

## Commentary



# Designing with Indigenous Knowledge: Turning Five Learning Principles into Implementable Curriculum Decisions

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Article Info	Abstract
<p><b>Article History</b> Received: January 2026 Revised: February 2026 Published: March 2026</p> <p><b>Keywords</b> Indigenous knowledge; Sustainability competencies; Curriculum framework; Knowledge governance; Assessment evidence</p> <p> <a href="https://doi.org/10.33394/ijete.v3i1.19635">10.33394/ijete.v3i1.19635</a> Copyright© 2026, Author(s) This is an open-access article under the <a href="https://creativecommons.org/licenses/by-sa/4.0/">CC-BY-SA</a> License.</p> 	<p>Education for Sustainable Development (ESD) increasingly emphasizes sustainability competencies (SCs), yet the educational pathways proposed to cultivate them often rest on implicit worldview assumptions that can marginalize Indigenous Knowledge (IK) and other epistemologies. This commentary/conceptual synthesis argues that the central challenge is not the absence of guiding principles but the limited translation of principles into implementable curriculum decisions that can be documented and reviewed. It proposes a minimum decision framework that makes curriculum design more traceable, evaluable, and improvable by linking learning principles to explicit decisions across four domains: selection (which competencies and IK domains are prioritized), authority (who validates, represents, and limits knowledge use), activity design (how engagement and pedagogy enact the principles), and assessment (what evidence counts as demonstrated competence and how it is judged). Two areas are emphasized as essential for curricular accountability: knowledge governance, to protect epistemic integrity and reduce tokenistic or extractive uses of IK, and assessment evidence logic, to recognize process-based demonstrations of competence without flattening plural worldviews. The core claim is that closing the education–reality gap depends on auditable decision logics and evidence practices, not principles alone.</p>
<p><b>How to Cite:</b> Babalola, E. O., &amp; Omolafe, E. V. (2026). Designing with Indigenous Knowledge: Turning Five Learning Principles into Implementable Curriculum Decisions. <i>International Journal of Ethnoscience and Technology in Education</i>, 3(1), 1–12. <a href="https://doi.org/10.33394/ijete.v3i1.19635">https://doi.org/10.33394/ijete.v3i1.19635</a></p>	

## INTRODUCTION

The development of sustainability competencies (SCs) is often presented as a universal educational agenda. Yet, the educational pathways proposed to cultivate these competencies frequently rest on implicit assumptions that are not universal. Across many Education for Sustainable Development (ESD) and Sustainable Development Goal (SDG) discourses, Western worldviews commonly operate as an unmarked reference point, which can

marginalize other epistemologies, including Indigenous knowledge (IK) (Demssie et al., 2020). At the same time, empirical evidence on pedagogies that reliably foster SCs remains limited, leaving learning design suspended between normative aspirations and fragile curricular practice.

The Ethiopian context illustrates the practical consequences of this tension (Demssie et al., 2020). Modern education is characterized as largely “imported,” insufficiently localized, and productive of an education–reality gap in which what students learn does not align with environmental realities, social values, and community needs. The critique targets curriculum design directly: content and teaching methods are not adequately redesigned to reflect collectivist cultural orientations and lived local experience.

In response, five learning design principles have been proposed as a starting point for integrating IK with modern education to strengthen SCs. These principles emphasize defining worldviews as a foundation, utilizing IK, building learning from students’ local experiences, providing authentic engagement opportunities, and adopting sustainability-oriented pedagogies such as field trips, cooperative learning, practice-based learning, and place-based learning (Demssie et al., 2020). This formulation is compelling because it shifts attention from isolated “teaching techniques” toward an architecture of values, experiences, and practices that binds curricula to socio-ecological contexts.

However, principles—however persuasive—do not by themselves resolve the most consequential work of curriculum-making: specifying what is selected, who decides, how implementation is enacted, and how claims of competence are evidenced. Even when worldview is asserted as the basis of pedagogy, implementation still requires explicit choices about what counts as core content, which forms of IK are appropriate to include under community protocols, who holds curatorial and instructional authority, and what kinds of learning activities credibly develop competencies without reducing IK to cultural decoration. In this sense, the claim that ESD should begin not with pedagogy but with worldview offers direction, but that direction must be translated into design mechanisms that are transparent, defensible, and open to scrutiny—especially in higher education contexts where multiple worldviews may coexist within the same program or classroom.

This commentary focuses on that operational gap. Rather than rejecting the integration of IK and modern education, it argues that the success of integration depends on the quality of curriculum decisions made at the point of implementation. Specifically, it proposes a minimum decision framework that links the five principles to explicit choices about content selection, knowledge governance, learning activities, and assessment, so that efforts to close the education–reality gap do not remain conceptual but become design practices that can be documented, compared across cases, and iteratively improved within and across higher education settings.

