

Original Research Article

Teachers as Cultural Mediators: Pedagogical Integration of Indigenous Agricultural and Ecological Knowledge in Uganda's Lower Secondary Schools

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Abstract: The successful integration of indigenous knowledge within formal education depends not only on curriculum content but also on pedagogical mediation. This study examines how teachers in Uganda's lower secondary schools integrate Indigenous Agricultural and Ecological Knowledge (IAEK) within the Competency-Based Curriculum (CBC). Guided by Vygotsky's Sociocultural Theory and culturally responsive pedagogy frameworks, the study employed a convergent parallel mixed-methods design involving 382 teachers, interviews, focus group discussions, and classroom documentation review in Central Uganda. Quantitative findings reveal that 82% of teachers report regular integration of indigenous knowledge into classroom instruction ($M = 3.95$), primarily through experiential learning, subject-based examples, project-based tasks, and school garden activities. However, community expert engagement (51%, $M = 3.17$) and structured apprenticeship models remain limited. Regression analysis indicates that pedagogical practices significantly predict perceived educational benefits ($\beta = .258$, $p < .001$). Qualitative findings reveal structural constraints including limited training, resource shortages, time constraints, and assessment misalignment. The study argues that teachers function as cultural mediators who bridge indigenous epistemologies and formal scientific knowledge. However, effective mediation requires systemic pedagogical scaffolding within curriculum architecture. The study contributes theoretically by extending sociocultural mediation to institutional pedagogical structures and empirically by demonstrating the predictive role of pedagogical practices in indigenous knowledge integration outcomes.

Keywords: Indigenous Knowledge Integration, Culturally Responsive Pedagogy, Sociocultural Theory, Competency-Based Curriculum, Teacher Mediation, Uganda.

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1. INTRODUCTION

The integration of indigenous knowledge into formal education systems is not merely a matter of curriculum content inclusion; it is fundamentally a pedagogical endeavor. Curriculum texts may reference indigenous agricultural and ecological practices, but their translation into meaningful learning experiences depends largely on teachers' interpretive and instructional choices (Shulman, 1987; Cochran-Smith, 2004). In competency-based reform contexts such as Uganda's Lower Secondary Curriculum (CBC), where learner-centred, inquiry-based, and experiential approaches are emphasized, the teacher's role as mediator of culturally embedded knowledge becomes

even more central (Mulenga & Kabombwe, 2019; Wiggins & McTighe, 2005).

Indigenous Agricultural and Ecological Knowledge (IAEK) in Uganda encompasses soil fertility management, seed preservation, traditional crop storage systems, botanical pest control, environmental stewardship, water conservation practices, and indigenous food systems (Warren, 1991; Altieri, 2004). These knowledge systems are historically transmitted through community-based processes of observation, participation, storytelling, and apprenticeship forms of situated learning embedded in everyday life (Lave & Wenger, 1991). Knowledge acquisition in such contexts

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is experiential, intergenerational, and socially mediated, aligning closely with constructivist perspectives that emphasize learning through interaction and contextual engagement (Vygotsky, 1978; Kolb, 1984).

However, formal schooling in many postcolonial contexts historically separated learners from these contextual knowledge systems by privileging abstract, textbook-driven scientific paradigms often detached from local ecological and socio-economic realities (Dei, 2000; Tikly, 2016). In agricultural communities, this separation has contributed to a disconnect between school knowledge and livelihood knowledge, limiting the perceived relevance of formal education (Woolman, 2001). As a result, even where indigenous knowledge exists within communities, it may remain marginalized within classroom practice.

The introduction of the CBC in 2020 by the National Curriculum Development Centre (NCDC) sought to address this disjunction by promoting competence development, real-life application, critical thinking, creativity, and learner-centered pedagogy (NCDC, 2020). The reform framework emphasizes contextualization, project-based learning, continuous assessment, and cross-cutting issues such as environmental sustainability. These features create structural opportunities for integrating IAEK into teaching and learning processes.

Yet policy intent does not guarantee pedagogical realization. The mediation of indigenous knowledge depends on teachers' pedagogical content knowledge, beliefs about indigenous epistemologies, confidence in facilitating experiential learning, and access to locally relevant instructional resources (Shulman, 1987; Gay, 2010). Teachers may integrate IAEK through strategies such as project-based agricultural activities, community resource mapping, school garden experiments, guest engagements with local farmers, comparative analysis of indigenous and scientific practices, and reflective discussions on sustainability. Conversely, time constraints, examination pressures, limited training, or insufficient curricular guidance may constrain meaningful integration (Fullan, 2007).

This study therefore examined the pedagogical mediation of IAEK within Uganda's CBC framework through four analytical lenses:

1. **Pedagogical practices used by teachers to integrate IAEK;** including experiential learning, inquiry-based instruction, collaborative projects, field-based activities, and culturally responsive teaching strategies (Gay, 2010; Kolb, 1984).
2. **Extent and frequency of integration;** assessing how consistently IAEK is embedded within lesson planning, classroom instruction,

assessment practices, and cross-curricular activities.

3. **Structural constraints affecting pedagogical mediation;** including teacher preparation, instructional materials, assessment alignment, workload, policy clarity, and institutional support (Fullan, 2007).
4. **Predictive relationship between pedagogical practices and perceived educational benefits;** examining whether particular instructional approaches are statistically associated with perceived improvements in learner engagement, critical thinking, environmental awareness, cultural identity, and competence development.

By moving beyond descriptive accounts to analyse the relationship between pedagogical mediation and perceived outcomes, the study contributes to understanding not only whether indigenous knowledge is present in policy discourse, but how it is enacted in practice within a competency-based reform context.

2. LITERATURE REVIEW

2.1 Indigenous Knowledge and Pedagogy: Epistemological Foundations and Instructional Forms

Indigenous knowledge systems are not merely bodies of accumulated information; they are embedded within distinct epistemological traditions and pedagogical processes. Unlike Western formal education, which often separates knowledge from lived practice and codifies learning into abstract disciplinary categories, indigenous knowledge is generated, transmitted, and validated through sustained interaction with ecological, social, and spiritual environments (Agrawal, 2002; Battiste, 2002). Consequently, indigenous knowledge is inherently pedagogical: it embodies its own methods of teaching, learning, and validation.

