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Implementation of an Ethnopedagogical Approach Based on the Ken-Duren Wonosalam Tradition in Phase A Mathematics Learning

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ABSTRACT

This study aims to implement an ethnopedagogical approach based on the Kenduri Durian (Ken-Duren) Wonosalam tradition in Mathematics learning for Phase A elementary school students. The need for this research arose because the application of ethnopedagogy in elementary education is still limited, mainly due to the lack of structured teaching materials that utilize local wisdom. To address this need, this study used a descriptive qualitative method by collecting data through observation, interviews with traditional leaders, and analysis of cultural documents. The data obtained were used to formulate ethnomathematics concepts relevant to the material on flat shapes. The results showed that the application of Ken-Duren ethnomathematics-based LKPD in the Problem-Based Learning (PBL) model was able to improve the quality of learning. The average student learning outcome reached 65.5 out of a maximum score of 70, indicating an increase in understanding of the concept of flat shapes. In addition to academic improvement, this contextual learning was also effective in fostering learning motivation, improving critical thinking skills, and strengthening collaboration between students. Cultural values contained in the Ken-Duren tradition such as mutual cooperation, gratitude, and ecological harmony were successfully integrated, thus supporting the formation of positive student character. These findings align with the Sustainable Development Goals (SDGs), particularly Goals 4 and 11. Thus, the integration of local culture not only strengthens numeracy competency but also fosters a love of regional culture.
Keywords: Ethnopedagogy, Ethnomathematics, Ken-Duren Wonosalam, Mathematics Learning, Phase A

ABSTRAK

Penelitian ini bertujuan mengimplementasikan pendekatan etnopedagogi berbasis tradisi Kenduri Durian (Ken-Duren) Wonosalam dalam pembelajaran Matematika untuk siswa sekolah dasar Fase A. Kebutuhan penelitian ini muncul karena penerapan etnopedagogi di pendidikan dasar masih terbatas, terutama akibat kurangnya bahan ajar terstruktur yang memanfaatkan kearifan lokal. Untuk menjawab kebutuhan tersebut, penelitian ini menggunakan metode kualitatif deskriptif dengan mengumpulkan data melalui observasi, wawancara dengan tokoh adat, serta analisis dokumen budaya. Data yang diperoleh dimanfaatkan untuk merumuskan konsep etnomatematika yang

relevan dengan materi bangun datar. Hasil penelitian menunjukkan bahwa penerapan LKPD berbasis etnomatematika Ken-Duren dalam model Pembelajaran Berbasis Masalah (PBL) mampu meningkatkan kualitas pembelajaran. Rata-rata hasil belajar siswa mencapai 65,5 dari skor maksimal 70, menunjukkan peningkatan pemahaman konsep bangun datar. Selain peningkatan akademik, pembelajaran kontekstual ini juga efektif menumbuhkan motivasi belajar, meningkatkan keterampilan berpikir kritis, dan memperkuat kolaborasi antar siswa. Nilai budaya yang terkandung dalam tradisi Ken-Duren seperti gotong royong, rasa syukur, dan keharmonisan ekologis berhasil diintegrasikan sehingga mendukung pembentukan karakter positif siswa. Temuan ini selaras dengan Tujuan Pembangunan Berkelanjutan (SDGs), khususnya tujuan 4 dan 11. Dengan demikian, integrasi budaya lokal tidak hanya memperkuat kompetensi numerasi, tetapi juga menumbuhkan kecintaan terhadap budaya daerah.
Kata Kunci: Etnopedagogi, Etnomatematika, Ken-Duren Wonosalam, Pembelajaran Matematika, Fase A.

