

Reimagining teacher education through eco-pedagogy: Transitioning curriculum silos towards situated, justice-oriented learning

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Abstract

In the face of escalating ecological crises and widening social inequalities, reimagining teacher education through eco-pedagogy becomes not only urgent but transformative. This article examines how eco-pedagogical principles can be embedded across a four-year Bachelor of Education (BEd) programme at a South African university to cultivate ecological consciousness and social justice. Framed within Freirean critical pedagogy and implemented through Participatory Action Learning and Action Research (PALAR), the study positions teaching and learning as relational, justice-oriented, and situated within the more-than-human world. The Anthropocene, understood here as both an epochal crisis and an ontological condition that exposes the interdependence of humans and the earth, provides the conceptual context. Grounded in Indigenous and situated knowledges as the ontological foundation for eco-pedagogy, the research extends the 4B model (Bridging, Becoming, Belonging, and Being) to integrate ecological awareness, ethical responsibility, and community engagement throughout teacher formation. Drawing on collaborative data from lecturers, student teachers, community members, and in-service teachers, the study proposes a developmental framework that disrupts curriculum silos and redefines teacher education as a site of ecological activism and curricular decolonisation. The article contributes to emerging scholarship that links ontological reorientation, participatory praxis, and curriculum transformation as interdependent dimensions of justice-oriented learning in the Anthropocene.

Keywords: critical pedagogy, ecological justice, eco-pedagogy, Indigenous knowledge, PALAR, Paulo Freire, teacher education

Introduction

The accelerating ecological crisis marked by climate disruption, biodiversity loss, food and water insecurity, and environmental injustice is not only a planetary emergency but also an epistemic and ontological calamity. The term Anthropocene denotes the current geological epoch in which human activity has become a dominant force shaping Earth's systems, demanding that education



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reconsider what it means to live, learn, and act in relational accountability with the more-than-human world (Le Grange, 2019). The global education system, and particularly higher education, remains deeply implicated in sustaining anthropocentric and extractivist paradigms that privilege technical knowledge over ethical, relational, and ecological ways of knowing (Affifi, 2023; Kahn, 2010). Within this context, teacher education becomes a crucial site for cultivating ecological consciousness and social responsibility, especially in the Global South where environmental degradation is intertwined with histories of coloniality, inequality, and dispossession (Lotz-Sisitka, 2016; O'Donoghue, 2016). However, in many South African universities, ecological learning remains peripheral confined to science modules or community projects with limited engagement in foundational educational theory.

This paper responds to that disjuncture between curriculum and context between what is taught in teacher education and the lived realities of ecological and social precarity. We argue that eco-pedagogy, grounded in Freirean critical pedagogy and collective transformation, offers a generative framework for reimagining what counts as knowledge, whose knowledge matters, and how learning can foster ecological and social justice (Misiaszek, 2011; Grigorov, 2012). In this study, Indigenous and situated knowledges form the ontological grounding for such reimagining: they centre relationality, reciprocity, and responsibility as core educational values. South Africa's persistent environmental inequalities, low ecological literacy, and socio-economic fragility make eco-pedagogy both urgent and locally resonant (Fundisa for Change, 2022). Moving beyond imported models, this research draws on situated knowledges, Indigenous epistemologies, and context-responsive pedagogical innovation (Olvitt, 2016; O'Donoghue, 2016) to explore how ecological thinking can be meaningfully embedded across a four-year BEd programme.

The aim is to investigate how eco-pedagogy understood not merely as environmental content but as a transformative educational orientation can be enacted developmentally through the BEd programme. Specifically, the study asks:

- How can ecological thinking, sustainability, and social justice be meaningfully integrated into core Education Studies modules?
- What pedagogical strategies and curriculum design processes can support this integration in ways that are experiential, critical, and contextually grounded?
- How might this contribute to a more just, responsive, and relational vision of teacher education in the Anthropocene?

