

Ethnopedagogy and Global Education: A Strategy for Integrating Local Wisdom into the 21st-Century Curriculum

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Abstract

Twenty-first-century education requires learners to develop collaboration, critical thinking, digital literacy, creativity, and civic literacy skills. However, globally standardized educational frameworks often fail to align with local realities and may contribute to the erosion of students' cultural identities. This study proposes the integration of ethnopedagogy through the 4T Model (Targets, Threads, Tasks, and Traces) as a strategy for harmonizing global competencies with the local wisdom values of the Bima community. The research employed a Design-Based Research (DBR) approach conducted through three iterative cycles in three junior secondary schools, involving 12 teachers, 180 students, and local cultural leaders. Data were collected through document analysis, classroom observations, interviews, focus group discussions, student reflections, and cultural portfolios, and were analyzed using thematic analysis with source and method triangulation. The findings indicate that ethnopedagogical integration strengthens the connection between global competencies and local values, particularly in linking collaboration with gotong royong (mutual cooperation), critical thinking with Maja Labo Dahu, and digital literacy with oral traditions. Student engagement increased significantly, as evidenced by higher classroom participation, a greater number of critical questions, and reflective responses expressing cultural pride and self-confidence. Furthermore, the implementation of authentic assessment through cultural portfolios successfully documented students' cognitive, affective, and psychomotor achievements, resulting in improvements in problem-solving skills (+18%) and communication skills (+15%) compared with the control group. Although challenges related to teacher capacity and regulatory constraints remain, this study contributes theoretically by extending the ethnopedagogy literature, practically by offering an applicable culture-based learning model, and policy-wise by emphasizing the importance of recognizing authentic assessment within national evaluation systems.

Keywords: Global Education, Twenty-First-Century Skills, Ethnopedagogy, Local Wisdom

I. INTRODUCTION

Twenty-first-century education requires learning experiences that are cognitively, socially, and culturally

relevant, while the forces of globalization frequently promote the standardization of curriculum frameworks and pedagogical practices. In many educational contexts, such homogenization risks weakening students' cultural

identity, cultural agency, and the sustainability of local knowledge systems within classroom practices (Zubaidah & Arsih, 2021; Lee et al., 2020). Within this context, ethnopedagogy an educational approach that positions local wisdom and indigenous knowledge as primary learning resources has emerged as a promising framework for bridging global educational demands with local realities while preserving cultural dignity and enhancing meaningful learning experiences (Van Der Bly, 2007; I Wayan Suanda et al., 2024; Krezhevskikh & Karataeva, 2022).

Existing literature demonstrates significant progress in several areas, including: (1) the integration of indigenous knowledge into thematic and project-based curricula; (2) the strengthening of character education through local cultural values; (3) the utilization of technology as a medium for cultural transmission in educational settings; and (4) the alignment of ethnopedagogical approaches with sustainable development goals and inclusive education initiatives (Krezhevskikh & Karataeva, 2022; Istiqomah et al., 2024). Despite these developments, three major gaps remain evident. First, at the conceptual level, many studies are limited to describing “best practices” without proposing explicit curriculum integration models. As a result, critical elements such as learning objectives, instructional content, learning experiences, assessment mechanisms, and teacher professional development are rarely organized into a coherent framework that ensures local wisdom functions as a substantive component rather than a symbolic addition to the curriculum. Second, from a methodological perspective, most studies remain confined to single-context investigations, limiting the transferability of findings. Comparative multi-site studies or mixed-methods approaches that connect instructional practices with measurable student learning outcomes are still scarce. Third, at the implementation level, limited attention has been given to the relationship between ethnopedagogical integration and curriculum policy, accountability systems, educational standards, assessment mechanisms, and teacher professional development. Consequently, the scalability and sustainability of ethnopedagogical initiatives remain insufficiently examined (Uyun et al., 2024; Gumartifa et al., 2025).

This study addresses these gaps by proposing a strategic model for integrating local wisdom into twenty-first-century curricula. The model is developed through theoretical inquiry and empirical investigation within the Indonesian educational context, a setting characterized by rich cultural diversity and ongoing curriculum reform. Although the study focuses on Indonesia as an explanatory case, its implications extend beyond national boundaries and offer insights for culturally diverse educational systems worldwide.

Specifically, this study is guided by the following research questions:

RQ1. How can an ethnopedagogical curriculum framework be formulated to align global educational objectives, particularly twenty-first-century competencies, with measurable local wisdom-based learning outcomes?

RQ2. What instructional and assessment strategies are most effective in transforming local values and indigenous knowledge into authentic and well-documented learning experiences?

RQ3. What policy conditions, institutional supports, and teacher competencies determine the successful implementation and scalability of ethnopedagogical curriculum integration?