## **WHY PRINCIPLES NEED CURRICULUM DECISIONS**

Learning design principles function like a compass: they provide normative direction for what education should look like when sustainability competencies are the primary goal.

The five principles discussed here foreground worldview foundations, the use of IK, students' local experiences, engagement opportunities, and sustainability-oriented pedagogies. Yet a compass does not complete the most consequential work of curriculum-making—namely, specifying what is selected, who has decision authority, how implementation is enacted, and how success is judged. This gap between “direction” and “decision” is repeatedly identified as a persistent weakness in sustainability-oriented curriculum reforms, where broad commitments often fail to materialize into design choices that can be monitored, compared, and improved (Pacis & VanWynsberghe, 2020; Mohan & Hong, 2018).

This gap matters because the critique of modern education in Ethiopia targets precisely the failure to localize curriculum, producing an education–reality gap in which learning becomes misaligned with socio-ecological conditions and community needs (Demssie et al., 2020). If the root problem lies in curriculum decisions that do not resonate with local contexts, the remedy must likewise be formulated as explicit curriculum decisions rather than principles alone. Put differently, principles lose practical force if they cannot be traced into examinable choices: which competencies are prioritized, which knowledge is appropriate to include under community protocols, and which local experiences are substantively integrated into course structures rather than referenced symbolically (Parsons et al., 2017; Assefa, 2021; Nishima-Miller et al., 2025).

There is also a technical reason. The framework treats worldview as foundational, but worldview does not automatically “drop” into classroom practice. It must be operationalized through learning outcomes, interaction norms, problem-framing strategies, and criteria for evaluating solutions. Without explicit decisions about these design elements, worldview risks becoming a slogan with limited practical effect. For example, affirming collectivist cultural commitments is largely empty if assessment remains strictly individualistic and recall-based, or if fieldwork is conducted without ethical and meaningful community engagement processes that align with the stated worldview (Wright, 2014; Başaran et al., 2022).

Moreover, the principle to “utilize Indigenous knowledge” introduces selection and authority questions that cannot be resolved by goodwill alone. Even when curricula adopt culturally responsive moves—such as local language use, apprenticeship models, or community participation—implementation still hinges on harder decisions: which IK domains are appropriate to include, on what criteria, who is recognized as a legitimate curator or instructor, and what safeguards prevent IK from being reduced to decontextualized “cultural stories” detached from ethical, ecological, and lived-practice roots. When such decisions remain implicit, inclusion can become symbolic and may reproduce existing power relations rather than transform them (Govender, 2019; Parsons et al., 2017; Machimana & Genis, 2024).

For these reasons, this commentary argues that each principle should be paired with a minimum curriculum decision package that program designers can articulate, document, and defend. At minimum, this package includes four types of decisions: selection (which IK and target competencies are prioritized, and why), authority (who validates, represents, and limits

knowledge use), activity design (which forms of engagement and pedagogical practices are used to enact the principles), and assessment (what evidence counts as demonstrated competence, and how it is judged). Principles can articulate a vision for sustainability-focused education, but without explicit and auditable curriculum decisions, the goal of bridging the education–reality gap remains an aspiration rather than a verifiable change in educational practice (Pacis & VanWynsberghe, 2020; Craddock, 2025; Assefa & Mohammed, 2022).

## **OPERATIONALIZING THE FIVE PRINCIPLES INTO A DECISION FRAMEWORK**

Translating the five learning design principles into actionable curriculum decisions is the key test of whether ESD can move from aspiration to implementation. When treated as design anchors, the principles can make curricula traceable (what was decided and why), evaluable (what changed and how we know), and improvable (what to refine next). Here, operationalization means converting each principle into a minimum decision set across four domains—selection, authority, activity design, and assessment—with tangible outputs that curriculum teams can document, review, and revise. In other words, the framework asks programs not only to endorse principles, but to specify the decisions and artifacts required to enact them through IK integration and sustainability competencies.

