal," proposing that planting trees among graves would allow each one to "symbolize life springing from death." This reconceptualization reframes mortality within ecological continuity, positioning human loss within broader cycles of renewal.

A similar imaginative reorientation appears in Noah's reflection on a young seedling emerging in a burned landscape. He described it both scientifically, as "secondary ecological succession, where life re-emerges in a disturbed ecosystem", and symbolically, as "a testament to nature's ability to bounce back." In this account, ecological knowledge and affective interpretation converge, producing a form of hope that is grounded Instead of naïve. The seedling becomes both evidence of ecological resilience and a metaphor for recovery, allowing participants to sustain engagement despite environmental damage.

These narratives exemplify what Ojala (2012) conceptualizes as constructive hope, a form of hope that does not deny ecological crisis but emerges through its recognition. Participants do not overlook or minimize degradation; instead, they hold together awareness of damage and belief in renewal. This distinguishes their perspectives from optimistic denial, revealing instead a stance that is critically hopeful and forward-looking. Ecological consciousness, in this sense, begins to incorporate imagination as a key dimension, extending beyond awareness toward envisioning alternative ecological futures.

Importantly, this imaginative dimension builds upon earlier orientations within the continuum. Critical ecological literacy (Theme 2) enables participants to recognize environmental harm, while relational consciousness (Theme 3) situates this harm within interconnected ecological systems. Theme 4 integrates these foundations, allowing participants to project possibilities for renewal. Several narratives demonstrate intra-reflective movement across these orientations, as participants transition from diagnosing environmental problems to imagining their transformation. This further reinforces the recursive nature of ecological consciousness, where analysis and imagination interact dynamically.

The photovoice process appears to play a central role in enabling this shift. Through the SHOWED guide question "What can we do?", participants are encouraged not only to analyze but to imagine responses, transforming reflection into a space of possibility. This dialogic engagement supports the emergence of future-oriented thinking, suggesting that photovoice functions as a pedagogical catalyst for ecological imagination, not merely as a tool for documenting environmental realities.

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At the same time, this hopeful orientation remains bounded and uneven. Participants' visions of renewal are often localized and symbolic, centered on acts such as tree planting, natural regrowth, or community-level efforts. While these actions are meaningful, they tend to remain within micro-level or experiential domains, with limited engagement with the larger structural transformations required to address environmental crises at scale. As in earlier themes, references to broader systems, such as governance, policy, or economic dynamics, are largely absent from participants' imaginative projections.

This does not diminish the significance of participants' constructive hope; rather, it highlights its developmental character. The capacity to imagine ecological alternatives has emerged, but has not yet been fully linked to systemic or collective transformation. Hope, in this context, functions as a mediating orientation, bridging critical awareness and future action by sustaining engagement and possibility.

Within the Ecopedagogical Continuum of Ecological Consciousness, this theme represents a transition toward imaginative and future-oriented engagement. It provides the conceptual and affective grounding necessary for the emergence of praxis in the next orientation, while also revealing that ecological consciousness at this stage remains in formation, expanding in depth yet not fully connected to broader socio-political dimensions of change.

Theme 5: Emergent Praxis and the Formation of an Eco-Teacher Identity:

Acting, Teaching, and the Limits of Depoliticized Engagement

The fifth orientation marks the most explicit development in participants' ecological consciousness: the movement from reflection toward praxis, understood as the integration of awareness and action. At this point in the ecopedagogical continuum, ecological understanding begins to translate into intentional behavior, with participants not only recognizing environmental issues but also positioning themselves as agents of change. What distinguishes this orientation is its pedagogical framing, where participants envision themselves as future educators responsible for shaping ecological awareness in others.

Figure 5. *Left: "Drought"; Right: "Aloe Vera"*

(Reflection translated into stewardship, advocacy, and pedagogical commitment.)

Participants articulate this emerging praxis through both personal and pedagogical commitments. Jacob, reflecting on drought, expressed a desire to "start small, for example, cutting back on water at home," and extended this commitment by emphasizing that "teaching others, especially kids, about water conservation is important too." Similarly, Chloe, documenting a campus planting activity, framed environmental care as both personal practice and instructional responsibility, stating a desire to "instill sustainable habits that we can pass on to future generations." These narratives illustrate how ecological consciousness becomes future-oriented and role-based, as participants begin to imagine themselves as teachers who model and transmit environmental responsibility.

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Across the dataset, participants consistently frame action in terms of advocacy, stewardship, and education. They describe intentions to "promote responsible practices," "encourage conservation," and raise environmental awareness within their communities. These commitments are often linked to an intergenerational ethic, which emphasizes responsibility toward "future generations." In this sense, the hope and imagination articulated in Theme 4 are not only envisioned but translated into concrete intentions to act and to teach, reinforcing the developmental continuity across the continuum.