The theoretical foundation of this study integrates three complementary perspectives: ethnopedagogy, critical pedagogy, and eco-pedagogy. Ethnopedagogy positions local knowledge as a legitimate epistemological resource for learning; critical pedagogy emphasizes cultural awareness, social justice, and the democratization of knowledge; while eco-pedagogy highlights the interconnected relationship between humans, culture, and the environment. Through this integrated perspective, curriculum development extends beyond merely incorporating local content into lessons. Instead, it seeks to design meaningful learning experiences that enable students to interpret, evaluate, and reconstruct local knowledge in response to contemporary societal challenges (Hidayat et al., 2023 Sakti et al., 2024). In this study, ethnopedagogy is defined as a pedagogical approach that: (1) originates from local cultural ontologies and practices; (2) facilitates the production of new knowledge through dialogue between tradition and modern science; and (3) employs culturally relevant authentic assessment to evaluate student learning outcomes (Palacio Tordecilla, 2023 Krishnan et al., 2023).

This article offers contributions at three levels. Theoretically, it introduces the **4T Integration Model**, consisting of **Targets** (alignment between global and local learning outcomes), **Threads** (cross-disciplinary integration of indigenous knowledge), **Tasks** (contextual and performative learning activities), and **Traces** (evidence of learning and authentic assessment metrics). Methodologically, the study combines Design-Based Research (DBR) with a multi-site comparative case approach, incorporating curriculum document analysis, classroom observations, and assessment artifact analysis to examine the applicability and transferability of the proposed model. Practically and from a policy perspective, the study provides a toolkit for aligning lesson planning, assessment rubrics, national curriculum standards, and global competency frameworks, thereby

offering practical guidance for schools, educational authorities, and teacher education institutions.

In summary, this research employs a Design-Based Research approach involving three iterative cycles conducted across several junior secondary schools in Bima Regency, Indonesia. Participants include teachers of Indonesian Language, Science, and Mathematics, local cultural experts, and students. Data were collected from curriculum documents, lesson study activities, classroom observations, interviews, focus group discussions, and assessment artifacts. Data analysis was conducted through layered thematic coding and curriculum-alignment mapping using performance-based rubrics. The Indonesian context was selected due to its rich cultural diversity, providing a robust setting for developing and evaluating a framework that is both context-sensitive and potentially generalizable across diverse educational environments.

II. LITERATURE STUDY

The increasing emphasis on twenty-first-century competencies has encouraged educators to explore learning approaches that are both globally relevant and culturally meaningful. Ethnopedagogy has emerged as a promising framework for addressing this challenge by positioning local wisdom, indigenous knowledge, and cultural practices as integral components of the learning process. Rather than viewing local culture as supplementary content, ethnopedagogical approaches recognize cultural knowledge as a legitimate source of learning that contributes to students' cognitive, social, and moral development (Krezhevskikh & Karataeva, 2022; Istiqomah et al., 2024; I Wayan Suanda et al., 2024)..

Recent studies have highlighted the potential of ethnopedagogy in strengthening the relevance of education within culturally diverse societies. (Krezhevskikh & Karataeva, 2022) demonstrated that ethnopedagogical practices can enhance students' engagement while preserving cultural heritage. Similarly, (I Wayan Suanda et al., 2024) emphasized that ethnopedagogy serves as an effective strategy for integrating local wisdom into science education, enabling students to connect academic concepts with community-based knowledge and practices. These findings indicate that cultural contexts can function as meaningful learning resources capable of improving educational outcomes.

The integration of local wisdom has also been associated with the development of character education. (Bestari & Nurhayati, 2023) argue that character education rooted in cultural values contributes to the formation of responsible and socially conscious citizens. Likewise, (Asri & Deviv, 2023) found that character-building initiatives become more effective when they are

grounded in values that are familiar and relevant to students' cultural backgrounds. Supporting this perspective, (Rangkuti et al., 2022) reported that cultural values play an important role in shaping ethical behavior, social responsibility, and community participation among learners.

Within the Indonesian context, local wisdom has increasingly been recognized as a valuable educational resource. (Istiqomah et al., 2024). demonstrated that education plays a critical role in preserving local cultural wisdom while simultaneously supporting community development. Furthermore, (Uyun et al., 2024). Found that local wisdom, cultural values, and religious values significantly contribute to the cultivation of social awareness and integrity among students. These studies suggest that the incorporation of local wisdom into educational practices can strengthen both academic learning and character formation.

Ethnopedagogical approaches have also shown considerable potential in science and language education. (Hidayat et al., 2023) reported that ethnopedagogy supports science learning in the Society 5.0 era by connecting scientific concepts with local knowledge systems and real-world experiences. Similarly, (Gumartifa et al., 2025) Found that the integration of ethnopedagogical principles into English language instruction enhanced students' literacy skills and cultural awareness. Together, these findings demonstrate that ethnopedagogy can be effectively applied across multiple disciplines while maintaining cultural relevance.