INTRODUCTION

Mathematics encompasses measurements, numbers, and symbolic representation (Daga, 2020). Mathematics learning is a systematically structured process designed to strengthen students ability to solve mathematical problems effectively (Kurniawan & Manurung, 2023). It plays a crucial role in shaping cognitive development and preparing individuals for future challenges (Annur & Hermansyah, 2020). Mathematics becomes meaningful and engaging when educators contextualize content according to students needs, cognitive development, and daily experiences (Machfud Fatkurochman et al., 2024). This perspective aligns with national education regulations, particularly Permendikbud No. 22 of 2016 concerning process standards, which mandates that elementary learning must be interactive, contextual, and student-centered (Kemendikbud, 2016b). Thus, mathematics learning may be conceptualized as a systematically designed and intentionally managed educational activity that cultivates deep mathematical understanding, allowing learners to engage in and resolve mathematical problems with enhanced competence and conceptual precision.

Mathematics learning primarily aims to cultivate students reasoning, logical thinking, and conceptual understanding, which is a vital foundation for problem-solving (Hadi et al., 2025). Conceptual understanding is reflected by students ability to articulate, apply, and draw logical conclusions from a concept (Cahani et al., 2021). The Merdeka Curriculum further emphasizes reasoning, problem-solving, and higher-order thinking as part of the Profil Pelajar Pancasila (Kemdikbudristek, 2022). Since students often lack opportunities to develop higher-order thinking skills, teachers are encouraged to employ strategies that foster contextual reasoning. The Problem-Based Learning (PBL) model is an effective approach for promoting critical thinking and supporting strong conceptual understanding, which is essential for advancing in mathematics learning (Anggraeni et al., 2023). It use is supported by the pedagogical guidelines of Kurikulum Merdeka, which recommends inquiry-based and problem-based learning models (Kemdikbudristek, 2022).

Mathematics is often seen as difficult and uninteresting, with many students struggling to understand concepts, express problems, and memorize formulas. These challenges are worsened by limited learning resources, lack of technology, insufficient teacher training, restricted instructional time, and low parental involvement (Yansah et al., 2023). In Indonesian primary schools, Phase A mathematics still relies on traditional, rote-based teaching, which

weakens students motivation and makes it harder for them to grasp basic concepts such as measurement and geometry, as these are rarely connected to real-life contexts. This situation is inconsistent with Permendikbud No. 20 of 2016 concerning Graduate Competency Standards, which requires students to develop contextual reasoning and foundational conceptual understanding beginning from the early grades (Kemendikbud, 2016a). An effective solution is an ethnopedagogical approach that integrates cultural knowledge and local wisdom into learning (Sugara & Sugito, 2022). Rooted in multicultural education, this approach values cultural diversity and helps strengthen students conceptual understanding (Zahro et al., 2022). This practice is also aligned with UU No. 20 of 2003 concerning the National Education System, which mandates that curriculum development must consider local culture and community characteristics (Republik Indonesia, 2003). Through ethnomathematics, teachers can design more engaging lessons while enhancing students mathematical competencies (Bimantara, 2024).

Culture plays a vital role in shaping character and individual values (Kamila Adinda Nurul, 2021). A prominent local tradition in Jombang is the Durian Feast (Ken-Duren) Wonosalam, a communal thanksgiving ceremony for the abundant durian harvest (Alviana, 2022). Ken-Duren embodies a synthesis of spiritual, social, ecological, and economic values characterizing agrarian society (Sulistiyono, 2015). The tradition serves as a cultural identity marker and a vehicle for sustaining communal solidarity, mutual cooperation (*gotong royong*), and local wisdom amidst modernization (Aryansyah, 2025). Integrating Ken-Duren facilitates the application of academic concepts to authentic contexts, enhancing mathematical numeracy, cultural literacy, and the development of descriptive writing skills rooted in lived experiences (Fatonah et al., 2023).

Cultural practices serve as an authentic medium through which mathematical concepts can be internalized, recognizing that all communities construct their own distinctive ways of performing mathematical activities (Arianti & Mariana, 2021). By integrating the Kenduri Durian Wonosalam tradition into mathematics instruction through an ethnopedagogical framework, concepts such as geometry can be meaningfully conveyed within culturally situated contexts.