The research applies Participatory Action Learning and Action Research (PALAR) to foreground relational knowledge, democratic co-construction, and collective reflection (Wood, 2020; Kearney, et al., 2013). Drawing on data from an eight-member Action Learning Set (ALS) comprising lecturers, student teachers, community members, and in-service teachers, the study explores how ecological and justice-oriented principles can reframe curriculum across developmental stages of teacher formation. Central to this process is the 4B model Bridging,

Becoming, Belonging, and Being originally conceptualised by the BEd FET programme team (Sathorar & Geduld, 2018) and extended here through an eco-pedagogical lens.

Rather than offering a prescriptive model, the paper invites readers to imagine curriculum as an ethical, relational, and political project responsive to both local realities and planetary responsibilities. The next section outlines the theoretical framework, integrating four strands the Anthropocene, Indigenous and situated knowledges, eco-pedagogy (Freirean critical pedagogy), and the 4B developmental model. This is followed by a description of the PALAR methodology, the findings that trace how eco-pedagogy disrupts curricular silos, and a discussion that synthesises implications for justice-oriented teacher education. The conclusion restates the study's contribution and identifies actionable steps for embedding eco-pedagogy across teacher education in South Africa.

Theoretical framing – Eco-pedagogy, Freire, and situated knowledges

This section develops the theoretical grounding of the study by weaving together four intersecting strands: (1) the Anthropocene as both an epochal crisis and an ontological condition demanding reorientation of education; (2) Indigenous and situated knowledges as the relational and ontological grounding for an alternative epistemic order; (3) eco-pedagogy as a Freirean praxis of justice-oriented, dialogical, and ecological learning; and (4) the 4B developmental model as a curricular scaffold through which these principles can be enacted across the Bachelor of Education (BEd) programme. These conceptual strands collectively frame how teacher education can move beyond anthropocentric and siloed traditions toward relational, contextually grounded, and justice-oriented learning.

At its core, eco-pedagogy is not merely an environmental teaching tool but a radical reorientation of the educational project. Emerging at the intersection of critical pedagogy, environmental justice, and decolonial thought, eco-pedagogy challenges the compartmentalisation of ecological knowledge and the assumed neutrality of schooling. It asserts that environmental degradation is inseparable from socio-economic oppression, colonial legacies, and epistemic injustice (Misiaszek, 2011; Kahn, 2008; Lotz-Sisitka, 2016). As such, eco-pedagogy foregrounds the need to trouble dominant ontologies and reimagine education as a site of ecological healing, community solidarity, and planetary responsibility.

To develop a coherent theoretical grounding, we begin by unpacking the conceptual status of eco-pedagogy. The term pedagogy itself is often used loosely in educational literature as method, theory, philosophy, or practice. In this paper, we adopt a capacious but precise understanding: pedagogy refers to the ethical, relational, and epistemological orientation that underpins teaching and learning. In this sense, a pedagogy functions as a framework, an approach, and a set of practices what Perold-Bull (2025) calls embodied praxis. Eco-pedagogy thus constitutes both a framework for educational justice and a set of pedagogical dispositions oriented toward ecological awareness, solidarity, and transformation.

While Paulo Freire did not explicitly write on environmental education, his ideas on conscientisation, praxis, and the pedagogy of the oppressed have provided foundational

inspiration for eco-pedagogues across the globe (Freire, 1970; Freire & Vittoria, 2007). Freire's insistence on dialogical, contextually relevant, and action-oriented education resonates deeply with efforts to cultivate ecological literacies that are not merely cognitive but ethical and critical. As Kahn (2010) and Grigorov (2012) argue, eco-pedagogy extends Freire's project into ecological terrains, asserting that ecological degradation must be read as a form of structural violence that disproportionately affects marginalised communities and Indigenous populations, particularly in parts of the Global South where colonial extraction and environmental injustice converge.

In this framing, the Anthropocene signals not only a geological epoch but also an ontological rupture a moment that compels education to confront human earth entanglements and to reimagine learning as an ecological act. Here, Indigenous and situated knowledges provide the ontological grounding for this reimagining. They affirm that knowledge is situated, relational, and co-constituted through interdependence with the more-than-human world (Haraway, 1988; Maila & Loubser, 2003; Le Grange, 2019). This relational ontology destabilises Eurocentric assumptions of universality and positions education as a space for living-with, learning-with, and acting-with others human and non-human alike.