In addition to enhancing academic achievement, ethnopedagogy has been linked to student motivation and engagement. (Reading & Redford, 2022) argue that culturally sustainable education promotes stronger feelings of belonging and participation among learners. Similarly, (Ramírez, 2023) emphasizes that culture and environment are fundamental pillars of sustainable education because they provide learners with meaningful contexts for knowledge construction. These perspectives support the argument that culturally relevant learning experiences contribute to increased student engagement and deeper learning.

The rapid development of educational technology has further expanded opportunities for ethnopedagogical implementation. According to (Krishnan et al., 2023), digital transformation enables educational institutions to preserve and disseminate cultural knowledge through innovative learning platforms. Digital storytelling, multimedia projects, and cultural documentation activities provide opportunities for students to engage with local traditions while simultaneously developing digital literacy skills required in contemporary society. Such approaches help bridge traditional knowledge systems and modern educational demands.

Despite the growing body of research, several gaps remain in the ethnopedagogy literature. First, most studies focus on describing the benefits of integrating local wisdom into learning without proposing comprehensive curriculum integration frameworks. Second, empirical evidence linking ethnopedagogical implementation to measurable learning outcomes remains limited. Third, relatively little attention has been given to authentic assessment models capable of evaluating cognitive, affective, and psychomotor outcomes simultaneously. Finally, challenges related to policy support, curriculum alignment, and teacher capacity continue to hinder the large-scale implementation of ethnopedagogical practices (Uyun et al., 2024; Gumartifa et al., 2025).

To address these gaps, the present study proposes the 4T Integration Model (Targets, Threads, Tasks, and Traces) as a systematic framework for integrating local wisdom into twenty-first-century curricula. By connecting curriculum objectives, interdisciplinary learning experiences, authentic learning tasks, and culturally responsive assessment, the model seeks to strengthen the relationship between global competencies and local cultural values while supporting meaningful and sustainable learning outcomes.

III. METHOD

This study employed a **Design-Based Research (DBR)** methodology to develop, implement, and refine an ethnopedagogical framework for integrating local wisdom into twenty-first-century education. DBR was selected because it enables the systematic design and evaluation of educational innovations within authentic learning environments while simultaneously generating practical solutions and theoretical insights. The research was conducted through three iterative cycles involving needs analysis, model development, pilot implementation, evaluation, and refinement.

The study was carried out in three junior secondary schools located in Bima Regency, Indonesia. The setting was selected due to its rich cultural heritage and its ongoing transition toward the implementation of the Merdeka Curriculum, which emphasizes contextual and student-centered learning. A total of 197 participants were involved in the study, consisting of 12 teachers from core subject areas (Indonesian Language, Science, and Mathematics), 180 students, and five local cultural leaders who participated as co-designers and cultural advisors throughout the research process.

Data were collected through multiple sources to ensure a comprehensive understanding of the implementation process and outcomes. Curriculum documents, lesson plans, teaching materials, and assessment artifacts were analyzed to identify opportunities for integrating local wisdom into

classroom instruction. Classroom observations were conducted to examine instructional practices, student participation, and the enactment of cultural values during learning activities. Semi-structured interviews and focus group discussions (FGDs) were undertaken with teachers and cultural experts to explore perceptions, challenges, and recommendations related to ethnopedagogical integration. In addition, students maintained reflective journals documenting their learning experiences and cultural understanding. Cultural portfolios containing project artifacts, visual documentation, reflective writings, and presentation records were also collected as evidence of authentic learning.

The research procedure followed the typical DBR cycle. The first phase focused on identifying existing educational practices and assessing the need for integrating local wisdom into classroom learning. Findings from this stage informed the development of the initial prototype of the **4T Integration Model**, consisting of **Targets, Threads, Tasks, and Traces**. The second phase involved the implementation of the prototype in selected classrooms, followed by systematic observation and evaluation of its effectiveness. In the third phase, the model was refined based on empirical evidence gathered during implementation and subsequently validated through further classroom applications. The final outcome was a revised framework supported by transferable design principles for ethnopedagogical curriculum integration.

Qualitative data obtained from interviews, observations, FGDs, and student reflections were analyzed using thematic analysis. The analysis involved open coding, axial coding, and selective coding to identify recurring patterns and relationships among emerging themes. Quantitative data derived from classroom participation records, project assessments, and portfolio evaluations were analyzed descriptively using percentages, mean scores, and comparative analyses to examine changes in student engagement and learning outcomes following the implementation of the ethnopedagogical model.

To enhance the credibility and trustworthiness of the findings, source triangulation and methodological triangulation were employed. Member checking was conducted with participating teachers and cultural experts to verify the accuracy of interpretations, while external audits were performed by specialists in curriculum studies and ethnopedagogy. Ethical considerations were carefully observed throughout the study. Informed consent was obtained from all participants, anonymity and confidentiality were maintained, and particular attention was given to respecting community ownership of indigenous knowledge and cultural heritage incorporated into the learning process.