Knowledge transmission in indigenous communities typically occurs through storytelling, observation, imitation, guided participation, apprenticeship, communal labor, ritual practice, and intergenerational dialogue (Ogawa, 1995; Zinyeka *et al.*, 2016). Storytelling serves not only as narrative communication but also as a cognitive structuring device that embeds moral reasoning, ecological awareness, and social responsibility within memorable symbolic frameworks. Demonstration and apprenticeship allow learners to engage in situated learning, where knowledge acquisition occurs within authentic activity contexts rather than decontextualized abstraction. Community participation situates learning within social networks, reinforcing collective accountability and relational understanding.

These pedagogical forms closely align with experiential learning theory (Kolb, 1984), which posits

that effective learning emerges from a cyclical process involving concrete experience, reflective observation, abstract conceptualization, and active experimentation. Indigenous pedagogical systems often move learners through similar cycles organically. For instance, agricultural knowledge is learned by participating in planting cycles (concrete experience), discussing outcomes (reflection), interpreting seasonal patterns (conceptualization), and applying improved methods in subsequent seasons (experimentation). Thus, indigenous pedagogy anticipates modern constructivist frameworks.

Madimabe *et al.*, (2020) argue that indigenous pedagogical approaches, including narrative teaching, communal problem-solving, and participatory labor, foster not only cognitive development but also identity formation. Learning in indigenous contexts is not value-neutral; it is identity-constitutive. Through participation in communal agricultural and ecological practices, learners internalize cultural norms, environmental ethics, and collective responsibility. This integration of cognition and identity contrasts with the often-fragmented nature of formal schooling, where academic knowledge may be detached from cultural meaning.

Empirical research supports the cognitive benefits of indigenous pedagogical integration. Jacob *et al.*, (2018) found that incorporating indigenous teaching methods into science instruction improved student engagement and conceptual comprehension. Students were more likely to connect scientific concepts to real-world phenomena when indigenous examples and practices were used as entry points. Similar findings in sustainability education literature suggest that contextualized indigenous examples enhance systems thinking and ecological literacy (Demssie *et al.*, 2020).

However, despite its pedagogical richness, indigenous knowledge integration faces structural barriers within formal education systems. Adejumo (2020) notes that many teachers lack formal training in culturally responsive and experiential pedagogies. Teacher education programs often emphasize standardized curriculum delivery and examination preparation rather than contextual adaptation. Furthermore, standardized examination systems privilege decontextualized knowledge recall, marginalizing experiential and community-based learning (Njenga, 2016). When assessment frameworks do not validate indigenous knowledge competencies, teachers may perceive integration as risky or secondary to examinable content.

Thus, while indigenous knowledge systems offer robust pedagogical models aligned with contemporary constructivist theory, institutional constraints often limit their systematic incorporation into formal schooling. Integration therefore becomes contingent on teacher initiative rather than structural design.

2.2 Sociocultural Theory and Teacher Mediation: From Interpersonal Scaffolding to Institutional Mediation

Vygotsky's (1978) Sociocultural Theory provides a powerful theoretical lens for understanding indigenous knowledge integration in formal education. Central to sociocultural theory is the proposition that learning is mediated through social interaction and culturally constructed tools. Cognitive development does not occur in isolation; it is shaped by historically accumulated cultural practices and artifacts.

Within this framework, teachers function as "more knowledgeable others" who scaffold learners' movement from everyday understandings toward more formalized conceptual structures (Vygotsky, 1978). The concept of the Zone of Proximal Development (ZPD) describes the space between what learners can accomplish independently and what they can achieve with guided support (Vygotsky, 1978). Indigenous knowledge provides an important entry point into this zone because learners often possess tacit familiarity with community-based agricultural and ecological practices prior to formal schooling. When teachers deliberately activate this experiential base, they situate new learning within culturally meaningful cognitive pathways.

For example, a learner raised in a farming community may understand seasonal planting cycles through observation and participation. A teacher who connects this experiential understanding to formal concepts such as soil chemistry, nutrient cycles, or climatic variability leverages prior knowledge to scaffold scientific abstraction. In this way, indigenous knowledge operates as a cultural bridge between informal and formal epistemologies, facilitating concept formation through guided mediation (Vygotsky, 1978; Wertsch, 1985). The movement from everyday concepts to scientific concepts reflects a core sociocultural process in which structured interaction enables cognitive transformation (Vygotsky, 1986).

Cultural tools including language, artifacts, agricultural implements, proverbs, and rituals play central roles in mediating cognition (Vygotsky, 1978). When incorporated into classroom instruction, these tools anchor abstract disciplinary ideas in socially meaningful contexts, thereby enhancing internalization. Sociocultural theory thus legitimizes indigenous knowledge not as peripheral cultural enrichment but as a substantive cognitive resource embedded in historically accumulated practices (Cole, 1996).

However, mediation is not automatic. It requires intentional pedagogical design. Teachers must consciously identify learners' indigenous experiences, structure instructional tasks that extend those experiences, and guide reflective dialogue that connects practice to theoretical explanation. Without deliberate scaffolding, indigenous knowledge risks remaining

anecdotal rather than conceptually integrated, thereby limiting its transformative pedagogical potential (Daniels, 2001).

Moreover, while sociocultural theory traditionally emphasizes interpersonal mediation, the integration of indigenous knowledge within competency-based reforms also necessitates institutional mediation. Curriculum documents, assessment frameworks, and teacher professional development systems function as structural mediators that shape what forms of knowledge are legitimized (Engeström, 2001). If institutional structures privilege Western scientific paradigms exclusively, teacher-level mediation becomes constrained despite pedagogical intent. Extending sociocultural theory to curriculum integration contexts therefore requires recognizing mediation as occurring at both interpersonal and systemic levels.

This study contributes to sociocultural scholarship by foregrounding the necessity of structural scaffolding within competency-based reform. While teachers may act as willing mediators, the absence of vertical curriculum alignment, explicit competency mapping, and assessment validation limits the durability and consistency of indigenous knowledge integration. Effective mediation thus depends not only on classroom interaction but also on coherent curriculum architecture that structurally supports culturally responsive pedagogy.

2.3 Culturally Responsive Pedagogy: Asset-Based Integration and Structural Tensions

Culturally responsive pedagogy (CRP) offers a complementary framework for understanding indigenous knowledge integration. Gay (2010) conceptualizes culturally responsive teaching as instruction that recognizes students' cultural backgrounds as assets rather than deficits. CRP emphasizes affirming cultural identity, incorporating community knowledge into curriculum, and fostering inclusive classroom environments.