From an ecopedagogical perspective, these accounts reflect the emergence of praxis-oriented ecological consciousness, where reflection and action become interconnected. Importantly, this praxis is deeply pedagogical. Participants do not solely position themselves as individuals making sustainable choices. they also position themselves as multipliers of ecological consciousness, whose professional roles will extend their influence. Ecological responsibility thus becomes embedded within professional identity formation. This indicates that the pre-service teachers are actively constructing what it means to be an eco-conscious teacher.

This praxis operates across multiple levels of engagement. At the personal level, participants emphasize behavioral change, such as conserving water or reducing waste. At the interpersonal and pedagogical level, these actions are extended through teaching, awareness-building, and modeling practices for others. This second level is particularly prominent, reflecting participants' anticipation of their future roles in education. However, engagement at the level of collective or structural action remains limited. Few participants articulate strategies involving broader community mobilization, policy engagement, or systemic change. This unevenness reflects a pattern observed in previous themes.

While participants demonstrate a strong willingness to act, their actions are largely situated within individual and pedagogical domains, with limited extension into structural or institutional contexts. Environmental responsibility is therefore often framed as a matter of ethical practice and education, rather than as a site of engagement with wider socio-ecological systems.

Instead of diminishing the significance of this praxis, this pattern highlights its developmental character. Participants have reached a point in the continuum where ecological understanding motivates action, yet this action remains in formation. The emergence of an eco-teacher identity represents a critical advance, as participants begin to link ecological awareness with professional responsibility. They are not only interpreting environmental issues but are repositioning themselves within them, rehearsing roles as educators who can influence future generations.

The photovoice process plays a crucial role in enabling this transition. Through the SHOWED guide question "What can we do about it?", the pre-service teachers are encouraged to move from analysis toward action and to situate themselves within potential solutions. This reinforces photovoice as both a research method and a pedagogical intervention (Robertson et al., 2022), which facilitates the integration of reflection, imagination, and action.

Within the Ecopedagogical Continuum of Ecological Consciousness, this theme represents the culminating orientation, wherein affect, critique, relational awareness, and hope converge into praxis. It demonstrates that ecological consciousness, while clearly present and evolving, remains a developing and uneven process. Continued support is thus required to extend from personal and pedagogical commitments toward more comprehensive forms of ecological engagement.

Development of the Ecopedagogical Continuum of Ecological Consciousness (ECEC) Model

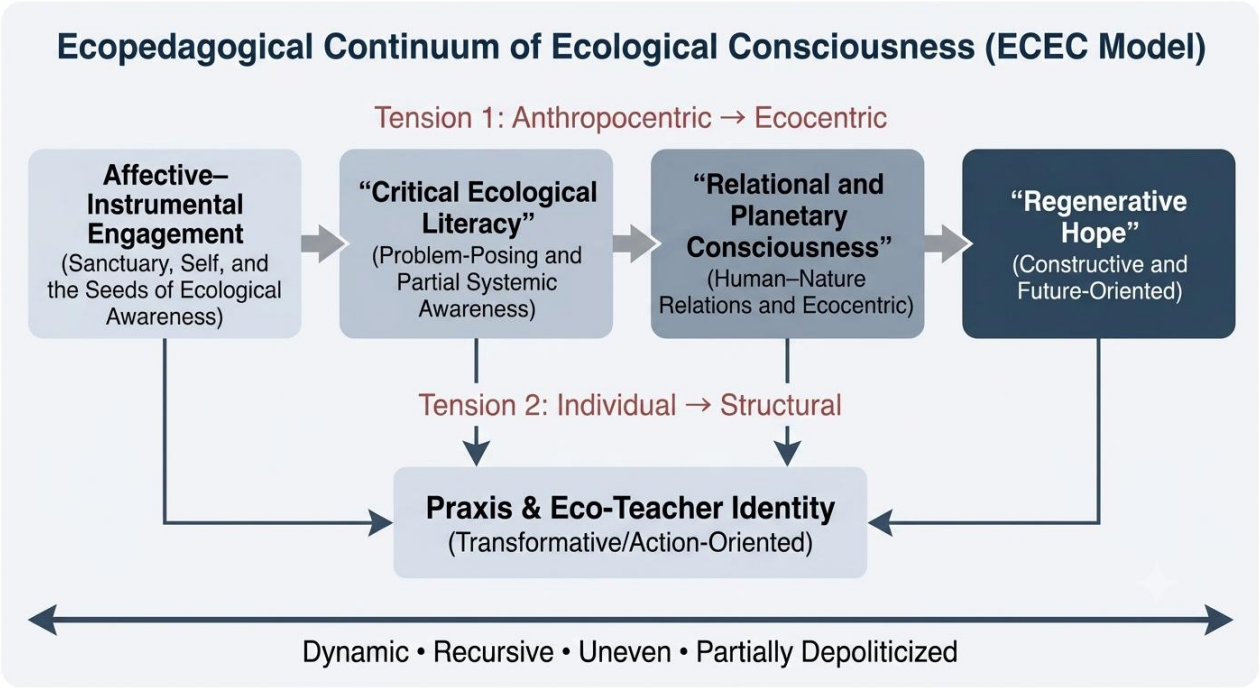
Taken together, these orientations are synthesized in the Ecopedagogical Continuum of Ecological Consciousness (ECEC) Model (Figure 6), an empirically grounded model that conceptualizes ecological consciousness as developing unevenly. Instead of representing a linear progression or a fixed set of competencies, it depicts ecological consciousness as a continuum of interacting orientations, shaped by participants' lived experiences, dialogic reflection, and evolving interpretations of environmental realities.