IV. RESULT AND DISCUSSION

A. Alignment of Global and Local Learning Outcomes

The implementation of the 4T Integration Model demonstrated that twenty-first-century competencies can be meaningfully aligned with local wisdom values within classroom learning. Rather than merely incorporating cultural elements as supplementary content, teachers transformed local wisdom into a conceptual framework for interpreting and contextualizing global competencies. This approach enabled students to connect abstract educational concepts with their lived experiences and cultural identities.

One notable example was the integration of collaboration skills with the local value of *gotong royong* (mutual cooperation). While collaboration in global competency frameworks generally emphasizes teamwork, communication, and shared responsibility, *gotong royong* extends these dimensions by incorporating collective solidarity, social responsibility, and communal well-being. Consequently, collaborative learning activities became not only opportunities for skill development but also mechanisms for strengthening cultural values and social cohesion.

Similarly, critical thinking skills were connected with the Bima cultural philosophy of *Maja Labo Dahu*, which emphasizes moral awareness, self-reflection, and accountability. Within classroom discussions, students

were encouraged to critically evaluate arguments and solutions while considering ethical consequences and social responsibilities. Rather than functioning as a restrictive cultural norm, *Maja Labo Dahu* served as a catalyst for reflective thinking and intellectual responsibility.

The integration of digital literacy also revealed significant educational potential. Teachers utilized oral traditions, folk stories, and local narratives as learning resources and encouraged students to transform these cultural assets into digital products, including videos, podcasts, and digital storytelling projects. Through this process, technology became a medium for cultural preservation and knowledge dissemination rather than merely a technical skill. As a result, digital literacy evolved into a form of critical cultural literacy that enabled students to engage with both local and global information environments.

These findings suggest that local wisdom can function as a mediating framework connecting global educational competencies with students' socio-cultural realities. Competencies often perceived as universal and culturally neutral gained deeper meaning when interpreted through local values and traditions. Consequently, curriculum integration became not merely an adaptation process but also an epistemological reconstruction that positioned local and global knowledge as complementary rather than competing sources of learning.

Table 1. Mapping Twenty-First-Century Competencies with Bima Local Wisdom Values

Twenty-First-Century Competency	Bima Local Wisdom Value	Classroom Implementation
Collaboration	<i>Gotong Royong</i> (mutual cooperation and solidarity)	Culture-based group projects, equitable role distribution, and collaborative problem-solving activities.
Critical Thinking	<i>Maja Labo Dahu</i> (moral awareness and accountability)	Reflective discussions, argument evaluation, and ethical reasoning exercises.
Creativity	<i>Dou Labo Dana</i> (resourcefulness and innovation)	Creative projects utilizing local materials and traditional knowledge.
Communication	<i>Sara Dana Ro Weki</i> (respectful communication and deliberation)	Group presentations, cultural storytelling, and classroom deliberations.
Digital Literacy	Bima Oral Traditions	Digital storytelling, cultural documentation videos, podcasts, and multimedia projects.
Civic Literacy	<i>Nggusu Waru</i> (collective leadership values)	Civic education activities, leadership simulations, and community-based discussions.
Problem Solving	<i>Hudu Dana</i> (wisdom in resolving social issues)	Community-based case studies and contextual problem-solving activities.

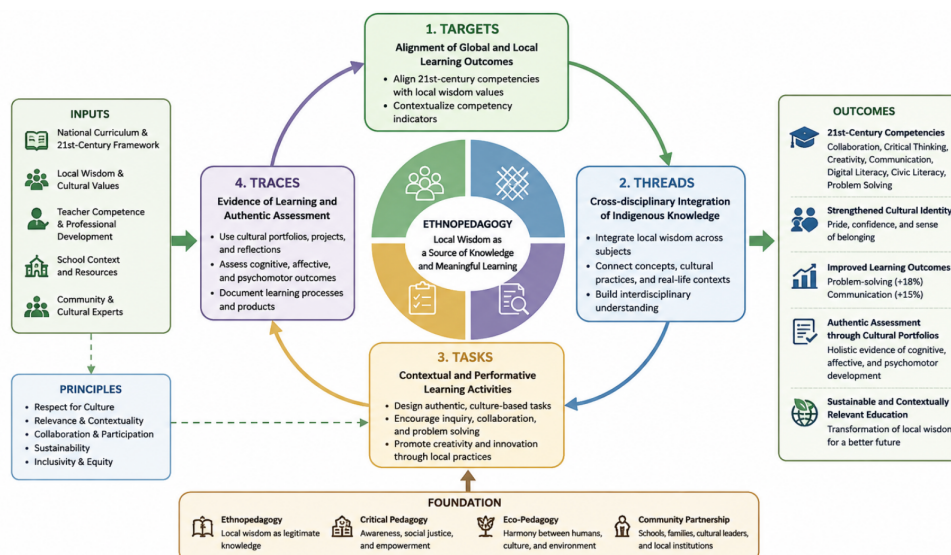


Figure 1. Conceptual Diagram to describe ethnopedagogy relevant to Global Education in the 21st Century

Based on Table 1, and Figure 1, the conceptual alignment between global competencies and local wisdom values illustrates the potential of ethnopedagogy to create culturally responsive learning environments while maintaining alignment with international educational standards.