In light of this, this study focuses on the implementation of the Ken-Duren Wonosalam tradition within Phase A Mathematics learning using the ethnopedagogy approach, which involves linking mathematical concepts to local cultural phenomena. Cultural practices allow for the embedding of mathematical concepts and acknowledge that all people develop unique ways of engaging in mathematical activities (Arianti & Mariana, 2021). The novelty of this study lies in integrating the Ken-Duren Wonosalam tradition an untapped and locally unique cultural practice into early grade mathematics, specifically geometry, which has rarely been explored in previous ethnomathematics or ethnopedagogy research at the Phase A level. This innovation not only contextualizes mathematical ideas but also offers a culturally responsive learning model that strengthens students identity and increases motivation.

This research is further necessitated by the existing gap between the national curriculum and local cultural realities, a discrepancy that potentially diminishes student learning motivation and subsequently impacts their mathematical comprehension. Through the Ken-Duren Wonosalam-based ethnopedagogy, mathematical concepts such as geometry can be taught meaningfully and authentically. Moreover, this approach is supports sustainablity by

providing a culturally grounded learning framework that can be continously adaptedand developed by teachers,preserved across academic years, and integrated into broader schoolprograms centered on local wisdom. Ultimately,this model is expected to foster deep mathematical understanding, enhance appreciation for local culture, and ensure meaningful, contextual, and enduring learning experiences.

METHODS

Type and Design

This study employed a qualitative research method with a descriptive design, aiming to describe and understand phenomena in depth based on real-world conditions without manipulating the variables under study. This design was chosen because it yielded a detailed description of Ken-Duren cultural practices and their integration into elementary school learning, and enabled researchers to interpret the meaning behind the observed activities. As explained by Fitrani et al. (2024), descriptive qualitative methods are approaches that focus on understanding social conditions through detailed explanations or descriptions and in-depth interpretations, without altering the conditions or phenomena being studied. The research procedure followed the common steps in qualitative descriptive research, starting with determining the research focus, collecting data through observations, interviews, and documentation, and then conducting data reduction, data display, and drawing conclusions. These stages align with the data analysis model proposed by Miles et al. (2013), which emphasizes iterative and continuous analysis throughout the research process. Data validity was ensured through triangulation of sources and techniques as suggested by (Moleong, 2021), allowing the researchers to confirm the credibility of findings related to the implementation of Ken-Duren cultural values in learning.

Data and Data Sources

The research was conducted at Sidokaton Public Elementary School, Jombang Regency, a school located in a community open to ethnopedagogical innovation. The research subjects included the principal as the school policymaker, teachers, second-grade students, and cultural figures who practice the Ken-Duren tradition. The primary data sources were the principal, teachers, second-grade students, and cultural figures, while supporting data sources came from school documents, activity photographs, and cultural archives on the Ken-Duren tradition.

Data collection technique

Data collection techniques used triangulation in the form of participant observation, in-depth interviews, and document analysis. Observations were conducted during the learning process and cultural activities of Ken-Duren. In-depth semi-structured interviews were conducted to explore the perspectives, experiences, and interpretations of informants. Document analysis was used to complement and validate the information from the observations and interviews.

Data analysis

The data obtained were then explained interactively, including data reduction, data presentation, and drawing conclusions. Data reduction was carried out by selecting and focusing information relevant to the research objectives, then presented in descriptive

narrative form to highlight patterns and relationships among findings. Conclusions were drawn and tested through triangulation of sources and techniques to ensure the validity and credibility of the data. Through these procedures, the research was able to produce a deep, comprehensive, and contextual understanding of Ken-Duren culture and its implementation in elementary school learning.