In African contexts, culturally responsive pedagogy requires recognition of indigenous epistemologies as legitimate knowledge systems. This involves moving beyond tokenistic references to culturally embedded examples toward meaningful integration that reshapes instructional practice. Indigenous agricultural and ecological knowledge offers rich opportunities for CRP because it is deeply embedded in learners' lived realities.

CRP aligns with competency-based education by promoting experiential, collaborative, and problem-based learning approaches. Narrative teaching, communal problem-solving, and project-based agricultural tasks embody culturally responsive practices that enhance learner agency and identity affirmation.

However, CRP implementation in formal systems encounters structural tensions. Singh (2018) notes that teachers often struggle to balance national curriculum mandates with culturally embedded practices. Examination-driven systems create pressure to prioritize examinable content over contextual learning. Time constraints limit opportunities for experiential activities. Resource shortages restrict access to materials needed for practical engagement.

Furthermore, CRP requires teacher epistemological transformation. Teachers must view indigenous knowledge not as supplementary folklore but as intellectually rigorous and pedagogically valuable. Without sustained professional development, teachers may lack confidence in integrating indigenous practices into formal subject structures.

Structural constraints also affect school–community relationships. Indigenous knowledge is often located outside formal school boundaries. Effective integration requires collaboration with community experts, elders, and practitioners. Yet institutional frameworks rarely formalize such partnerships.

Thus, while culturally responsive pedagogy provides a compelling normative framework for indigenous knowledge integration, its realization depends on systemic alignment. Teacher willingness alone cannot overcome institutional barriers.

Theoretical Synthesis

Taken together, the literature suggests that indigenous knowledge integration operates at the intersection of three theoretical domains:

1. Indigenous pedagogical traditions, which provide experiential, relational learning models.
2. Sociocultural mediation, which explains how cultural tools shape cognitive development.
3. Culturally responsive pedagogy, which frames cultural knowledge as educational assets.

However, the literature also reveals a persistent gap: most scholarship focuses either on pedagogical practices or on theoretical legitimacy, with limited empirical analysis of how teachers navigate institutional constraints in competency-based reform contexts.

This study addresses that gap by examining not only whether teachers integrate indigenous knowledge, but how pedagogical mediation interacts with structural factors within Uganda's CBC framework.

4. METHODOLOGY

This study was anchored within a pragmatic research paradigm, which recognizes that complex educational phenomena require methodological pluralism and problem-centered inquiry rather than strict adherence to a single epistemological tradition (Creswell

& Creswell, 2018). The integration of Indigenous Agricultural and Ecological Knowledge (IAEK) within Uganda's Competency-Based Curriculum (CBC) involves both measurable patterns of instructional practice and interpretive dimensions related to teacher mediation, institutional constraints, and cultural meaning-making. A purely positivist approach would have limited the inquiry to statistical associations, while an exclusively interpretivist design would have constrained generalizability and predictive modeling. Pragmatism therefore provided a philosophically coherent foundation for combining quantitative and qualitative methods in order to generate both explanatory depth and empirical robustness.

Guided by this paradigm, the study adopted a convergent parallel mixed-methods design as articulated by Creswell and Plano Clark (2018). In this design, quantitative and qualitative data are collected concurrently, analyzed independently, and subsequently merged during interpretation. The rationale for this design was threefold. First, indigenous knowledge integration is simultaneously structural and experiential; quantitative data were required to measure frequency, distribution, and statistical relationships, while qualitative data were necessary to explore teacher agency, contextual mediation, and institutional barriers. Second, concurrent data collection minimized temporal bias and ensured that both strands reflected similar policy and curricular conditions under the CBC implementation phase. Third, convergence enhanced validity through triangulation, allowing corroboration or clarification of findings across data sources.

The study was conducted in selected districts within the Buganda sub-region of Central Uganda. This region was purposively chosen due to its rich agricultural heritage, strong presence of indigenous ecological practices, and diversity of lower secondary schools, including government-aided, private, urban, and peri-urban institutions. The contextual diversity of the region provided an appropriate setting for examining how indigenous agricultural and ecological knowledge intersects with formal schooling under the CBC reform introduced nationwide in 2020 by the National Curriculum Development Centre (NCDC).

The target population comprised lower secondary school teachers (Senior 1 to Senior 4) actively implementing the CBC. Teachers were selected as primary participants because they function as pedagogical mediators and are directly responsible for translating curriculum content into classroom practice. A total of 382 teachers participated in the quantitative strand of the study. This sample size was considered statistically adequate for regression modeling, exceeding recommended minimum ratios of cases to predictor variables for reliable inferential analysis (Tabachnick & Fidell, 2013).

Sampling followed a multi-stage procedure designed to ensure representation while maintaining feasibility. Districts were purposively selected based on agricultural activity and school diversity. Within selected districts, schools were stratified by ownership (government and private) to ensure proportional representation. Teachers within schools were then selected using simple random sampling techniques to reduce selection bias and increase generalizability. For the qualitative strand, purposive sampling was employed to select teachers who demonstrated varying levels of indigenous knowledge integration, as well as learners for focus group discussions. Classroom documentation, including lesson plans and schemes of work, was also reviewed to assess structural evidence of indigenous knowledge integration.

Data collection relied on multiple instruments to enable triangulation. A structured questionnaire was developed to measure the frequency and nature of IAEK integration, pedagogical strategies employed, perceived educational benefits, and institutional constraints. Items were measured using a five-point Likert scale ranging from strongly disagree to strongly agree. Instrument development was guided by constructs derived from sociocultural theory and culturally responsive pedagogy literature, ensuring theoretical alignment. Content validity was established through expert review by curriculum specialists and educational researchers, who assessed item clarity, relevance, and construct alignment. A pilot study was conducted with teachers outside the main sample to refine wording and structure. Reliability testing using Cronbach's alpha yielded coefficients exceeding the accepted threshold of .70 for all major scales, indicating satisfactory internal consistency (Nunnally & Bernstein, 1994).

In addition to the questionnaire, semi-structured interviews were conducted to explore teachers' conceptual understanding of indigenous knowledge, mediation strategies, alignment with CBC competencies, and perceived institutional constraints. Interviews allowed for elaboration beyond structured survey responses and facilitated exploration of contextual nuances. Focus group discussions with learners provided insight into how indigenous knowledge integration was experienced from the student perspective, particularly regarding engagement, comprehension, and relevance to community life. Classroom documentation review enabled examination of whether reported pedagogical practices were reflected in instructional planning.