B. Enhancement of Student Engagement and Motivation

Field observations revealed a substantial increase in student engagement when learning materials were presented through the integration of local cultural contexts. This contextualization functioned as a cultural anchor, enabling students to perceive learning as more closely connected to their identities and lived experiences. In mathematics classes, for example, traditional Bima weaving motifs were not merely used as examples of geometric patterns but were also treated as cultural artifacts containing symbolic meanings and philosophical values. This approach stimulated students' curiosity not only regarding mathematical concepts such as symmetry, repetition, and transformation but also concerning the cultural significance embedded within these motifs.

Similarly, in science classes, the incorporation of traditional agricultural practices, including local irrigation techniques and intercropping systems, enabled students to recognize direct connections between modern ecological concepts, such as nutrient cycles and ecosystem balance, and the practices of their ancestors. This process generated a meaningful transfer of understanding, whereby scientific knowledge was no longer perceived as an abstract body of information but rather as an extension of existing social and cultural practices within their communities.

Written reflections and informal interviews with students revealed strong emotional responses to the learning experience. Many students expressed feelings of pride because they were able to bring their own cultural heritage into the

classroom. At the same time, they reported increased self-confidence upon realizing that their traditions were recognized as legitimate components of contemporary education. This form of intrinsic motivation is particularly important because, according to Self-Determination Theory, student engagement increases when the needs for autonomy, competence, and relatedness are fulfilled. In this context, autonomy emerged through students' active participation in sharing cultural practices, competence developed as they connected cultural knowledge with new academic concepts, and relatedness was strengthened through the role of culture in linking home, community, and school environments.

These findings are also consistent with the principles of culturally relevant pedagogy and are reinforced by the concept of funds of knowledge, which views students' cultural experiences as valuable resources for constructing meaningful learning. In other words, local culture functioned not merely as a decorative element within the curriculum but as an epistemic resource that transformed the way students interacted with knowledge and learning processes.

Furthermore, increased motivation was reflected in observable classroom behaviors. Students became more active in asking questions, more confident in presenting discussion outcomes, and more cooperative during group projects. Teachers reported a noticeable shift in classroom dynamics from a predominantly teacher-centered approach toward a more student-centered learning environment. This transformation suggests that ethnopedagogy can create dialogic spaces in which students are not merely passive recipients of knowledge but active participants in the negotiation and construction of meaning alongside their teachers.

Consequently, the enhanced engagement and motivation observed in this study should not be regarded as temporary outcomes. Rather, they represent the result of a deeper transformation in the relationship between culture, identity, and knowledge. The integration of local wisdom values shifted learning from a top-down process toward a collaborative and

co-constructive experience that was relevant, authentic, and empowering for students.

To further examine the impact of ethnopedagogical learning on student engagement and motivation, several indicators were compared between the control group and the ethnopedagogical implementation group. The results are

presented in Table 2.

Table 2. Summary of Student Engagement and Motivation Outcomes Following the Implementation of Ethnopedagogical Learning

Table 2. Summary of Student Engagement and Motivation Data

Engagement Indicator	Control (Without Cultural Integration)	Class Ethnopedagogical Implementation Class	Change (%)	Qualitative Description
Active Participation in Discussions (percentage of students actively contributing)	35%	68%	+33%	Students demonstrated greater confidence in expressing their opinions when learning topics were connected to traditional weaving and agricultural practices.
Questions Raised by Students (average per session)	7	18	+157%	Questions became more analytical and reflective, extending beyond “what” to include “why” and “how.”
Collaboration in Group Projects (observed member participation)	Mean score: 2.8/5	Mean score: 4.3/5	+54%	Mutual cooperation emerged naturally, with students distributing responsibilities according to individual strengths and expertise.
Student Reflections (expressions of pride and self-confidence)	22% of students	71% of students	+49%	Many students reported feeling proud that their cultural heritage was recognized and valued within classroom learning.
Project Scores (average score, scale 0–100)	73	84	+15%	Improvements were particularly evident in problem-solving and presentation communication skills.

Source: Research findings based on the implementation of the 4T Ethnopedagogical Integration Model.

As shown in Table 2, substantial differences were observed between the control group and the ethnopedagogical implementation group. Overall, all indicators demonstrated positive improvements, both quantitatively and qualitatively.

First, active classroom participation increased from 35% to 68%, representing a 33% improvement. This finding indicates that the integration of local wisdom contributed to the creation of a more democratic learning environment in which students felt comfortable and motivated to express their opinions. The use of weaving motifs and traditional agricultural practices as learning contexts served as cultural anchors that facilitated connections between students’ everyday experiences and academic content.