RESULTS AND DISCUSSION

Results

A. Description of the Ken-Duren Wonosalam Culture

The Ken-Duren tradition in Wonosalam is an annual expression of gratitude for abundant durian and agricultural harvests, held between February and March, and reflecting harmony in human relationships with Allah SWT, others, and nature. Its religious dimension appears through collective prayers and *tumpeng* offerings (Maghfiroh et al., 2023), while its social dimension is seen in mutual cooperation and communal sharing similar to the Javanese *slametan*. Ecological harmony is symbolized through offerings that emphasize balance with nature. The tradition features an iconic eight-meter durian *tumpeng* made from local farmers' harvests (Sulistiyono, 2015), surrounded by smaller *tumpeng* of coffee, cloves, bananas, and vegetables that represent agricultural diversity (Aryansyah, 2025). Residents from nine villages parade these *tumpeng* from the district office to the ceremony site, accompanied by *hadrah*, *reog*, and *barongan* performances, before prayers and *tahlil* are recited. The highlight is the *purakan*, the communal distribution of the giant and village *tumpeng*, symbolizing generosity, unity, and Aswaja values such as *tasamuh* and *tawazun* (Sufidiana et al., 2021). Over time, Ken-Duren has evolved into the Wonosalam Durian Festival, strengthening regional agritourism while supporting local welfare and preserving living cultural wisdom.

B. The Relationship Between Ken-Duren Wonosalam Culture and Learning Concepts in Elementary Education

Table 1. Integration of Ken-Duren with Elementary School Learning Concepts

Subject	Learning Concept	Ken-Duren Context
Mathematics	Time	- Schedule of the Ken-Duren celebration. - Arrangement of task distribution and guard shifts. - Duration of constructing the *tumpeng*.
	Whole Numbers	- Counting the number of durians used to build the *tumpeng*. - Counting the number of people involved in constructing the *tumpeng*.
	Fractions	- Distributing durians evenly to visitors during *purakan*.
	Arithmetic Operations	- Addition of durians. - Subtraction of durians distributed. - Multiplication of *tumpeng* contributed by nine villages.

		- Division of team assignments in *tumpeng* preparation.
	Geometry	- Shapes of the *tumpeng* and other objects used in Ken-Duren.
	Measurement	- Measuring the size and height of the giant *tumpeng*. - Measuring the weight of the *tumpeng*.
IPAS (Science & Social Studies)	Ecosystems and Environmental Sustainability	- Interactions between humans and nature during the durian harvest. - Physical characteristics and growth of durian plants within the Wonosalam ecosystem.
	Economics	- Economic and tourism impacts of Ken-Duren on the Wonosalam community.
PAI & BP (Islamic Education and Character Education)	Values of Gratitude and Sharing	- The practice of sharing agricultural blessings during *purakan* and expressing gratitude for the harvest.
	Tolerance, Harmony, and Social Unity	- The atmosphere of tolerance and communal harmony expressed during Ken-Duren, which strengthens cohesion among diverse religious and social groups.
Pancasila Education	Mutual Cooperation	- Inter-village collaboration to ensure the success of the celebration.
Indonesian Language	Descriptive Texts and Factual Reports	- Using Ken-Duren as a topic for writing descriptive texts about the *tumpeng*, narrative texts recounting the procession.
Arts and Culture	Visual Arts	- Cultural expression through designing posters or creating miniature models of the *tumpeng*.

C. The Relationship Between Ken-Duren Wonosalam Culture and the Sustainable Development Goals (SDGs)

Behind its festive atmosphere, the Ken-Duren tradition embodies values that align with the Sustainable Development Goals (SDGs). By strengthening cultural understanding and supporting meaningful learning, this tradition contributes to quality education as one of the core pillars of sustainable development (Hana et al., 2024). Economically, Ken-Duren supports SDGs 1 (No Poverty) by empowering local communities through increased income for durian farmers, small vendors, and micro-entrepreneurs during the festival, thereby contributing to poverty reduction at the village level. In terms of food security, the tradition reflects SDGs 2 (Zero Hunger) through expressions of gratitude manifested in communal meals that ensure all residents, regardless of social status, can share and enjoy the harvest.