Building on this, eco-pedagogy offers a planetary citizenship (Gadotti, 2008) rooted in interconnectedness and responsibility that extend beyond anthropocentric and Eurocentric limits. Yet, while eco-pedagogy provides a global discourse, it must be critically contextualised within South Africa's specific histories, landscapes, and pedagogical traditions. South Africa has a vibrant community of environmental educators whose work predates and, in many ways, prefigures the current turn to eco-pedagogy (Lotz-Sisitka, 2016; Schudel, 2016; O'Donoghue, 2016). The challenge, then, is not to import theory but to situate it to engage eco-pedagogy as a living dialogue between global frameworks and local epistemologies.

We therefore position eco-pedagogy not in opposition to Environmental Education (EE) or Education for Sustainable Development (ESD), but as a critical development that extends and politicises these traditions. While EE has often emphasised ecological knowledge, and ESD developmental goals, eco-pedagogy insists on structural critique, political agency, and epistemic plurality. As Olvitt (2016) notes, this requires navigating laminated open systems overlapping and historically constituted terrains of meaning and power. In this sense, eco-pedagogy moves beyond awareness to action rooted in local histories, Indigenous knowledges, and material realities.

This also means taking seriously what Schudel (2016) calls the curriculum landscape the contradictory and contested terrain in which pedagogical interventions must operate. Teacher education in South Africa, like schooling more broadly, is shaped by outcomes-based logics and performative assessments that often marginalise ecological, Indigenous, and relational knowledges. As Mona and Hurst Harosh (2024) remind us, decolonising education demands rethinking the norms of correctness, neutrality, and standardisation that frame knowledge itself. In this spirit, eco-pedagogy invites us to think-with the earth, learn-with communities, and teach-with and for justice.

Our theoretical commitment, therefore, is to a situated (Haraway, 1988), dialogical, and praxis-based conception of eco-pedagogy one that affirms local knowledge systems, interrogates power, and cultivates new pedagogical imaginaries. Aligned with Critical Studies in Teaching and Learning's commitment to decolonial and transformative praxis, we advocate for teacher education as a space that transcends disciplinary boundaries, foregrounds ontological relationality, and reconfigures teaching and learning as collective possibilities in an era of ecological and social crisis.

Linking the 4B Developmental Model to an Eco-Pedagogy Framework

The Bachelor of Education (BEd) programme at Nelson Mandela University is a four-year professional qualification designed to prepare student teachers for diverse South African school contexts. Within this programme, Education Studies forms a core strand spanning all four years, introducing students to child development, curriculum theory, inclusive education, and the philosophy of education. While this stream offers a solid theoretical foundation for teacher identity and pedagogical practice, it has historically given limited attention to ecological concerns or environmental justice a notable gap in a country marked by widening environmental inequalities and climate vulnerability (Fundisa for Change, 2022; Lotz-Sisitka, 2016).

To explore how ecological thinking could be more coherently and transformatively integrated into teacher preparation, this study employed a Participatory Action Learning and Action Research approach. The research site was the Faculty of Education at Nelson Mandela University, where an Action Learning Set (ALS) of eight participants was formed: two university lecturers, two in-service teachers, two BEd student teachers, and two community members involved in environmental initiatives. Participants were purposively selected to represent diverse forms of experiential, pedagogical, and community-based knowledge. This composition enabled the team to collaboratively analyse how eco-pedagogical principles might be embedded throughout the BEd curriculum.

Rather than developing a new framework, the study drew on the existing 4B model Bridging, Becoming, Belonging, and Being originally conceptualised by the BEd FET programme team (Sathorar & Geduld, 2018) to structure the relationship between theory and praxis in teacher education. The present research extends that model through an eco-pedagogical lens, aligning each developmental stage with principles of contextual relevance, ethical responsibility, environmental agency, and justice-oriented transformation. This extension positions the 4B model as a living framework for cultivating ecological consciousness and relational learning across the four years of pre-service teacher formation.

Year 1: Bridging – Opening ecological awareness

The first year marks students' transition into higher education. Education Theory modules address foundations in child development and educational psychology. Within this stage, eco-pedagogy introduces ecological consciousness as integral to human development, drawing on research that links access to nature with cognitive, emotional, and social well-being (Barrable, 2019; Petridou,

2021). Practical tasks such as school observations and reflective journals are reframed to include analysis of how schooling environments engage or fail to engage with sustainability, food security, and care for place. These reflections enable students to begin recognising how learning is shaped by the interdependence between community and environment.