Second, the average number of questions raised by students increased dramatically from 7 to 18 per session, representing a 157% improvement. This increase reflects not only heightened curiosity but also greater depth in student inquiry. Rather than focusing solely on factual information, students began asking analytical questions such as why weaving patterns exhibit particular forms of

symmetry or how traditional agricultural practices influence local ecosystems. These findings suggest significant development in critical thinking skills, which are central to twenty-first-century competency frameworks.

Third, collaboration in group projects improved considerably, with average participation scores increasing from 2.8 to 4.3. Classroom observations indicated that the incorporation of gotong royong values fostered more equitable and organized teamwork. Students distributed responsibilities more proportionally and actively involved peers who had previously been less engaged. This finding highlights the potential of cultural values to serve as ethical frameworks for inclusive collaboration.

Fourth, student reflections revealed strong affective outcomes. Approximately 71% of students in the ethnopedagogical group expressed feelings of pride and self-confidence, compared to only 22% in the control group. This 49% increase suggests that the recognition of local culture within classroom learning has a direct influence on students’ identity formation and intrinsic

motivation. Culture was no longer perceived as separate from formal education but rather as an integral component of the learning experience.

Finally, average project scores increased from 73 to 84, representing a 15% improvement. The most significant gains were observed in problem-solving and presentation communication skills, two essential competencies for twenty-first-century learning. These results reinforce the argument that ethnopedagogical integration not only enhances motivation and engagement but also contributes to measurable academic achievement.

C. Innovation in Authentic Assessment

The implementation of the **Traces** dimension within the 4T Integration Model marked a significant shift in assessment practices, moving beyond traditional output-based evaluation toward a more holistic and contextualized form of authentic assessment. Rather than focusing solely on cognitive achievement through written examinations, teachers documented students' learning processes through the development of cultural portfolios. These portfolios included individual reflective journals, video recordings of practical activities, and project artifacts such as traditional house models, miniature weaving products, and simulations of agricultural rituals. Through this approach, learning generated not only correct answers but also products, processes, and cultural narratives that reflected students' deeper understanding of both academic concepts and local wisdom.

Simple quantitative analyses revealed significant improvements in problem-solving skills (+18%) and communication skills (+15%) compared with the control group. These findings suggest that authentic assessment encourages students not only to master academic content but also to apply their knowledge in real-world contexts. For instance, when students were required to design a simulation of water resource management based on the local value of *Hudu Dana* (wisdom in resolving social issues), they were expected to apply scientific concepts related to ecosystems while simultaneously demonstrating collaboration, negotiation, and decision-making skills.

Furthermore, Traces-based assessment captured affective dimensions that are often overlooked in

conventional evaluation systems. Cultural values such as *Maja Labo Dahu* were evident in students' reflective journals, where many described feeling responsible for the quality of group work because they were "afraid of disappointing their peers." Likewise, the spirit of *gotong royong* was visible in project documentation videos that showed students helping one another while constructing cultural artifacts. Consequently, this assessment approach documented not only what students knew but also how they behaved, interacted, and applied cultural values during the learning process.

From a theoretical perspective, this approach aligns with the concept of **culturally responsive assessment** (Gay, 2010), which emphasizes that assessment practices should be relevant to students' cultural backgrounds and experiences. Within the Traces framework, culture functions not merely as content to be assessed but also as a criterion for evaluation itself. As a result, the definition of learning outcomes expands beyond academic literacy to include cultural literacy, social responsibility, and identity development.

From a practical standpoint, this innovation offers several important benefits. First, teachers gain access to a more comprehensive assessment tool capable of evaluating students' cognitive, affective, and psychomotor development simultaneously. Second, students develop personal learning portfolios that can serve as long-term records of growth and evidence of competency development. Third, schools acquire digital cultural archives that contribute both to the preservation of local wisdom and to future curriculum development.

Consequently, Traces-based assessment can be viewed as both an epistemological and pedagogical bridge. It connects cognitive achievement with affective development, learning experiences with cultural identity, and local practices with global educational standards. More importantly, it provides academic legitimacy to ethnopedagogical values, enabling them to become institutionalized within formal curricula rather than remaining supplementary initiatives.

To operationalize the Traces component, students were required to develop cultural portfolios documenting their learning processes and outcomes. The structure of the portfolio and its assessment criteria are presented in Table 3.

Table 3. Sample Structure of Student Cultural Portfolios

Portfolio Component	Description	Evidence Type	Assessment Rubric (Scale 1–4)
Reflective Journal	Students' personal reflections on learning experiences, cultural values explored, and connections to academic content.	Narrative text (1–2 pages)	1 = Superficial reflection; 2 = Basic connection to content; 3 = Critical reflection with examples; 4 = Deep reflection connecting local culture with global concepts.