The five orientations identified: affective–instrumental engagement, critical ecological literacy, relational and planetary consciousness, constructive hope and regenerative imagination, and praxis expressed through an

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 6 (June 2026)

emerging eco-teacher identity, are not discrete stages but overlapping and co-existing dimensions. Participants frequently move across these orientations within a single reflection, demonstrating that ecological consciousness develops through layered and recursive engagement Instead of through sequential advancement. Earlier orientations are not abandoned; instead, they persist and are reworked as new ways of understanding emerge.

Figure 6. *Ecopedagogical Continuum of Ecological Consciousness (ECEC Model)*



The model conceptualizes ecological consciousness as a dynamic and uneven continuum structured by five interacting orientations: affective–instrumental engagement, critical ecological literacy, relational and planetary consciousness, constructive hope, and praxis with an emerging eco-teacher identity. It is shaped by developmental tensions between anthropocentric and ecocentric perspectives and between individual and structural engagement, revealing ecological consciousness as partially depoliticized and developmental, with praxis functioning as both integrative outcome and site of potential transformation.

As illustrated in Figure 6, the ECEC Model captures the expansion of ecological consciousness across multiple domains. Participants demonstrate the capacity to connect emotionally with nature, identify and analyze environmental issues, recognize ecological interdependence, imagine regenerative futures, and articulate action, particularly within pedagogical contexts. This indicates that ecological consciousness is clearly present and meaningfully developing, challenging assumptions that learners lack environmental awareness or engagement.

However, the model's central contribution lies in revealing the uneven and tension-filled nature of this development. Across orientations, participants' ecological consciousness is shaped by persistent tensions between anthropocentric and ecocentric perspectives, and between individualized and broader understandings of environmental responsibility. Affective engagement remains strongly tied to personal well-being; critical ecological literacy often emphasizes moral responsibility; relational consciousness foregrounds interdependence but remains primarily ecological; regenerative imagination envisions renewal but is frequently localized; and praxis is largely expressed through personal action and pedagogical intent.

These patterns converge in an important analytical insight: ecological consciousness develops as a hybrid and evolving construct, where depth in one dimension does not necessarily correspond to depth in others. Participants may express strong emotional connection, analytical awareness, or commitment to action, yet these

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 6 (June 2026)

orientations do not automatically extend into more comprehensive or integrated forms of ecological understanding. This unevenness highlights that ecological consciousness is not simply accumulated but is actively negotiated within specific experiential and educational contexts.

In this sense, the ECEC Model functions as a diagnostic framework, making visible both the strengths and limitations of ecological consciousness as it develops. It identifies where engagement deepens, such as in affective connection, critical awareness, relational thinking, and emerging praxis, while also revealing areas where further development is needed. Importantly, this unevenness is not interpreted as a deficiency, but as a defining characteristic of ecological consciousness in formation, reflecting the complexity of learning within socio-ecological contexts.

A key dimension underpinning this development is the role of photovoice as a catalytic pedagogical process. Through the SHOWED technique, participants are guided from observation toward explanation and from explanation toward action, facilitating movement across orientations. Photovoice enables participants to connect lived experience with critical reflection, supporting the emergence of ecological awareness, relational understanding, and initial forms of action. At the same time, the findings indicate that such movement remains contingent on the depth and direction of facilitation, emphasizing that participatory methods require intentional critical framing to support more comprehensive ecological development.