Year 2: Becoming – Eco-curriculum as praxis

In the second year, when students engage deeply with curriculum theory and pedagogical design, ecological perspectives are embedded as analytical lenses rather than supplementary content. Micro-teaching tasks and case studies from local communities encourage students to design lessons that foreground sustainability and situated Indigenous knowledges acknowledging their specificity rather than treating them as universal categories. The emphasis is on praxis: linking theory to situated action through iterative reflection, dialogue, and feedback.

Year 3: Belonging – Situated practice in real contexts

During the extended school-placement year, eco-pedagogical practice becomes embodied and community-engaged. Student teachers collaborate with in-service teachers and local partners to co-develop context-responsive learning activities that address local ecological issues such as water access, waste management, or school gardens. These practices are documented through multimodal artefacts (photographs, drawings, lesson plans) that serve as both reflective evidence and pedagogical tools for peer learning. This process reinforces belonging as ethical co-presence within human and ecological communities.

Year 4: Being – Philosophical reflection and curriculum transformation

The final year consolidates students' eco-pedagogical identity and ethical stance. Education Theory modules invite students to articulate teaching philosophies grounded in ecological justice, informed by traditions such as Ubuntu (Ramose, 1999), deep ecology (Naess, 1989), ecofeminism (Shiva, 1993), and Indigenous worldviews (Le Grange, 2019). A capstone research project requires students to design actionable proposals school-based sustainability interventions, eco-curriculum innovations, or community partnerships that demonstrate their integration of ecological and social justice principles.

Introducing eco-pedagogy through this staged, iterative framework embeds ecological thinking into the substance of teacher education while nurturing professional identities grounded in care, reciprocity, and environmental stewardship. In doing so, it resists the technicist and assessment-driven logics that often dominate teacher training, reaffirming teaching as an ethical, relational vocation inseparable from planetary well-being.

Methodology: Participatory Action Learning and Action Research (PALAR)

This study adopts a Participatory Action Learning and Action Research (PALAR) methodology (Zuber-Skerritt, 2018; Wood, 2020) to explore how eco-pedagogy can be integrated into a Bachelor of Education (BEd) programme in ways that are critically reflexive, contextually

grounded, and socially just. More than a method, PALAR functions as a philosophy of co-creation prioritising relational accountability, transformation, and the ethical imperative to include marginalised voices in both research and pedagogical practice (Wood, et al., 2023). This approach is particularly suited to teacher education studies seeking to shift knowledge production from hierarchical, individualistic models toward dialogical, collective, and praxis-oriented inquiry.

Design and framing

The PALAR process was guided by two interwoven loops: a relationship-building loop focused on cultivating trust, shared purpose, and collaborative learning, and a research loop aligned with the iterative action research cycle of plan–act–observe–reflect (Wood, 2020). The design drew on Zuber-Skerritt's (2018) framework, integrating the three Rs relationships, reflection, and recognition and the seven Cs communication, collaboration, critical reflection, coaching, compromise, commitment, and competence. These principles informed both the conduct of the study and the pedagogical values underpinning the eco-pedagogical framework. The PALAR process thus mirrored the ethos of eco-pedagogy itself: participatory, ethical, and transformative.

Participant recruitment and ethical considerations

The study was situated within the Faculty of Education at Nelson Mandela University, with the Education Studies stream of the BEd programme serving as the focal context for inquiry. Eight participants were purposively selected to form an Action Learning Set (ALS): two university lecturers, two in-service teachers, two BEd student teachers, and two community members (parents involved in school governance and environmental work). Selection was guided by three criteria: (1) active engagement in teaching or community learning contexts; (2) interest in ecological or justice-oriented education; and (3) willingness to engage in iterative reflection and collaborative knowledge-building. Recruitment occurred via departmental email invitation and word-of-mouth referral within existing faculty networks.