Visual Documentation	Evidence of student participation in culture-based learning activities.	Photos and videos of activities (e.g., weaving, ritual simulations, agricultural observations).	1 = Limited documentation; 2 = Evidence of participation; 3 = Clear documentation with descriptions; 4 = Rich documentation supported by cultural narratives and interpretations.
Project Artifact	Creative products integrating academic knowledge and local cultural practices.	Traditional house models, weaving miniatures, ecology posters based on local practices.	1 = Basic product; 2 = Moderately creative product; 3 = Creative product integrating knowledge; 4 = Innovative product integrating culture and modern science.
Presentation and Communication	Ability to present project outcomes and explain cultural relevance.	Individual or group presentations.	1 = Limited presentation; 2 = Adequate explanation; 3 = Clear presentation supported by arguments; 4 = Persuasive presentation connecting cultural values with global concepts.
Collaboration and Participation	Students' contributions to teamwork and mutual cooperation activities.	Teacher observations and peer feedback records.	1 = Passive; 2 = Partially involved; 3 = Active participant; 4 = Proactive contributor who supports and leads peers.

As shown in Table 3, the cultural portfolio provides a comprehensive framework for documenting students' learning experiences and achievements. Each component serves a distinct but complementary purpose in capturing various dimensions of student development. Reflective journals allow students to critically examine their experiences and connect cultural values with academic concepts. Visual documentation provides tangible evidence of participation in culture-based learning activities and helps preserve local cultural practices in digital form.

Project artifacts demonstrate students' ability to integrate academic knowledge with local wisdom through creative and practical outputs. Meanwhile, presentation and communication components assess students' capacity to articulate ideas, justify their work, and explain the relevance of cultural practices within contemporary contexts. The collaboration and participation component evaluates the extent to which students embody communal values such as *gotong royong* through teamwork and mutual support.

Collectively, these portfolio components enable teachers to assess students holistically by considering not only what students know but also how they apply knowledge, interact with others, and internalize cultural values. Consequently, the portfolio functions as both an authentic assessment instrument and a mechanism for cultural preservation, supporting the broader goals of ethnopedagogical education in preparing students for the demands of the twenty-first century while strengthening their cultural identity.

D. Analysis and Discuss

The findings of this study demonstrate that the integration of ethnopedagogy through the 4T Integration Model significantly enhances the relevance and

effectiveness of twenty-first-century learning. The alignment between global competencies and local wisdom values indicates that educational goals associated with globalization do not necessarily conflict with local cultural identities. Instead, local wisdom can serve as an interpretive framework that enables students to understand and apply global competencies within contexts that are meaningful to their everyday lives.

One of the most important findings concerns the successful alignment of twenty-first-century competencies with Bima cultural values. Collaboration was strengthened through the value of **Gotong Royong**, critical thinking was contextualized through **Maja Labo Dahu**, and digital literacy was linked to local oral traditions. These results support the argument that culture is not merely supplementary content within the curriculum but an epistemological resource capable of shaping how students construct knowledge. This finding is consistent with the principles of culturally responsive pedagogy (Situ et al., 2021) (Bestari & Nurhayati, 2023), which emphasize that learning becomes more meaningful when connected to students' cultural backgrounds and lived experiences. By grounding global competencies in local cultural values (Watts & Kristjánsson, 2022), the curriculum becomes both internationally relevant and locally meaningful.

The study also revealed substantial improvements in student engagement and motivation. Students who participated in ethnopedagogical learning activities demonstrated higher levels of classroom participation, greater curiosity, and stronger collaborative behaviors than those in the control group. The dramatic increase in the number of student-generated questions suggests that cultural contextualization stimulated deeper cognitive engagement and encouraged students to move beyond

factual learning toward analytical and reflective thinking (Ramírez, 2023) (Reading & Redford, 2022). This outcome aligns with Self-Determination Theory, which proposes that motivation increases when learners experience autonomy, competence, and relatedness. In the present study, students exercised autonomy by contributing cultural knowledge, developed competence through the integration of local and academic knowledge, and strengthened relatedness by connecting school learning with family and community experiences.

Another significant contribution of this study lies in the implementation of authentic assessment through the Traces component of the 4T Model. Unlike conventional assessments that primarily measure cognitive achievement, the portfolio-based approach enabled teachers to evaluate students' cognitive, affective, and psychomotor development simultaneously. Improvements in problem-solving (+18%) and communication skills (+15%) demonstrate that authentic assessment can effectively support the development of higher-order competencies required in twenty-first-century education. Furthermore, the cultural portfolio provided evidence of students' personal growth, cultural awareness, and collaborative behaviors, dimensions that are often neglected in standardized testing environments.

The findings further suggest that portfolio-based assessment contributes to the preservation and transmission of cultural knowledge. Through reflective journals, visual documentation, project artifacts, and presentations, students actively engaged in documenting and interpreting cultural practices. As a result, assessment became not only a mechanism for measuring learning outcomes but also a strategy for sustaining cultural heritage. This dual function is particularly important in contemporary educational contexts where globalization and technological advancement often challenge the continuity of local traditions.