Quantitative data were analyzed using statistical software. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were computed to establish patterns of indigenous knowledge integration and pedagogical practices. Pearson product-moment correlation analysis was employed to examine relationships between pedagogical mediation and perceived educational

benefits. Multiple regression analysis was conducted to determine the predictive strength of pedagogical practices while controlling for related variables. Prior to regression analysis, statistical assumptions including normality, linearity, homoscedasticity, and absence of multicollinearity were tested to ensure model robustness. Effect sizes were interpreted alongside statistical significance to assess substantive importance.

Qualitative data were analyzed thematically following the systematic procedures outlined by Braun and Clarke (2006). Transcripts were first read repeatedly to ensure familiarization. Initial codes were generated inductively from participant narratives and deductively from theoretical constructs such as mediation, scaffolding, experiential learning, and institutional constraint. Codes were then organized into broader themes reflecting patterns across interviews and focus groups. Themes were reviewed and refined to ensure coherence and theoretical alignment. Credibility was enhanced through member checking, whereby selected participants reviewed thematic summaries, and through peer debriefing with fellow researchers to minimize interpretive bias.

Integration of quantitative and qualitative findings occurred at the interpretation stage through comparative analysis. Statistical patterns were examined alongside qualitative explanations to assess convergence, complementarity, or divergence. For example, regression results indicating that pedagogical practices significantly predicted perceived educational benefits were contextualized through teacher narratives describing experiential learning strategies and community-based examples. This integrative approach strengthened explanatory depth and theoretical insight.

Ethical considerations were carefully observed throughout the study. Ethical clearance was obtained from relevant institutional authorities prior to data collection. Participants were provided with detailed information regarding the purpose, procedures, and voluntary nature of the study. Written informed consent was obtained from teachers, and assent procedures were

followed for learners participating in focus groups. Confidentiality was maintained through anonymization of responses and secure storage of data. Participants were informed of their right to withdraw at any stage without penalty. Reflexivity was maintained throughout the research process to acknowledge and mitigate potential researcher bias, particularly given the cultural sensitivity surrounding indigenous knowledge systems.

5. FINDINGS

This section presents the empirical findings of the study on the pedagogical mediation of Indigenous Agricultural and Ecological Knowledge (IAEK) within Uganda's Competency-Based Curriculum (CBC). Guided by sociocultural theory and culturally responsive pedagogy (Gay, 2010; Kolb, 1984), the analysis examines how teachers operationalize IAEK in classroom practice and the extent to which such mediation translates into perceived educational benefits. The findings are organized around four analytical lenses: (1) the pedagogical practices employed to integrate IAEK, (2) the extent and frequency of integration across instructional processes, (3) structural constraints shaping pedagogical implementation, and (4) the predictive relationship between instructional approaches and perceived learner outcomes.

Drawing on survey data from 382 teachers, complemented by qualitative evidence from interviews, focus group discussions, and curriculum document analysis, the section integrates descriptive, correlational, and regression results with thematic insights. This mixed-methods presentation enables a comprehensive understanding of both the instructional realities of IAEK integration and the systemic factors influencing its coherence and effectiveness within the CBC reform context.

5.1 Pedagogical Strategies Employed by Teachers

This section outlines the key instructional strategies teachers use to implement Indigenous Agricultural and Ecological Knowledge (IAEK) within classroom practice.

Table 1: Current practices used by teachers to implement indigenous knowledge in the secondary school curriculum

Items on the current practices used to implement indigenous knowledge in the secondary school curriculum	Percentage Response (%)					Mean	Std dev
	SD	D	N	A	SA		
I regularly incorporate indigenous knowledge in my teaching practices	3% (10)	14% (53)	2% (8)	49% (186)	33% (125)	3.95	1.067
I integrate indigenous knowledge into the secondary school curriculum through specific subjects or lessons	8% (32)	4% (15)	6% (21)	53% (204)	29% (110)	3.90	1.117
I integrate indigenous knowledge into the secondary school curriculum through incorporating indigenous perspectives in existing lessons	4% (16)	19% (74)	14% (53)	51% (196)	11% (43)	3.46	1.056
I integrate indigenous knowledge into the secondary school curriculum through field trips or cultural experiences	6% (21)	14% (53)	10% (39)	35% (135)	35% (134)	3.81	1.21
I integrate indigenous knowledge into the secondary school curriculum through inviting indigenous guest speakers	9% (34)	32% (123)	9% (33)	34% (129)	17% (63)	3.17	1.285

Source: Primary data

Table 1 presents teachers' reported practices for implementing indigenous knowledge within the secondary school curriculum and reveals varied but generally positive levels of engagement. A strong majority of teachers indicated that they regularly incorporate indigenous knowledge in their teaching practices (49% agree; 33% strongly agree), yielding a high mean score ($M = 3.95$, $SD = 1.067$). Similarly, integration through specific subjects or lessons attracted substantial endorsement (53% agree; 29% strongly agree; $M = 3.90$, $SD = 1.117$), suggesting that subject-based embedding represents a dominant implementation strategy.

In contrast, the incorporation of indigenous perspectives within existing lessons, though still positively rated (51% agree), recorded a comparatively lower mean ($M = 3.46$, $SD = 1.056$), reflecting more variability and possibly less systematic pedagogical integration. Experiential strategies such as field trips or cultural experiences were moderately strong (35% agree; 35% strongly agree; $M = 3.81$, $SD = 1.21$), indicating recognition of the value of contextual learning approaches consistent with competency-based

principles. However, inviting indigenous guest speakers emerged as the least utilized strategy (32% disagree; $M = 3.17$, $SD = 1.285$), with the relatively higher standard deviation suggesting considerable divergence in practice across schools.

Overall, the findings indicate that teachers predominantly rely on classroom-based and subject-integrated approaches, while community-linked and participatory strategies though present are less consistently implemented. This pattern suggests that while indigenous knowledge is being incorporated at the instructional level, its integration may remain largely teacher-driven and classroom-bound rather than systematically institutionalized through sustained community partnerships and structured experiential frameworks.

5.1 Frequency of Indigenous Knowledge Integration

This section presents findings on how consistently Indigenous Knowledge is incorporated into classroom instruction, based on teachers' self-reported practices.