Ethical clearance (Ref: H22-EDU-PGE-020), was granted by the Faculty of Education Research Ethics Committee, and informed consent was obtained from all participants. Anonymity and confidentiality were maintained in data reporting, though some participants opted to have first names associated with artefacts (e.g., drawings or journal excerpts). Consistent with PALAR's commitment to reciprocity, the process was designed to ensure mutual benefit: participants gained access to professional development resources, dialogical learning spaces, and pedagogical tools for integrating eco-pedagogy into their practice.

Data generation

Data were generated across two PALAR cycles spanning six months. The ALS engaged through both synchronous and asynchronous modalities. A WhatsApp group served as an asynchronous communication hub for ongoing reflection, sharing artefacts (images, quotes, and short videos), and posing critical questions. Monthly Zoom sessions (90 - 120 minutes each) facilitated collective planning, feedback, and reflection. Individual and group activities included:

- Baseline questionnaires on ecological literacy and teaching experience
- Reflective journals (textual and visual) documenting eco-pedagogical engagements
- Curriculum review tasks analysing the Education Studies modules through an eco-pedagogical lens
- Photovoice and drawing activities to visualise ecological and pedagogical relationships
- Short video-recorded micro-teaching demonstrations

All artefacts were stored in a shared Google Drive repository, serving both as a data corpus and a reflective learning portfolio. Visual data (drawings, photographs, and screenshots) were analysed collaboratively using visual elicitation and narrative commentary, allowing participants to interpret and annotate their own artefacts during group reflection. This process foregrounded participants' agency in meaning-making and embodied the eco-pedagogical principle of valuing diverse epistemic expressions.

Data analysis

Data analysis followed reflexive thematic analysis (Braun & Clarke, 2019), facilitated through two structured group coding workshops. Participants collaboratively identified and refined emergent themes through dialogue and consensus-building. The analysis was iterative and dialogical, with cycles of interpretation, feedback, and revision. To manage power dynamics inherent in co-analysis, facilitation rotated among participants, ensuring that no single voice dominated discussions. Divergent interpretations were explored through discussion until common or layered understandings were reached.

Trustworthiness was strengthened through triangulation of data sources (journals, visual artefacts, discussions), member validation of themes, and reflexive journaling by the facilitators. Participants reviewed excerpts and thematic summaries for accuracy and resonance. In several instances, they revised their journal entries or artefacts in response to collective insights, evidencing PALAR's iterative and participatory character.

Limitations and reflexivity

Despite its generative outcomes, the PALAR process was not without constraints. Time pressures, uneven digital access, and varying familiarity with reflective practice influenced participation across cycles. The use of WhatsApp, while cost-effective and accessible, sometimes limited the depth of sustained dialogue (Rangana, 2023). The dual role of the researchers as both facilitators and co-learners also introduced positional tensions. These were mitigated through continuous reflexive journaling, open discussion of positionality during group sessions, and collective decision-making about data interpretation.

While these limitations shaped the process, they also embodied the lived complexities of participatory research in higher education. Ultimately, the PALAR methodology enabled a multi-voiced, situated, and relational exploration of eco-pedagogy in teacher education producing

both theoretical insight and practical, collaboratively designed strategies for curriculum transformation.

Findings: Disruptions, tensions, and possibilities

The PALAR process generated four interrelated themes that reveal how eco-pedagogy can be meaningfully embedded within teacher education to foster justice-oriented, sustainable, and contextually responsive practice. These findings emerged through dialogical engagement among participants, their communities, and the curriculum itself. Across two iterative cycles, the Action Learning Set (ALS) experienced multiple tensions and transformative openings that challenged entrenched pedagogical assumptions while illuminating new strategies for curriculum renewal. Each theme corresponds with a research question and aligns with a stage of the 4B developmental model demonstrating how eco-pedagogical learning unfolded from Bridging (initial awareness) to Being (philosophical reflection and activist practice).