From a health perspective, Ken-Duren aligns with SDGs 3 (Good Health and Well-Being) by promoting the consumption of local agricultural products that support healthy

living, while communal gatherings, prayers, and mutual cooperation strengthen social cohesion and mental well-being. Furthermore, the local wisdom embedded in Ken-Duren supports SDGs 4 (Quality Education), as it serves as an authentic learning resource that connects school lessons with students cultural contexts, reinforcing spiritual, social, and ecological values. The tradition also contributes to SDGs 11 (Sustainable Cities and Communities) by encouraging residents to maintain cleanliness, order, and environmental aesthetics, while strengthening Wonosalam's identity as a sustainable agro-tourism region.

In relation to environmental responsibility, Ken-Duren embodies SDGs 12 (Responsible Consumption and Production) by teaching the wise use of natural resources, minimizing waste, and promoting the sharing of agricultural blessings as a form of ecological sustainability (Oktavia Prasetyaningtyas & Trimurtini, 2024). Finally, the implementation of this tradition reflects SDGs 17 (Partnerships for the Goals), as it is carried out through collaboration among community members, local government, farmers, and tourism stakeholders, demonstrating strong multi-stakeholder partnerships that support sustainable development. In relation to environmental responsibility, Ken-Duren embodies SDGs 12 (Responsible Consumption and Production) by teaching the wise use of natural resources, minimizing waste, and promoting the sharing of agricultural blessings as a form of ecological sustainability (Oktavia Prasetyaningtyas & Trimurtini, 2024). Finally, the implementation of this tradition reflects SDGs 17 (Partnerships for the Goals), as it is carried out through collaboration among community members, local government, farmers, and tourism stakeholders, demonstrating strong multi-stakeholder partnerships that support sustainable development.

D. Implementation of Ken-Duren Wonosalam in Mathematics Learning

1. Planning Stage

   The researcher conducted a pre-instruction diagnostic assessment to identify students needs and readiness. The learning outcomes were then analyzed to formulate instructional objectives, which guided the development of a learner-centered teaching module and student worksheets (LKPD) to enhance mathematical understanding. Appropriate instructional media were selected based on student needs and available school resources. At this stage, it was found that students had limited ability to apply mathematical concepts to real-life situations, particularly in plane geometry.

2. Preparation Stage

   The module was designed using the Problem-Based Learning (PBL) model to foster independent and collaborative problem-solving. The average learning outcomes of students who have high collaboration skills tend to be greater than the average learning outcomes of students who have low collaboration skills (Alamsyah et al., 2021). The LKPD depicted authentic situations like the shapes of *tumpeng* and decorative elements to encourage critical analysis and strengthen collaboration through group discussion.