Table 2: Frequency of IAEK Integration in Classroom Instruction (N = 382)

Frequency Level	% of Teachers	Mean	SD
Always/Often	82%	3.95	0.84
Sometimes	13%	—	—
Rarely/Never	5%	—	—

Table 2 presents the frequency with which teachers report integrating Indigenous Agricultural and Ecological Knowledge (IAEK) into classroom instruction ($N = 382$). The findings indicate that a substantial majority of teachers (82%) reported that they *always* or *often* incorporate IAEK in their teaching, with a high mean score ($M = 3.95$, $SD = 0.84$) on the Likert scale. This suggests that, at the level of classroom practice, IAEK integration is not peripheral but forms a regular component of instructional delivery for most respondents. The moderate standard deviation indicates some variability in practice, yet overall responses cluster toward the higher end of the scale. A smaller proportion of teachers (13%) reported integrating IAEK *sometimes*, while only 5% indicated *rarely* or *never* doing so. These findings demonstrate strong self-reported instructional engagement with indigenous knowledge across sampled

schools. However, when interpreted alongside structural analyses showing weak vertical and assessment alignment, the results suggest a potential distinction between frequency of classroom inclusion and systemic curriculum embedding. In other words, while teacher-level implementation appears robust, institutional coherence mechanisms may not yet fully support or standardize such practices across subjects and grade levels.

5.2 Pedagogical Practices Used for IAEK Integration

This section presents the range and frequency of pedagogical practices employed by teachers to integrate Indigenous Agricultural and Ecological Knowledge (IAEK) within classroom instruction, highlighting the dominant instructional approaches supporting implementation.

Table 3: Pedagogical Practices Used for IAEK Integration

Practice	% Using Regularly	Mean	SD
Experiential learning (hands-on tasks)	79%	4.12	0.69
School garden activities	76%	4.08	0.73
Project-based learning	71%	3.94	0.81
Storytelling and proverbs	64%	3.75	0.88
Group discussion & collaboration	83%	4.20	0.64
Community expert engagement	51%	3.17	0.92

Source: Primary data

The findings indicate that teachers employ a range of pedagogical strategies to operationalize Indigenous Agricultural and Ecological Knowledge (IAEK), with notable variation in frequency and intensity of use. Collaborative approaches such as group discussion and teamwork emerged as the most regularly used practice (83%; $M = 4.20$, $SD = 0.64$), suggesting strong alignment between indigenous knowledge integration and the learner-centered, interactive principles of the Competency-Based Curriculum (CBC). Experiential learning through hands-on tasks (79%; $M = 4.12$, $SD = 0.69$) and school garden activities (76%; $M = 4.08$, $SD = 0.73$) were also widely utilized, reflecting the practical and context-responsive nature of IAEK and its compatibility with activity-based instructional models. Project-based learning similarly recorded substantial uptake (71%; $M = 3.94$, $SD = 0.81$), reinforcing the role of inquiry-oriented and problem-solving approaches in contextualizing indigenous practices within formal learning structures.

In contrast, culturally embedded strategies such as storytelling and the use of proverbs, while still moderately practiced (64%; $M = 3.75$, $SD = 0.88$), appear less consistently employed than activity-based methods. Most notably, community expert engagement recorded the lowest level of regular use (51%; $M = 3.17$, $SD = 0.92$), with the comparatively higher standard deviation indicating variability across schools. This suggests that while classroom-based and school-grounded experiential methods are relatively well institutionalized, structured collaboration with community knowledge holders remains less systematic. Overall, the pattern demonstrates that teachers prioritize interactive and experiential pedagogies, yet the comparatively weaker engagement with community experts signals a gap in fully realizing the sociocultural and community-embedded dimensions of indigenous knowledge integration.

5.3 Structural Constraints to Indigenous Knowledge Integration

While quantitative findings indicate substantial teacher engagement in integrating Indigenous Agricultural and Ecological Knowledge (IAEK), qualitative analysis reveals that such integration operates within significant structural constraints. These constraints are institutional rather than individual, suggesting that teachers' efforts are often sustained through personal initiative rather than systemic support.

One of the most frequently cited challenges concerns limited instructional materials. Teachers reported that although indigenous agricultural practices are embedded in community life, formal teaching resources that systematically document and align these practices with curriculum competencies are scarce. Textbooks and teacher guides often reference indigenous examples superficially, without providing detailed procedural guidance, case studies, or structured lesson

frameworks. As a result, teachers who wish to incorporate indigenous soil management techniques, botanical pest control methods, or traditional food preservation practices must rely on personal knowledge or informal community sources. This reliance creates variability in instructional quality and limits standardization across schools. From a curriculum theory perspective, the absence of structured instructional materials weakens horizontal coherence and reduces the likelihood of sustained pedagogical integration.

Closely related to resource limitations is the issue of inadequate professional development. Many teachers indicated that their pre-service and in-service training programs did not explicitly prepare them to integrate indigenous knowledge within competency-based pedagogical frameworks. Teacher education historically emphasized content mastery and examination preparation rather than culturally responsive pedagogy or experiential learning design. Consequently, even teachers who value indigenous knowledge may lack confidence in designing structured learning activities that connect community practices to formal subject outcomes. This finding aligns with existing scholarship suggesting that culturally responsive pedagogy requires deliberate professional formation rather than assumption of intuitive competence (Gay, 2010). Without systematic training, integration remains dependent on teachers' personal backgrounds or intrinsic motivation.

Time constraints within syllabus coverage further constrain integration efforts. Although the Competency-Based Curriculum emphasizes learner-centered and experiential learning approaches, teachers reported pressure to complete prescribed content within limited instructional time. Experiential activities such as school garden projects, field-based observation, or community engagement require additional planning and execution time compared to lecture-based instruction. When faced with strict timetables and extensive subject content, teachers often prioritize examinable material to ensure syllabus completion. This dynamic reflects a broader structural tension between curriculum reform rhetoric and operational realities. Competency-based frameworks may advocate contextual learning, yet institutional scheduling and workload structures may not adequately accommodate such approaches.

An additional and particularly influential constraint arises from examination-driven educational culture. Teachers consistently noted that national and school-level assessment systems remain heavily oriented toward written examinations emphasizing factual recall and standardized responses. Performance-based tasks, project assessments, or practical demonstrations of indigenous agricultural competence are rarely central to high-stakes evaluation. In educational systems, assessment shapes instructional priorities. When indigenous knowledge competencies are not explicitly

validated through formal assessment mechanisms, teachers may perceive their integration as supplementary rather than essential. This misalignment between curriculum intent and assessment practice undermines structural embedding of indigenous knowledge. It also reinforces epistemic hierarchies in which formal scientific knowledge is prioritized over community-based experiential knowledge.