### **Define worldviews**

The first principle demands explicit decisions that connect learning outcomes to classroom governance. A worldview is not simply “cultural values” appended to a syllabus; it is a framing that shapes how problems are defined, what counts as evidence, and how solutions are judged within human–environment relationships (Sinakou et al., 2019; Martín-Garín et al., 2021). Operationally, this requires curriculum designers to decide which worldview(s) will ground the learning design (e.g., collectivist commitments, spiritual–ecological relations, or relational ethics) and to make that grounding visible in intended learning outcomes, participation norms, and success criteria. Crucially, designers must also decide how pluralism is handled in practice—whether the course works with a single dominant framing, uses parallel epistemic lenses, or relies on negotiated problem-framing and co-defined evaluation criteria. Without such decisions, “worldview” risks functioning as a slogan with little effect on what students are asked to do, how they are expected to relate to others, or how performance is judged (Sinakou et al., 2019; Martín-Garín et al., 2021). In decision-output terms, “define worldviews” should produce: (a) a stated worldview position (including how pluralism will be managed), (b) a translation of that position into competency language and learning outcomes, and (c) explicit governance rules for learning (decision-making norms, responsibility structures, and evaluation criteria).

### **Utilize Indigenous knowledge**

The second principle requires deliberate decisions about the selection and mode of integration of IK so it does not become a curricular add-on. To embed IK in the learning process, curricula must specify which domains or practices of IK are appropriate to include under community protocols, which competencies they are expected to cultivate, and how IK

will be enacted through learning activities rather than treated as illustrative content (Gokool-Ramdoe & Rumjaun, 2017; Johnson & Mbah, 2021). Practical options include local language use, community representatives as co-educators or guest lecturers, and community-based learning through collaborative projects. However, these are not neutral moves. A usable framework must also require explicit authority and validation decisions: who can represent which knowledge, how consent and permissions are obtained, how representational safeguards prevent over-reliance on a single voice, and how curriculum use avoids commodification or decontextualization of living practice (Gajparia et al., 2021; Johnson & Mbah, 2021). In decision terms, the minimum set includes: (a) IK selection criteria (including what is restricted or not shareable), (b) authority and validation procedures, (c) integration format (core content, field practice, case base, or dedicated course), and (d) safeguards that keep IK anchored to ethical and ecological practice rather than detached “cultural material.”

### **Build on students’ local experiences; provide engagement opportunities**

These two principles can be operationalized as experience designs that position students as active participants rather than passive listeners. “Building on local experiences” requires a systematic mechanism for identifying relevant student and community experiences and converting them into meaningful learning cases, tasks, or inquiry prompts (Fischer et al., 2025; Thomas, 2020). This can include structured elicitation of community-identified problems, mapping local socio-ecological tensions, and designing scenarios grounded in lived contexts rather than abstract sustainability narratives. “Providing engagement opportunities” raises the requirement further: students must have authentic chances to contribute to community challenges, not merely learn about them. Operational curriculum decisions include selecting community-based projects, defining ethical engagement protocols (permissions, responsibilities, reciprocity), and specifying what student work must produce (e.g., action plans, community assessments, or evidence-informed interventions) (Stewart et al., 2021; Hariyono et al., 2024). In the decision framework, these principles become auditable through: (a) project selection rationales, (b) partnership and consent rules, (c) role and boundary definitions (student autonomy, community responsibilities, faculty responsibilities), and (d) artifact requirements that demonstrate substantive engagement and feedback incorporation.

### **Utilize sustainability-oriented pedagogies**

The final principle requires tight alignment among pedagogical methods, targeted competencies, and assessment strategies. Research on competency-oriented ESD emphasizes that pedagogy should be selected because it builds specific competencies, and assessment should capture those competencies without collapsing them into simplistic end-product grading (Eberz et al., 2023; Predan & Oven, 2023). Approaches such as cooperative learning and place-based education can be powerful when they are designed to cultivate collaboration and systems thinking through cross-role coordination and analysis of causative relationships within sustainability problems. The corresponding assessment logic should privilege process quality and justification—how students reasoned, negotiated trade-offs, used evidence, incorporated feedback, and revised decisions—rather than only what final solution they

produced (Verhelst et al., 2021; Higgins & Calvert, 2024). In decision-output terms, this principle should produce: (a) a competence–pedagogy map (which methods build which competencies and why), (b) a competence–assessment map (which artifacts provide evidence of each competence), and (c) explicit criteria that treat reasoning, process, and accountability as first-class learning evidence (Verhelst et al., 2021; Higgins & Calvert, 2024).

Taken together, the framework imposes one consistency rule: worldview choices shape how competencies are defined; competency priorities shape pedagogy; and pedagogy shapes what counts as assessable evidence. When these links are explicit and documented, the five principles stop functioning as broad guidance and become a practical decision device that supports implementation, evaluation, and iterative redesign across higher education contexts (Sinakou et al., 2019; Eberz et al., 2023; Higgins & Calvert, 2024).