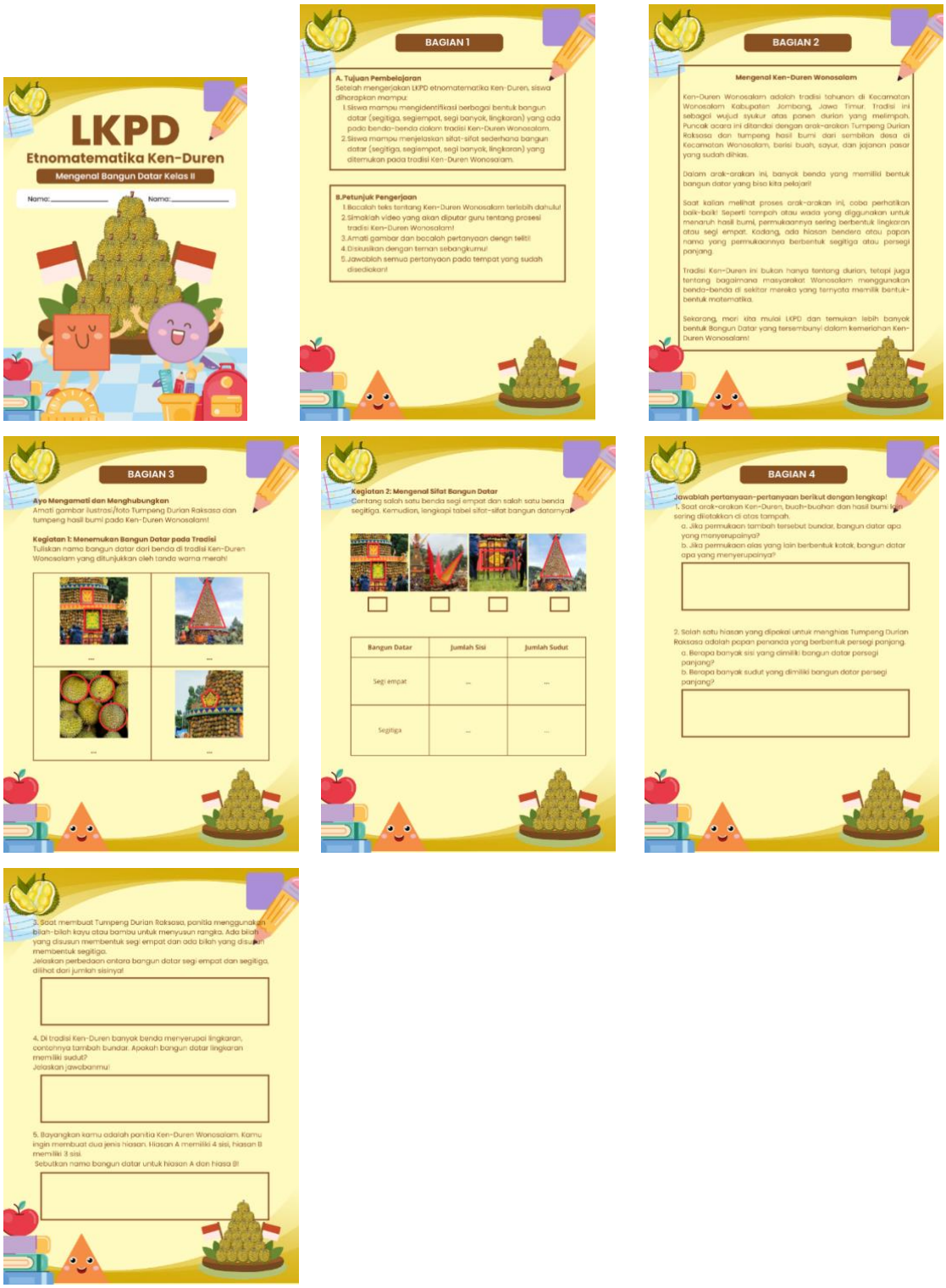

Figure 1. Ethnomathematics Student Worksheet (LKPD) Based on the Ken-Duren Wonosalam Tradition

3. Implementation Stage

In the introductory stage, the teacher prepared the classroom environment, clarified learning goals, and built a supportive atmosphere. Students were then oriented

to the problem through contextual questions that connected prior knowledge with real-life situations, followed by forming random pairs to encourage balanced collaboration.

Students analyzed Ken-Duren images, identified plane shapes, and explored problems independently while the teacher provided guidance as needed. In the development stage, they presented their LKPD results and exchanged feedback with peers. In the closing stage, students completed assessments, reflected on their learning, and received recognition for participation, collaboration, and progress.

Figure 2. Classroom Implementation

4. Analysis of the Implementation of Plane Geometry Learning

The learning process using the LKPD ran smoothly, with students showing strong enthusiasm and active engagement. Their responses reflected high interest in exploring geometric concepts through the ethnomathematics-based Ken-Duren Wonosalam context. The table below presents the LKPD scores from the plane geometry activities.

Table 2. Results of the Implementation of the Ken-Duren Wonosalam Ethnomathematics Worksheet (LKPD)

Group	Activity 1	Activity 2	Item 1	Item 2	Item 3	Item 4	Item 5	Total Score	Remarks
1	10	10	10	10	10	10	10	70	
2	10	10	7,5	10	10	7,5	10	65	1. Incomplete answers. 4. Explanation not accurate.