Finally, weak school–community collaboration frameworks limit systematic integration. Indigenous knowledge resides predominantly within community spaces, particularly among elders, farmers, herbal practitioners, and local environmental stewards. Effective integration would ideally involve structured partnerships enabling community experts to contribute to classroom instruction or experiential learning activities. However, teachers reported that such collaborations are rarely institutionalized. Engagement with community knowledge holders tends to occur informally and sporadically rather than through formalized agreements or programmatic structures. Without institutional recognition and support for community partnerships, integration efforts remain individualized and vulnerable to discontinuity.

Collectively, these structural constraints reveal a pattern in which teachers function as proactive mediators of indigenous knowledge despite limited systemic scaffolding. Integration often relies on personal commitment, prior cultural familiarity, and professional creativity rather than coordinated institutional

frameworks. From a sociocultural perspective, this indicates that mediation is occurring primarily at the interpersonal level (teacher–student interaction) rather than at the institutional level (curriculum architecture, assessment alignment, and policy support). While teacher agency is commendable and critical, sustainable integration requires structural reinforcement.

These findings suggest that indigenous knowledge integration cannot be sustained solely through individual teacher enthusiasm. Institutional transformation including development of instructional materials, structured professional development programs, alignment of assessment systems with experiential competencies, and formalized school–community collaboration frameworks is necessary to move from teacher-dependent integration toward systemically embedded practice.

5.4 Correlation Analysis

This section presents the results of the correlation analysis conducted to examine the strength and direction of the relationships between the key independent variables namely the, current pedagogical practices, and the dependent variable, which is the potential benefits of integrating and utilizing indigenous knowledge in the secondary school curriculum. Pearson's correlation coefficient was used as the appropriate statistical measure for assessing linear relationships between continuous variables. The analysis was conducted at a significance level of 0.05 (2-tailed), and the findings are summarized in Table 4 below.

Table 4: Showing correlations Pearson Correlation

Variables	Pedagogical Practices	Potential Benefits of IK
Pedagogical Practices	1	.439**
Potential Benefits of IK	.439**	1

N = 382

Note: Correlation is significant at the 0.05 level (2-tailed).

Source: Primary data

Table 4.15 presents the Pearson Product–Moment correlation results examining the relationship between pedagogical practices and the perceived potential benefits of integrating Indigenous Knowledge (IK) in the curriculum (N = 382). The analysis reveals a moderate, positive, and statistically significant correlation ($r = .439$, $p < .05$, two-tailed), indicating that more frequent and robust use of learner-centred and culturally responsive pedagogical practices is associated with higher perceptions of educational benefits. This suggests that instructional approaches such as experiential learning, collaborative projects, inquiry-based tasks, and contextualized teaching strategies meaningfully influence how teachers evaluate the contribution of indigenous knowledge to learner engagement, critical thinking, environmental awareness, cultural identity formation, and competence development.

The magnitude of the correlation (.439) reflects a substantive, though not strong, relationship, implying that while pedagogical practices play an important role in shaping perceived benefits, additional factors such as curriculum content depth, assessment alignment, teacher preparation, and institutional support may also contribute significantly. Nonetheless, the statistically significant association provides empirical support for the sociocultural argument that mediation through intentional pedagogy is central to translating indigenous knowledge content into meaningful educational outcomes.

5.5 Predictive Role of Pedagogical Practices

To determine whether instructional approaches meaningfully influence perceived educational outcomes, a regression analysis was conducted examining the predictive effect of pedagogical practices on the perceived benefits of Indigenous Knowledge integration.

This analysis moves beyond correlation to assess the extent to which pedagogical mediation explains variations in reported learner outcomes.

Table 3: Regression Analysis Predicting Educational Benefits

Coefficients^a					
Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	-.369	.235		-1.569
	Current pedagogical practices	.229	.034	.258	6.804
a. Dependent Variable: Education benefits/outcomes of integrating of indigenous knowledge in the curriculum					

Source: Primary data

A regression analysis was conducted to examine the predictive influence of current pedagogical practices on perceived educational benefits of integrating indigenous knowledge into the curriculum. The results indicate that pedagogical practices significantly predict educational outcomes ($\beta = .258$, $t = 6.804$, $p < .001$). The positive standardized beta coefficient suggests that improvements in the use of learner-centred, experiential, and collaborative teaching strategies are associated with increased perceptions of the educational benefits derived from indigenous knowledge integration. In practical terms, teachers who more frequently employ approaches such as hands-on learning, group discussion, project-based learning, and culturally grounded instructional methods are more likely to report enhanced critical thinking, learner engagement, sustainability literacy, and holistic development among learners.

The unstandardized coefficient ($B = .229$) indicates that a one-unit increase in the implementation of pedagogical practices corresponds to a .229 increase in the perceived educational benefits score, holding other factors constant. The constant term was not statistically significant ($p = .118$), suggesting that in the absence of effective pedagogical practices, perceived benefits would not differ meaningfully from zero. Overall, the findings underscore the critical role of instructional methodology in translating indigenous knowledge content into tangible educational outcomes. While content inclusion is important, the results affirm that pedagogical execution significantly shapes the extent to which indigenous knowledge integration yields perceived academic and developmental gains.

6. DISCUSSION

6.1 Teachers as Cultural Mediators: Translating Community Knowledge into Academic Structure

The findings of this study affirm that teachers function as primary cultural mediators between indigenous agricultural and ecological knowledge (IAEK) and the formal structures of the Competency-Based Curriculum (CBC). In sociocultural terms, teachers operate as “more knowledgeable others” who scaffold learners’ movement from community-based experiential knowledge toward formalized academic abstraction (Vygotsky, 1978). The high frequency of reported experiential learning practices, school garden

activities, and project-based tasks demonstrates that teachers actively draw upon learners’ lived realities to anchor instruction.

In agrarian contexts such as Central Uganda, learners often enter school possessing tacit familiarity with soil preparation, seasonal planting cycles, traditional food preservation, and local environmental practices. Teachers who integrate such knowledge into subject instruction are not introducing foreign content; rather, they are recontextualizing existing cultural knowledge within structured academic discourse. Through guided questioning, comparative analysis, and reflective discussion, teachers enable learners to reinterpret community practices through scientific lenses, thereby transforming experiential familiarity into conceptual understanding.

However, mediation in this context is not merely cognitive; it is also epistemological. Teachers implicitly negotiate the relationship between indigenous epistemologies and formal scientific paradigms. When they present indigenous pest control methods alongside biological explanations of plant-insect interactions, they validate community knowledge as rational and analytically meaningful. In doing so, they challenge historical hierarchies that positioned indigenous knowledge as inferior or informal.