The ECEC Model reframes ecological consciousness as a developmental, contested, and evolving process, shaped by the interplay of affect, analysis, relationality, imagination, and action. Its theoretical contribution lies in demonstrating that ecological consciousness is not a singular outcome but a continuum of becoming, characterized by both meaningful engagement and ongoing limitations. Building on this, the model provides a foundation for rethinking teacher education, highlighting the need to intentionally scaffold learning experiences that deepen and integrate these orientations toward more expansive and transformative ecological understanding.

CONCLUSION

This study examined the ecological consciousness of science pre-service teachers through an ecopedagogical lens using photovoice, foregrounding participants lived experiences and interpretive processes. By centering how participants perceive, interpret, and respond to their local environments, the study moves beyond assessing environmental knowledge or attitudes to conceptualize ecological consciousness as a non-linear and evolving process of meaning-making.

Through photovoice and reflexive thematic analysis, five interrelated orientations were identified: affective–instrumental engagement, critical ecological literacy, relational and planetary consciousness, constructive hope and regenerative imagination, and praxis through an emerging eco-teacher identity. These are synthesized in the Ecopedagogical Continuum of Ecological Consciousness (ECEC) Model. These orientations demonstrate that ecological consciousness develops through overlapping and interacting modes of engagement, where affect, analysis, relational awareness, imagination, and action coexist and inform one another. Instead of progressing linearly, ecological understanding emerges as a layered and hybrid process.

The findings reveal meaningful development across the continuum. Participants demonstrated strong affective connections to nature, increasing capacity to interpret environmental issues, recognition of ecological interdependence, the ability to imagine renewal, and willingness to act, often expressed through pedagogically oriented commitments. These findings challenge deficit perspectives by showing that ecological consciousness is not absent but actively forming and evolving among pre-service teachers.

However, the study's central contribution lies in revealing the uneven and tension-filled character of this development. Across orientations, ecological consciousness remains marked by persistent imbalances. Affective engagement frequently retains anthropocentric framing; critical ecological literacy often relies on moralized reasoning; relational awareness remains largely ecologically bounded; regenerative imagination tends toward localized and symbolic visions; and praxis is predominantly enacted within personal and pedagogical domains.

These patterns indicate that ecological consciousness develops as a partial and negotiated process, instead of as a fully integrated transformation.

Importantly, while participants demonstrate strong awareness, care, and willingness to act, their perspectives rarely extend to broader structural dimensions that shape environmental realities. Environmental issues are often interpreted through individual behavior, with limited engagement with wider systems such as governance, policy, or institutional dynamics. This indicates that ecological consciousness, as observed in this study, remains incompletely integrated, with a continuing gap between experiential engagement and more expansive, systemically informed ecological understanding.

The ECEC Model reframes this unevenness not as a deficiency but as a defining feature of ecological consciousness in formation. By conceptualizing ecological consciousness as recursive, dynamic, and internally hybrid, the model makes visible how different orientations develop at varying depths and how they interact in complex ways. It thus functions as both a conceptual and diagnostic framework, enabling a more nuanced understanding of how ecological consciousness expands, where it deepens, and where it remains partial.

A key insight from the study is the role of photovoice as a catalytic pedagogical process. Through structured dialogue, participants moved from observation toward explanation and from explanation toward action, supporting the emergence of ecological consciousness and identity. At the same time, the findings indicate that such development is not automatic. Without intentional facilitation that deepens reflection and connects perspectives across orientations, ecological engagement may remain experiential and pedagogically bounded.

This study contributes to a theory-generating understanding of ecological consciousness by demonstrating that it is not a stable outcome but a developmental and contested field, shaped by lived experience, dialogue, and educational context. While pre-service teachers exhibit meaningful ecological engagement, this engagement remains incomplete, requiring intentional ecopedagogical design to move beyond awareness toward more integrated, expansive, and transformative.

Implications And Recommendations

The study's findings have significant implications for teacher education, policy, and future research. Ecological consciousness must be understood as a developmental process requiring deliberate scaffolding, instead of an assumed outcome of exposure to environmental content. Teacher education institutions should position ecopedagogy as a cross-cutting pedagogical orientation, designing curricula that progressively develop affective, critical, relational, and action-oriented capacities while explicitly addressing structural and justice-oriented dimensions.

For curriculum developers and policymakers, the findings highlight the need to more fully operationalize Republic Act No. 9512 by moving beyond awareness-based environmental education toward critical and transformative approaches. This includes supporting teacher education programs in integrating participatory methodologies and socio-political analysis into environmental curricula. Teacher educators play a central role in mediating this development by linking environmental issues to systems of power and expanding praxis beyond individual action toward collective and structural engagement.

Future research should further investigate how ecological consciousness develops into practice over time, particularly through longitudinal and comparative studies, and explore strategies for translating ecological awareness into systemically informed action.

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