3	10	10	10	10	10	7,5	10	67,5	4. Explanation not accurate.
4	10	10	7,5	10	10	7,5	10	65	1. Answer not accurate. 4. Explanation not accurate.
5	10	10	10	10	10	7,5	10	67,5	4. Explanation not accurate.
6	10	10	10	10	10	7,5	10	67,5	4. Explanation not accurate.
7	10	10	10	5	10	7,5	10	62,5	2. Only one sub-question answered 4. Explanation incomplete.
8	10	10	10	10	10	10	10	10	
9	10	10	10	10	10	10	10	70	
10	10	10	10	10	10	7,5	10	67,5	4. Explanation incomplete.
Amount	**100**	**100**	**80**	**95**	**100**	**80**	**100**	**655**	
Average	**10**	**10**	**8**	**9,5**	**10**	**8**	**10**	**65,5**	

The average LKPD score of 65.5 out of 70 indicates that the cultural context effectively supported students understanding of geometric shapes.

Discussion

The implementation of the ethnomathematics-based Ken-Duren Wonosalam LKPD through the Problem-Based Learning (PBL) model effectively supported students understanding of two-dimensional shapes. Students showed enthusiasm and active participation when identifying geometric forms in cultural elements such as tumpeng and decorative ornaments. In line with students active engagement and entusiasm during the

learning process, the achievement of an average LKPD score of 65.5 out of 70 indicates that the ethnomathematics-based Ken-Duren Wonosalam learning activities effectively supported students understanding of two-dimensional geometry by enabling them to accurately recognize and explain geometric shapes within a culturally meaningful context.

Collaborative learning during LKPD discussions strengthened problem-solving abilities, supporting the findings of (Alamsyah et al., 2021). The PBL approach also enhanced students motivation, critical thinking, and independence (Anggraeni et al., 2023; Manggalastawaa & Nugraha, 2020; Nursanty et al., 2025). Throughout the process, the teacher acted as a facilitator, aligning with the constructivist principles emphasized in the Merdeka Curriculum.

Integrating the Ken-Duren Wonosalam tradition made mathematical concepts more relatable (Hartoyo et al., 2025; Nur et al., 2020), who highlight the importance of contextual and culturally relevant learning. Students connected geometric concepts to real-life experiences, which supports (Ika Nurhayati & Eko Susilo, 2022) view that contextual cultural learning fosters reasoning and character values. The Ken-Duren tradition itself contains mathematical elements geometric shapes, arithmetic distribution, and measurement making it a meaningful learning source (Bidiyah et al., 2024; Darmayanti et al., 2025).

From an ethnopedagogical standpoint, the findings reinforce Sugara & Sugito, (2022), who argue that local wisdom enriches educational innovation and strengthens cultural identity. The learning process also encouraged awareness of social and environmental contexts (Ridhaningtyas & Putra, 2025). This relevance to real-world cultural practices aligns with educational goals related to SDG 4 and SDG 11 as emphasized (Erman & Wakhidah, 2024).

Overall, the ethnomathematics-based Ken-Duren Wonosalam LKPD effectively enhanced student learning motivation and mathematical understanding. The study recommends further development of culturally grounded learning materials to support meaningful and engaging mathematics learning.

Based on these findings, it is recommended that ethnomathematics-based learning approaches continue to be developed, particularly within elementary mathematics education. Such approaches not only support academic achievement but also enrich students cultural awareness and build character through meaningful and enjoyable learning experiences.

CONCLUSION

This study demonstrates that implementing an ethnopedagogical approach specifically ethnomathematics based on the Ken-Duren Wonosalam tradition effectively supports the learning of two-dimensional geometry among Phase A elementary students. The use of ethnomathematics-based LKPD significantly improved students mastery of geometric concepts, reflected in an average score of 65.5 out of 70. Students were able to identify and explain basic shapes by engaging with culturally relevant visual materials from the Ken-Duren tradition. Beyond cognitive gains, the approach also enhanced students enthusiasm, collaboration, communication skills, and overall mathematical understanding through contextual problem-based activities. These findings affirm that the Ken-Duren tradition provides a meaningful cultural context that helps make mathematics more concrete, engaging, and connected to students everyday lives.

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