Despite this important mediating role, the findings reveal that such integration remains largely teacher-driven rather than structurally institutionalized. The absence of systematic vertical progression, limited assessment validation, and weak curriculum scaffolding suggest that indigenous knowledge integration depends heavily on individual teacher commitment. In institutional terms, mediation occurs primarily at the classroom level rather than being embedded within curriculum architecture. This reliance on personal agency raises concerns about sustainability, consistency, and equity across schools. Thus, while teachers are functioning effectively as cultural mediators, the broader educational system has not fully institutionalized this mediation process.

6.2 Pedagogical Agency and Structural Limitation: The Tension between Reform Intent and Systemic Reality

The study reveals a critical tension between pedagogical agency and structural limitation. On the one hand, teacher willingness to integrate indigenous knowledge is high, and pedagogical practices such as experiential learning and collaborative engagement are widely reported. On the other hand, systemic constraints undermine consistency and depth of integration.

The most significant structural limitation arises from examination-driven educational culture. Although the CBC emphasizes competence development, assessment systems remain largely oriented toward written examinations that prioritize factual recall and standardized responses. This misalignment creates a structural disincentive for sustained experiential learning. In educational systems, assessment defines value; what is examined becomes what is prioritized. When indigenous agricultural practices are not formally embedded within high-stakes evaluation frameworks, their instructional legitimacy remains conditional.

This dynamic reflects what curriculum theorists describe as the “hidden curriculum of assessment,” where formal evaluation structures subtly shape pedagogical practice (Schmidt & Prawat, 2006). Teachers, aware of examination pressures, may integrate indigenous knowledge selectively rather than systematically. Experiential projects may be reduced to illustrative examples rather than assessed competencies.

Additionally, time constraints and syllabus coverage pressures further limit depth of integration. Competency-based curricula often require more instructional time for project-based and contextual learning approaches. However, institutional timetables may not reflect this pedagogical shift. The result is a structural contradiction: reform rhetoric promotes experiential contextualization, while operational systems maintain traditional efficiency-oriented models. This tension underscores a key finding of the study: teacher agency alone cannot overcome structural inertia. Sustainable integration requires systemic alignment across curriculum documentation, assessment frameworks, teacher training, and instructional scheduling.

6.3 Extending Sociocultural Theory: From Interpersonal Mediation to Institutional Mediation

One of the central theoretical contributions of this study lies in its extension of sociocultural theory. Vygotsky’s (1978) framework emphasizes interpersonal mediation — the role of teachers and peers in scaffolding cognitive development through cultural tools. The findings of this study confirm the relevance of this perspective: teachers use indigenous knowledge as cultural tools to mediate understanding of scientific concepts and environmental systems.

However, the findings also suggest that mediation operates at two distinct but interconnected levels: interpersonal and institutional. While sociocultural theory traditionally focuses on teacher–learner interaction, educational systems themselves function as mediating structures. Curriculum documents, assessment policies, teacher training frameworks, and resource allocation mechanisms shape the conditions under which mediation occurs.

In this study, interpersonal mediation is evident through teachers’ classroom practices. Institutional mediation, however, remains incomplete. The lack of explicit competency mapping, limited performance-based assessment structures, and weak vertical progression indicate insufficient institutional scaffolding for indigenous knowledge integration.

By conceptualizing institutional structures as mediating tools, this study extends sociocultural theory beyond classroom interaction to systemic design. Cultural tools are not only linguistic or material artifacts; they include curriculum architecture and policy frameworks. Effective indigenous knowledge integration therefore requires institutional mediation that reinforces, rather than constrains, teacher agency. This extension has broader implications for educational reform theory. It suggests that culturally responsive practice cannot be sustained solely through individual educator commitment; it must be embedded within systemic structures that legitimize and scaffold such practice.

6.4 Implications for Competency-Based Reform: Avoiding Superficial Contextualization

Competency-based curricula are designed to shift education from memorization toward applied problem-solving, critical thinking, and real-life relevance. Indigenous pedagogical traditions inherently embody many of these competencies. Agricultural practices require observation, experimentation, adaptive reasoning, and systems thinking. Environmental stewardship involves ethical decision-making and community responsibility. Thus, indigenous knowledge aligns naturally with competency development.

The findings of this study indicate that when teachers integrate indigenous agricultural and ecological knowledge through experiential tasks, learner engagement and perceived educational benefits increase significantly. This supports arguments that contextualized learning enhances competence acquisition (Demssie *et al.*, 2020).

However, without systemic alignment, competency reform risks superficial implementation. If indigenous knowledge is included only as illustrative content without explicit competency mapping and assessment validation, integration remains symbolic rather than transformative. Competency-based reform

requires structural coherence across curriculum objectives, instructional strategies, and evaluation systems. Indigenous knowledge must be recognized not merely as cultural enrichment but as a source of competence-generating content.

The implications are therefore twofold. First, competency frameworks should explicitly identify indigenous knowledge competencies and performance indicators. Second, assessment systems must incorporate practical tasks and project-based evaluation methods that validate experiential learning. Without such alignment, competency-based reform may reproduce traditional examination culture under new terminology, limiting its transformative potential.

7. Implications

The findings of this study carry significant implications for teacher education, assessment reform, school–community collaboration, and resource allocation within competency-based education systems. If indigenous agricultural and ecological knowledge (IAEK) is to move from teacher-dependent inclusion toward structurally embedded integration, systemic transformation is required at multiple institutional levels.

One of the most immediate implications concerns teacher education and professional development. The study demonstrates that teachers are willing and capable mediators of indigenous knowledge, yet many rely on personal initiative rather than structured preparation. This suggests the need to formally integrate indigenous pedagogy into both pre-service and in-service teacher education programs. Teacher preparation institutions should incorporate modules that explicitly address culturally responsive pedagogy, sociocultural mediation, experiential learning design, and indigenous knowledge systems as legitimate epistemologies. Rather than treating indigenous knowledge as supplementary cultural content, teacher education programs should frame it as a foundational resource for competence development, sustainability education, and contextual relevance. Structured training would enhance teacher confidence, reduce variability in implementation, and promote consistent pedagogical standards across schools. Furthermore, ongoing professional development workshops could support practicing teachers in designing interdisciplinary projects, developing culturally grounded instructional materials, and aligning indigenous practices with curriculum competencies. Without such systematic capacity building, integration risks remaining uneven and personality-dependent.