1. Curriculum silos and the possibility of interdisciplinarity

Linked to Research Question 1: How can ecological thinking be integrated into core Education Studies? → 4B Stage: Bridging, Participants consistently identified the rigidity of the BEd curriculum as a barrier to ecological learning. Lecturers and student teachers described how sustainability content is largely confined to science-based modules, reinforcing an artificial division between “content” and “context.” As Student 2, a second-year student, reflected in her journal:

When I asked why we don't talk about the environment in Education Theory, someone said it's not part of the module outcomes. But how can education not talk about life, water, soil, and food? (Student 2, 2023)

Curriculum-mapping exercises confirmed that ecological and place-based themes are often excluded by design rather than oversight. The group identified opportunities to infuse ecological perspectives into foundational modules linking, for instance, child-development theory to the role of nature in learning, or inclusive-education modules to environmental access and justice.

As one lecturer observed during a Zoom session,

We don't need a green module we need a green thread (Lecturer 1, 2023).

This call for integration echoes Schudel (2016), who contends that interdisciplinarity is not an enhancement but a prerequisite for socially and ecologically relevant teacher education.

2. Reclaiming learning as situated and embodied

Linked to Research Question 2: What pedagogical strategies can support experiential, critical, and contextually grounded learning? → 4B Stage: Becoming. Participants emphasised the disconnection between formal learning and lived ecological realities. For many, ecological awareness was shaped less by textbooks than by daily encounters with scarcity, pollution, and community resilience. During a Photovoice activity, Student 3, an in-service teacher, shared a photograph of his school's broken borehole:

We talk about sustainability in workshops, but our learners drink dirty water. If the curriculum doesn't start here, it's not real. (Student 3, 2023)

Such reflections prompted a re-envisioning of fieldwork assignments not merely as observation tasks but as spaces for *eco-conscientisation* where student teachers identify environmental exclusion and local responses. One first-year participant's drawing of a tree labelled *family, soil, language, rain, and Ubuntu* visualised learning as rooted and relational. She remarked,

This is what I think learning is, but we only draw mind maps with bullet points in class. (Student 1, 2023)

These artefacts reinforced the value of multimodal and embodied learning. They align with Perold-Bull (2025), who defines pedagogy as embodied praxis a perspective resonant with eco-pedagogy's emphasis on learning with rather than about the world.

3. Unearthing indigenous knowledge and community wisdom

Linked to Research Question 1 & 2: How can ecological and social justice be integrated? → 4B Stage: Belonging. Although policy promotes the inclusion of Indigenous Knowledge (IK) in education, participants noted that it often appears as tokenistic or decontextualised. Within the ALS, community members played a pivotal role in re-centring IK as *living, situated epistemology*. One participant a parent who is also a community gardener shared local soil-testing rituals used to determine planting readiness. This story opened discussion on how traditional ecological knowledges could inform science or life-skills teaching.

As one teacher reflected,

If we allow learners to bring in their grandmothers' wisdom, they'll see that science is not just from textbooks. (Teacher 1, 2023)

Building on this insight, the group proposed Education-Theory assignments that document and analyse local ecological practices such as rainwater harvesting, seed preservation, or indigenous food gardens recognising, as O'Donoghue (2016) argues, the interface where

scientific and Indigenous knowledges can engage respectfully and productively. These dialogues repositioned communities as co-educators and affirmed that eco-pedagogy is inseparable from decolonial and place-responsive learning.

4. The challenge of institutional inertia and the emergence of activist pedagogy

Linked to Research Question 3: How can teacher education foster relational, justice-oriented praxis in the Anthropocene? → 4B Stage: Being. Participants voiced frustration with systemic constraints that hinder curriculum innovation rigid module outcomes, workload pressures, and limited training in eco-pedagogical methods. A lecturer summarised the dilemma:

It's easier to write about eco-pedagogy in a journal than to insert it into our curriculum.
(Lecturer 2, 2023)

Rather than accepting inertia as inevitable, the group reframed it as an invitation to micro-activism. Drawing on Freire's concept of praxis, they identified small but potent acts of curricular disruption: rewording assignment briefs to include local environmental contexts, introducing outdoor learning, or initiating student-led garden projects. These "small acts" embody what Thondhlana and McKenna (2024) term liminal pedagogical spaces threshold zones where transformation begins through practice, not policy. As Botes (2025) reminds us, such activism redefines the teacher not as a deliverer of content but as an agent of ecological and social change.