### **KNOWLEDGE GOVERNANCE AND EPISTEMIC INTEGRITY: WHO DECIDES WHAT COUNTS AS INDIGENOUS KNOWLEDGE?**

A decision framework that claims to “utilize Indigenous knowledge” necessarily raises governance questions that cannot be treated as secondary implementation details. Even well-intentioned curriculum designs can reproduce extractive dynamics if they treat IK as content to be collected, translated, and delivered without explicit rules about authority, representation, and accountability. For this reason, curriculum decisions must specify not only which knowledge is appropriate to include under community protocols, but also who is recognized as a legitimate curator or teacher, how that legitimacy is validated, and what safeguards prevent IK from being reduced to decontextualized “cultural stories” detached from ethical and ecological roots (Govender, 2019; Parsons et al., 2017; Machimana & Genis, 2024). Without such governance, “integration” risks becoming symbolic while dominant knowledge structures remain intact.

Operationally, knowledge governance should be articulated as a set of auditable curriculum decisions rather than an implied stance of goodwill. If programs use local language, guest lecturers, apprenticeship models, or community-based projects as modes of IK integration, these moves must be supported by procedures that clarify: (a) consent and permissions (what can be shared, recorded, or assessed), (b) role definitions (who teaches, who advises, who evaluates, and who holds responsibility if harm occurs), and (c) reciprocity and benefit (how communities gain value from participation beyond symbolic inclusion) (Gokool-Ramdoos & Rumjaun, 2017; Johnson & Mbah, 2021). A curriculum that invites community representatives must also decide who speaks for whom, how divergent interpretations or internal community differences are handled, and how epistemic authority is distributed between academic staff and community knowledge holders. In this sense, “knowledge governance” is not external to curriculum design; it is part of curriculum architecture, shaping both the credibility and the ethics of what is taught.

A practical implication is that the authority component of the minimum decision package must extend beyond naming stakeholders. It should include explicit validation procedures (how knowledge is reviewed and by whom), representational safeguards (to

avoid over-reliance on a single voice and to reduce pan-Indigenous generalizations), and protections against commodification or selective appropriation of knowledge detached from its relational and place-based grounding. Governance decisions should also specify restrictions on dissemination, including whether student outputs can be publicly shared, archived, or published, and under what conditions. These requirements align with the broader argument that sustainability-focused curricula must be accountable to socio-cultural contexts rather than merely referencing them rhetorically (Parsons et al., 2017; Assefa & Mohammed, 2022). In short, designing with IK demands governance structures that make epistemic integrity visible, defensible, and revisable within curriculum practice.

### **ASSESSMENT AND EVIDENCE: MEASURING SUSTAINABILITY COMPETENCIES WITHOUT FLATTENING WORLDVIEWS**

Assessment is where learning design principles most often collapse into conventional practice. If worldview is treated as foundational, assessment cannot be an afterthought or a generic add-on; it must align with how competencies are conceptualized within the chosen worldview(s). Otherwise, programs risk teaching for one set of values while measuring success with another. This problem is especially acute in sustainability education, where competencies are commonly described as complex, contextual, and practice-oriented, yet are assessed through narrow instruments that privilege individual recall and standardized outputs (Wright, 2014; Başaran et al., 2022). The result can be an implicit re-centering of dominant epistemic norms—even in curricula that explicitly claim plural worldviews—because what is most easily measured becomes what is treated as most legitimate.

A decision framework therefore requires an explicit evidence logic: what counts as credible proof that students have developed sustainability competencies, how that proof is generated, and how it is interpreted and judged. Competency-oriented ESD research emphasizes that pedagogy and assessment must be aligned with targeted competencies rather than treated as separate domains (Eberz et al., 2023; Predan & Oven, 2023). Concretely, if collaboration and systems thinking are priorities, assessment must capture the quality of collaboration (role negotiation, shared decision-making, accountability, and relational responsibility) and the quality of systems reasoning (causal analysis, trade-off articulation, uncertainty handling, and attention to unintended consequences), not merely the polished final product. This alignment requirement operationalizes the earlier insistence that competence–pedagogy and competence–assessment mapping should be core outputs of curriculum decision-making.

In practical terms, this points toward assessment designs that privilege process, justification, and situated performance. Evidence can be assembled through portfolios of community-engaged projects, iterative design or inquiry documents, reflective analyses that make ethical reasoning explicit, and rubrics that reward revision and learning from feedback. Such approaches align with arguments that assessment should foreground how students reason, negotiate, and use evidence, not only what solutions they propose (Verhelst et al., 2021; Higgins & Calvert, 2024). At the same time, process-based assessment must be designed

carefully to avoid turning relational work into performative compliance. For example, assessment criteria can evaluate how students documented decisions, handled disagreement, and accounted for community-identified priorities, while recognizing that some knowledge may be restricted or inappropriate to reproduce in student submissions.