A second critical implication relates to assessment reform. The findings reveal that examination-driven educational culture continues to shape instructional priorities, often limiting the depth of experiential integration. Competency-based curricula, by design, require performance-based assessment strategies

that evaluate application, problem-solving, and contextual reasoning. If indigenous knowledge is to be meaningfully embedded, assessment systems must validate experiential and community-based competencies, but also encourage formative assessment which is linked to indigenous pedagogies that encourage experiential learning and also observation by both the learner and the teacher. This requires deliberate redesign of national and school-level evaluation frameworks to incorporate project-based tasks, practical demonstrations, reflective portfolios, and applied agricultural or ecological problem-solving exercises. Assessment rubrics should explicitly recognize indigenous knowledge competencies, such as sustainable soil management, community resource mapping, or ecological stewardship practices. Aligning assessment systems with experiential learning would not only legitimize indigenous knowledge within formal education but also reinforce the coherence of competency-based reform. Without such alignment, instructional innovation remains constrained by the implicit authority of traditional written examinations.

The study also underscores the importance of structured school–community partnership frameworks. Indigenous knowledge resides primarily within community contexts, including farmers, elders, herbal practitioners, and local environmental custodians. While teachers occasionally draw upon community expertise informally, integration would be strengthened by institutionalized collaboration mechanisms. Schools could establish formal partnerships with community resource persons, develop mentorship arrangements, and incorporate local expertise into structured learning projects. Policy guidelines could outline procedures for inviting community knowledge holders into classrooms, organizing field-based learning activities, and co-designing culturally grounded instructional modules. Such frameworks would transform indigenous knowledge from an informal supplement into a recognized educational resource. Moreover, structured partnerships would reinforce mutual respect between schools and communities, positioning education as a reciprocal rather than extractive process. In this way, curriculum integration becomes a community-engaged practice rather than a classroom-bound initiative.

Resource allocation represents another crucial implication. Effective experiential learning requires material support, including school gardens, demonstration plots, basic agricultural tools, locally relevant case studies, and instructional guides. Teachers reported that limited instructional materials constrain their ability to systematically integrate indigenous agricultural practices. Ministries of education and curriculum development bodies should therefore invest in developing structured teaching guides, locally contextualized textbooks, and resource kits that document indigenous agricultural and ecological practices aligned with curriculum competencies.

Providing schools with modest funding for practical activities would significantly enhance the sustainability of integration efforts. Importantly, resource support should prioritize low-cost, locally available materials to ensure scalability and contextual appropriateness. Resource provision signals institutional commitment and reduces overreliance on individual teacher creativity.

Taken together, these implications emphasize that indigenous knowledge integration cannot be sustained through individual enthusiasm alone. It requires systemic alignment across teacher education, assessment frameworks, community engagement structures, and material support systems. When these institutional mechanisms reinforce one another, teachers' role as cultural mediators is strengthened, competency-based reform gains substantive depth, and indigenous knowledge becomes structurally embedded rather than symbolically acknowledged.

Ultimately, these implications extend beyond the Ugandan context. They highlight a broader principle applicable to curriculum reform in postcolonial and multicultural societies: meaningful integration of indigenous knowledge requires institutional transformation at multiple levels. When educational systems recognize indigenous pedagogies as sources of competence, sustainability, and epistemic legitimacy, curriculum reform moves closer to achieving both cultural responsiveness and educational effectiveness.

8. CONCLUSION

This study set out to examine the pedagogical integration of Indigenous Agricultural and Ecological Knowledge (IAEK) within Uganda's Competency-Based Lower Secondary Curriculum and to analyze the mediating role of teachers within this process. The findings demonstrate that teachers in Uganda's lower secondary schools are not passive implementers of curriculum documents; rather, they actively function as cultural mediators who translate community-based knowledge systems into structured academic learning experiences. Through experiential strategies such as school garden activities, project-based learning, collaborative inquiry, and contextual examples, teachers connect learners' lived realities with formal subject content.

Quantitative analysis confirms that pedagogical practices significantly predict perceived educational benefits, reinforcing the argument that culturally grounded and experiential approaches enhance learner engagement, contextual understanding, and competence development. Indigenous knowledge, when pedagogically mediated, operates not as peripheral cultural ornamentation but as a substantive resource for developing sustainability literacy, problem-solving skills, and applied reasoning. These findings align with sociocultural theory, demonstrating that cognition is

mediated through culturally embedded tools and practices.

However, the study also reveals a critical structural tension. While teacher willingness and pedagogical innovation are evident, systemic constraints undermine consistent and sustainable integration. Examination-driven assessment structures, limited instructional resources, inadequate professional development, time pressures within syllabus coverage, and weak school-community collaboration frameworks collectively inhibit structural embedding of indigenous knowledge within curriculum architecture. In effect, mediation remains predominantly interpersonal dependent on teacher agency rather than institutionally scaffolded.

Theoretically, this study contributes to curriculum reform scholarship by extending sociocultural theory beyond classroom interaction to include institutional mediation. Curriculum structures, assessment systems, and teacher education frameworks function as mediating tools that either enable or constrain cultural knowledge integration. Without alignment across these systemic dimensions, indigenous knowledge integration risks remaining symbolic rather than transformative.

From a competency-based reform perspective, the findings underscore a central paradox. Competency-based curricula emphasize contextualization, experiential learning, and real-life application; all of which align naturally with indigenous pedagogical traditions. Yet without structural coherence across curriculum objectives, instructional strategies, and evaluation mechanisms, competency reform may be implemented superficially. Indigenous knowledge must therefore be recognized not merely as culturally relevant content, but as a competence-generating epistemological resource.

The broader implication is that meaningful integration of indigenous knowledge requires institutional scaffolding that reinforces teacher mediation. Teacher education programs must explicitly prepare educators in culturally responsive and experiential pedagogies. Assessment systems must validate applied and community-based competencies. Curriculum frameworks must articulate vertical progression of indigenous knowledge competencies. Schools must formalize partnerships with community knowledge holders. Resource allocation must support practical engagement.

In the absence of such systemic alignment, integration remains fragile and uneven. In its presence, however, indigenous knowledge can contribute significantly to sustainability education, epistemic justice, and contextualized competence development.

Ultimately, this study affirms that indigenous agricultural and ecological knowledge is not an educational relic of the past, but a vital resource for the future of competency-based education in Uganda and comparable contexts. When institutionally supported, teachers' cultural mediation can transform indigenous knowledge from peripheral illustration into foundational curriculum architecture, strengthening both educational relevance and cultural legitimacy.

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