Together, these themes reveal that eco-pedagogy is not a discrete curricular addition but a disruptive, relational practice that reconfigures teacher education itself. It challenges disciplinary silos (*Bridging*), embeds embodied praxis (*Becoming*), reclaims community knowledges (*Belonging*), and cultivates activist professionalism (*Being*). Through this process, teacher education emerges as a potential site of ecological justice, epistemic plurality, and collective imagination where learning to teach becomes inseparable from learning to live well with the earth.

Discussion: Reimagining teacher education through eco-pedagogy

The findings of this study challenge the assumption that environmental content can simply be added to teacher-education curricula without attending to the deeper epistemological, pedagogical, and relational shifts required for transformation. As revealed through the PALAR process, eco-pedagogy is not an insertion but a reorientation a call to trouble inherited curricular logics, to destabilise disciplinary boundaries, and to reimagine teaching and learning as situated, embodied, and accountable to both people and planet.

This aligns with Sparks' (2024) argument that curriculum transformation requires epistemic disobedience: a refusal to reproduce normative practices that silence subaltern knowledges, decontextualise learning, and privilege compliance over criticality. The eco-pedagogical framework developed here therefore extends existing work (Kahn, 2008; Misiaszek, 2011; Lotz-

Sisitka, 2016) by demonstrating how eco-pedagogy can be operationalised across a four-year BEd programme using the 4B model. In doing so, it advances a novel articulation of eco-pedagogy as both ontological grounding and developmental process anchored in Indigenous, Freirean, and participatory paradigms.

From siloed content to relational knowledge

A key insight emerging from the Action Learning Set is the inadequacy of compartmentalised curriculum design for addressing ecological realities. Participants critiqued “green additions” to the curriculum as a form of tokenism that leaves intact the technocratic logic of outcomes-based education. In contrast, the eco-pedagogical 4B framework invites a relational curriculum logic where learning is connected by relevance, context, and care rather than fragmented by subject boundaries.

This resonates with Lotz-Sisitka (2016) and Olvitt (2016), who argue that transformative environmental learning requires teachers to transcend static content and cultivate integrative, socially responsive pedagogies. The 4B developmental model contributes to this shift by scaffolding ecological awareness and pedagogical complexity over time: Bridging through awareness, Becoming through praxis, Belonging through community engagement, and Being through ethical reflection. Unlike top-down curricular reforms, this progression roots transformation in iterative practice rather than acceleration or abstraction. In doing so, it resists both instrumentalism and superficial “greening,” repositioning learning as a long-term, relational act of ecological becoming.

Pedagogy as praxis: Embodiment, dialogue, and disruption

Drawing on Freirean principles, this study positions pedagogy as praxis an ongoing dialectical engagement between reflection and action. The use of photographs, drawings, and storytelling in the PALAR process demonstrates how embodied and multimodal practices can reconfigure what counts as knowledge in teacher education (Perold-Bull, 2025; Collett, et al., 2025). These creative practices enabled participants to insert their lived experiences of environmental precarity and community resilience into the curriculum, challenging the dominance of abstract, depersonalised learning. Moreover, participants’ identification of curricular interruptions small acts of resistance such as outdoor learning, student-led gardens, and contextualised assessment illustrates a grounded model of activist pedagogy. These acts, though modest, enact what Thondhlana and McKenna (2024) describe as pedagogical liminality micro-spaces of transformation that disrupt the symbolic violence of standardised curricula. Through such moments of disruption, both educators and student teachers begin to reclaim the right to imagine education otherwise.

Decolonial ecologies and the ethics of plural knowing

A further contribution lies in repositioning Indigenous and community knowledges as ontological foundations rather than supplementary content. Engagements with local soil practices, food

traditions, and land rituals demonstrated that ecological learning is inseparable from epistemic justice. As O'Donoghue (2016) and Le Grange (2019) contend, authentic transformation in environmental education depends on creating critical interfaces between scientific and Indigenous epistemologies spaces where multiple ways of knowing coexist without assimilation. This study extends that argument by embedding such interfaces within the Education-Studies curriculum, reframing teacher education as both political and ecological practice. In so doing, it responds to Mona and Hurst Harosh's (2024) call to move beyond deficit-based assessments of learners' knowledge toward an appreciation of variation, multiplicity, and context. The inclusion of situated Indigenous knowledges thus constitutes not a thematic enrichment but an ontological shift one that redefines what counts as learning, who counts as knower, and how teachers come to know.