Despite these positive outcomes, several challenges emerged during implementation. Teachers reported difficulties balancing standardized curriculum requirements with the flexibility needed to incorporate local wisdom into classroom instruction. In addition, many teachers indicated limited experience in designing authentic assessments and integrating indigenous knowledge into lesson plans. These challenges highlight the need for sustained professional development programs that equip educators with the pedagogical and assessment competencies necessary for ethnopedagogical implementation (Rangkuti et al., 2022) (Asri & Deviv, 2023). Institutional support and policy flexibility are equally important to ensure that culturally responsive practices can be implemented consistently across schools.

From a theoretical perspective, this study extends

the literature on ethnopedagogy by proposing the 4T Integration Model as a practical and transferable framework for connecting global competencies with local cultural values. The model contributes to broader discussions on curriculum contextualization, knowledge pluralism, and culturally responsive education by demonstrating that local and global knowledge systems can coexist in mutually beneficial ways. Rather than viewing globalization as a threat to cultural identity, the findings suggest that education can function as a space where local wisdom and global competencies interact productively.

From a practical perspective, the study offers a structured framework that teachers and curriculum developers can adopt when designing culturally relevant learning experiences. The integration of Targets, Threads, Tasks, and Traces provides a systematic approach for aligning learning objectives, instructional activities, and assessment practices with both local cultural contexts and national curriculum standards. Such an approach may contribute to the development of more inclusive and meaningful learning environments.

Finally, from a policy perspective, the findings emphasize the importance of formally recognizing authentic culture-based assessment within educational accountability systems. Without institutional recognition, ethnopedagogical innovations risk remaining isolated classroom initiatives rather than becoming sustainable components of educational reform. Policymakers should therefore consider incorporating culturally responsive assessment practices into curriculum guidelines, teacher training programs, and national evaluation frameworks. Such measures would strengthen the capacity of education systems to promote both academic excellence and cultural sustainability.

Overall, the findings suggest that ethnopedagogy offers a viable pathway for achieving the objectives of twenty-first-century education while simultaneously preserving local cultural heritage. By integrating local wisdom into curriculum design, instructional practice, and assessment, education can become a transformative process that empowers students to participate effectively in a globalized world without losing connection to their cultural roots.

V. CONCLUSIONS

This study demonstrates that the integration of ethnopedagogy through the 4T Integration Model comprising **Targets, Threads, Tasks, and Traces** provides an effective framework for connecting twenty-first-century competencies with local wisdom values. The findings indicate that global competencies such as collaboration, critical thinking, communication, digital literacy, and problem-solving can be meaningfully

contextualized through Bima cultural values, including *Gotong Royong*, *Maja Labo Dahu*, *Hudu Dana*, and local oral traditions. Consequently, local wisdom functions not merely as cultural content but as an epistemological foundation that enriches learning experiences and enhances their relevance to students' lives.

The implementation of the model resulted in significant improvements in student engagement and motivation. Students demonstrated higher levels of classroom participation, increased critical questioning, stronger collaboration in group projects, and greater expressions of cultural pride and self-confidence. These outcomes suggest that culturally responsive learning environments can strengthen both academic engagement and students' sense of identity. Furthermore, the integration of local cultural contexts transformed learning from a predominantly teacher-centered process into a more participatory and student-centered experience.

The study also highlights the value of authentic assessment through the Traces dimension. Cultural portfolios enabled the comprehensive evaluation of cognitive, affective, and psychomotor learning outcomes while simultaneously documenting cultural knowledge and practices. Improvements in problem-solving and communication skills indicate that authentic assessment can effectively support the development of essential twenty-first-century competencies. Beyond its evaluative function, portfolio-based assessment also contributes to cultural preservation and the promotion of lifelong reflective learning.

Theoretically, this research extends the literature on ethnopedagogy by proposing the 4T Integration Model as an operational framework for integrating local wisdom into contemporary curricula. Practically, the study provides educators with a structured approach to designing culturally relevant learning experiences and authentic assessment strategies. From a policy perspective, the findings underscore the importance of formally recognizing culture-based assessment and culturally responsive pedagogies within curriculum guidelines and educational evaluation systems.

Despite these contributions, the study was conducted within a limited geographical and cultural context, which may affect the transferability of the findings to other regions. Future research should examine the applicability of the 4T Integration Model across different cultural settings, educational levels, and disciplinary contexts. Comparative and longitudinal studies are also recommended to investigate the long-term impact of ethnopedagogical integration on academic achievement, cultural identity development, and global competency acquisition.

In conclusion, ethnopedagogy offers a promising pathway for achieving the goals of twenty-first-century

education while preserving cultural heritage. By integrating local wisdom into curriculum design, instructional practices, and assessment systems, education can become a transformative process that prepares students to participate effectively in a globalized world without losing connection to their cultural roots.

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