Importantly, assessment choices return directly to governance. If IK is used as a knowledge base for sustainability work, evaluation criteria should be co-defined or, at minimum, reviewed and validated with relevant community stakeholders to avoid re-imposing external standards that flatten local epistemic priorities. However, community involvement in assessment should be structured to avoid token validation, undue burden, or external gatekeeping. Operationally, this means deciding which aspects of assessment are community-informed (e.g., criteria for respectful engagement, relevance of outputs, and harm avoidance) and which remain the responsibility of academic staff (e.g., grading logistics, alignment with institutional requirements).

Finally, assessment decisions should be transparent enough to be audited and improved. If the aim is to close the education–reality gap, then the credibility of claimed competency development depends on whether assessment evidence reflects real engagement with socio-ecological contexts rather than simulated compliance with course requirements (Pacis & VanWynsberghe, 2020; Craddock, 2025). By making evidence logic explicit—what is assessed, why it represents competence, and how it is judged—curricula can better demonstrate that principles have been translated into practices that genuinely cultivate sustainability competencies in context.

## CONCLUSION

This commentary has argued that the five learning design principles provide a credible starting point for integrating Indigenous knowledge (IK) and modern higher education to foster sustainability competencies, particularly in contexts where an education–reality gap reflects weak curricular localization. The central claim, however, is that principles function as direction rather than design by themselves. Their practical value depends on whether they are translated into explicit, documentable, and auditable curriculum decisions across four domains: selection (which IK domains and sustainability competencies are prioritized, and why), authority (who validates, represents, and limits knowledge use), activity design (how engagement and pedagogy enact the principles in practice), and assessment (what evidence counts as demonstrated competence and how it is judged).

Operationalizing the principles through a decision framework clarifies both what implementation requires and where failure tends to occur. Worldview commitments remain rhetorical when they are not embedded in learning outcomes and classroom governance, or when pluralism is invoked without clear rules for how competing framings are navigated. IK integration becomes tokenistic when selection criteria, consent conditions, and epistemic authority arrangements are left implicit. Engagement loses authenticity when community partnership rules, reciprocity expectations, and responsibility boundaries are undefined. Competency claims become unconvincing when assessment privileges narrow end-products

over process quality, justification, and situated performance. The next step beyond articulating principles is therefore not simply “more innovation,” but stronger design accountability: decision logics and evidence logics that can be examined, challenged, revised, and adapted across contexts without turning IK into compliance checklists or flattening plural worldviews.

## **LIMITATIONS**

This commentary advances a conceptual decision framework rather than reporting empirical testing, so its claims about traceability, evaluability, and improved curricular accountability remain analytic and illustrative rather than demonstrated through implementation outcomes. The framework’s usefulness will also vary by institutional conditions—such as availability of sustained community partnerships, time and resources for co-design, staff capacity for governance and assessment redesign, and the feasibility of process-based assessment in large cohorts or short-course formats. In addition, the emphasis on “auditable” decisions carries a potential risk of bureaucratization or checklist compliance that could inadvertently re-standardize IK integration; careful attention is therefore required to ensure that governance protocols protect restricted knowledge, respect community protocols, and preserve space for pluralism and incommensurability rather than forcing commensuration.

## **RECOMMENDATION**

Future work should translate the framework into a minimum usable product for curriculum teams, including a one-page principle-by-decision matrix, a decision-log template, and at least one worked example showing how IK selection, authority/consent, community-engaged activity design, and process-based assessment evidence can be aligned to specific sustainability competencies under explicit worldview commitments. Empirical studies—ideally design-based, participatory, or implementation-oriented—should then pilot the framework across diverse higher education settings to evaluate feasibility, ethical robustness, learning outcomes, and unintended effects (e.g., tokenism, burden shifting to communities, or over-auditing). As a practical implication, institutions aiming to close the education–reality gap should invest in governance infrastructure (clear permissions, reciprocity agreements, dissemination restrictions, and dispute-resolution pathways) and in assessment capacity (portfolio structures and rubrics that capture reasoning, trade-offs, relational accountability, and iterative learning) so that IK integration becomes a defensible curriculum practice rather than a rhetorical commitment.

### **Author Contributions**

The authors have sufficiently contributed to the study, and have read and agreed to the published version of the manuscript.

### **Funding**

This research received no external funding.

### **Acknowledgment**

We gratefully acknowledge the scholarly works that informed this conceptual synthesis. We also appreciate reviewers and colleagues for feedback that strengthened the framework.

### **Conflict of Interests**

The authors declare no conflict of interest.

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