Reimagining the curriculum as a living ecology

Most significantly, this study contributes to ongoing debates within *Critical Studies in Teaching and Learning* by conceptualising the curriculum not as a static prescription but as a living, relational ecology dynamic, contested, and open to co-creation. Within this ecology, eco-pedagogy becomes both method and ethos: an invitation to cultivate *care*, *accountability*, and *planetary justice* as foundational educational principles. Reimagining the BEd through eco-pedagogy therefore represents more than a curriculum intervention; it signals an ontological reorientation toward teaching as an act of ecological and social stewardship. In this sense, the 4B eco-pedagogical model offers a practical, context-responsive pathway for operationalising justice-oriented education in the Anthropocene where to teach is, fundamentally, to learn how to live well with the earth.

Conclusion

This study has argued for a radical re-imagination of teacher education through the lens of eco-pedagogy, grounded in participatory engagement, critical theory, and situated practice. Drawing on a collaborative PALAR process with lecturers, student teachers, in-service teachers, and community members, the research examined how ecological thinking and justice-oriented pedagogy can be meaningfully embedded across the Bachelor of Education (BEd) programme. The study generated four central insights: that existing curriculum silos limit ecological responsiveness and must give way to integrative and relational designs; that learning becomes transformative when it is embodied, place-based, and rooted in lived ecological realities; that Indigenous and community knowledges are not supplements but vital epistemic and ontological foundations for eco-pedagogy; and that activist pedagogies, even in modest and localised forms, can interrupt institutional inertia and create new spaces for transformation.

These insights converged in the co-creation of an eco-pedagogical extension of the 4B model; *Bridging, Becoming, Belonging, and Being* which scaffolds ecological consciousness, relational practice, and ethical reflection over the four years of pre-service teacher education. This developmental framework represents a practical contribution to both eco-pedagogy and

curriculum-renewal scholarship by demonstrating how a justice-oriented, participatory approach can be operationalised in South African higher education. It suggests that eco-pedagogy is not the inclusion of environmental content but a transformative educational orientation that reshapes what it means to know, to teach, and to be in relation with the more-than-human world.

The implications of this study for teacher education are significant. Reimagining curriculum design through eco-pedagogy requires that ecological and justice-oriented questions are embedded across the Education Studies stream as recurring “green threads” rather than stand-alone modules. It calls for pedagogical practices that integrate embodied, multimodal, and community-based learning experiences such as Photovoice, school gardens, and reflective journaling that connect theory with lived experience. This also implies a shift in professional development, where lecturers collaborate across disciplinary boundaries and engage in eco-pedagogical training that fosters collective reflection and innovation. Within institutions, such transformation may begin with small but deliberate acts of curricular activism: re-framing assignment briefs, incorporating community voice in assessment, or introducing ecological perspectives into classroom discussions. These incremental actions model the participatory ethos of PALAR and reveal how change can emerge even within constraint.

While the study affirms the transformative potential of eco-pedagogy, it also recognises its limitations. The small size of the Action Learning Set and the digital-access inequities experienced by some participants constrained the depth and breadth of engagement. Future research could expand this work across multiple teacher-education institutions, follow graduates longitudinally to assess shifts in classroom practice, and explore how eco-pedagogy interacts with issues of digital and linguistic diversity in higher education. These next steps would help to clarify the broader applicability and sustainability of the 4B eco-pedagogical framework.

In contributing to the ongoing scholarly conversations within *Critical Studies in Teaching and Learning*, this article positions teacher education as a crucial site for unsettling colonial and anthropocentric paradigms and for cultivating pedagogical imaginaries that are ethical, relational, and attuned to planetary precarity. Reimagining teacher education through eco-pedagogy is, ultimately, about more than curriculum reform; it is an ontological reorientation that calls educators and learners to live differently with humility, reciprocity, and hope in relation to one another and to the earth.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the author(s) used Grammarly to assist with language editing and grammar. After using this tool, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the publication.

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