Glocal Praxis in Elementary Education

Journal homepage: journal.unesa.ac.id/index.php/GPrEEc

The Implementation LKPD of Majapahit Surya Symbol to Improve Elementary School Student's Understanding of Triangle and Circle Concepts

Rachmalia Widya Andini[1], Neni Mariana[2],

[1,2] Elementary Teacher of Education, State University of Surabaya, East Java, Indonesia
*Correspondence: Rachmalia.22225@mhs.unesa.ac.id

ARTICLE INFO

Received: 29 January 2025
Revised: 1 August 2025
Accepted: 14 September 2025
Published Online: 12 November 2025

Keywords:
Realistic Mathematics Education (RME), LKPD, Ethnomathematics, Two-Dimensional Shapes, Majapahit Surya Symbol.

ABSTRACT

Geometry learning in elementary schools is often abstract, making it difficult for students to understand basic geometric concepts. This study aims to evaluate the implementation of a Student Worksheet (LKPD) based on Realistic Mathematics Education (RME) integrating the Surya Majapahit cultural symbol to support students' understanding of triangles and circles. This qualitative study employed a design research methodology consisting of preparing for the experiment, teaching experiment, and retrospective analysis stages. The participants were second-grade students at SDN Mejoyo, Mojokerto Regency. Data were collected through observations, interviews, documentation, and students' work, and analyzed by comparing the Hypothetical Learning Trajectory (HLT) and the Actual Learning Trajectory (ALT). The results indicate that contextual learning activities using the Surya Majapahit symbol facilitated students' gradual construction of geometric understanding from informal contexts to formal concepts. Revisions from HLT to ALT improved the alignment between predicted and actual learning processes. Therefore, RME-based worksheets integrated with ethnomathematics effectively promote meaningful and contextual geometry learning in elementary schools.

How to Cite: Andini, R.W. & Mariana, N. (2025). The Implementation LKPD of Majapahit Surya Symbol to Improve Elementary School Student's Understanding of Triangle and Circle Concepts. *Glocal Praxis in Elementary Education, 2*(1), 97-112.

Mathematics learning in Indonesia continues to undergo changes, one of which is marked by the emergence of modern mathematical concepts that emphasize mathematics as a way of meaningful thinking (Simanjuntak et al., 2021). To support this more meaningful understanding, learning can be facilitated through the use of concrete media. Learning activities that utilize concrete objects can serve as an effective instructional approach to improving the quality of mathematics learning (Bahtiar et al., 2024). The use of concrete media has also been shown to enhance students' mathematics learning outcomes (Maulida, 2025).

This issue becomes increasingly important because the teaching of plane geometry in elementary schools still tends to be abstract and dominated by rote memorization of shape properties, making mathematics less engaging for students (Apriliana, 2024). In fact, mastery of basic geometric concepts is essential as a foundation for understanding mathematics at higher educational levels. The introduction of fundamental geometric concepts, including plane shapes, serves as an initial step for students to comprehend three-dimensional shapes and geometry more broadly (Mailani et al., 2025). Moreover, several studies indicate that without contextual approaches and the use of concrete media, many students experience difficulties in learning geometry due to limitations in visualization and abstraction abilities (Dwi & Fitriyani, 2024).

Based on observations conducted at SDN Mejoyo, instruction on plane geometry remains conventional and abstract, with limited use of contextual approaches or integration of local cultural elements. As a result, students tend to memorize the properties of plane shapes without understanding their application in real-life contexts, despite the presence of cultural potential in the school environment that could support learning. Therefore, contextual learning emerges as an innovative solution that connects instructional content with students' lived experiences (Suhermi et al., 2025). A learning environment that is contextual and closely related to students' cultural backgrounds can enhance motivation and provide more engaging learning experiences, which are ultimately expected to positively influence their mathematical abilities (Putra & Prasetyo, 2022).

These difficulties can be addressed through the use of Student Worksheets (LKPD) based on Realistic Mathematics Education (RME), as the integration of cultural symbols into plane geometry content aligns with the principles of RME. The three core principles of RME guided reinvention, didactical phenomenology, and self-developed models are highly relevant to culturally based plane geometry instruction, as real-life contexts enable students to construct a more meaningful understanding of geometric concepts (Pujilestari & Juliangkary, 2025). RME-based LKPD have been shown to be effective in improving students' conceptual understanding

(Filahanasari et al., 2022; Fathir et al., 2025). In this regard, ethnomathematics serves as a relevant approach, as it connects mathematical concepts with local culture (Fauziyah & Mariana, 2023). Cultural integration not only facilitates students' understanding of mathematical concepts but also fosters appreciation for cultural heritage (Pratiwi et al., 2022). In this study, LKPD utilize the Majapahit Surya symbol as a cultural context through activities such as reading stories about the Majapahit era, drawing plane shapes within the symbol, cutting and pasting the drawings, and accurately identifying the characteristics of plane figures, thereby making learning more concrete and meaningful. This is in line with the statement of Zamania et al. (2025) who asserts that Realistic Mathematics Education (RME) is one of the instructional strategies capable of bridging mathematics with real-life contexts, thereby making learning more meaningful and relevant.

Studies entitled "Design of Plane Geometry Learning through the RME Approach" by Hadila et al. (2020), "Development of RME-Based Student Worksheets on Plane Geometry" by Filahanasari et al. (2022), and "Design of Place Value Learning Activities Based on RME" by Syabrina and Mariana (2024) demonstrate that the RME approach is effective in improving students' conceptual understanding through real-life contexts and meaningful learning activities. Meanwhile, studies such as "Ethnomathematics-Based Student Worksheet: Surya Majapahit" by Putri et al. (2024) and "Ethnomathematics-Based Geometry Worksheets" by Wulandari and Fitrianawati (2022) provide evidence that integrating local culture into mathematics instruction can strengthen conceptual understanding and foster students' appreciation of regional cultural heritage. Nevertheless, these studies tend to proceed along two separate lines: RME-based studies have not incorporated local cultural elements, while ethnomathematics-based studies have not employed RME principles as the foundation for instructional design. Therefore, the present study offers novelty by developing RME-based student worksheets that integrate the Surya Majapahit cultural context into plane geometry learning, thereby promoting instruction that is more realistic, contextual, and rooted in local culture.

The purpose of this study is to evaluate and explain how learning activities embedded in RME-based student worksheets (LKPD) that incorporate the cultural context of Surya Majapahit support students' thinking processes through a comparison between the Hypothetical Learning Trajectory (HLT) and the Actual Learning Trajectory (ALT). This evaluation is conducted to examine the extent to which the designed activities ranging from reading Majapahit stories, drawing, cutting, and pasting, to identifying the characteristics of plane shapes—align with the anticipated learning progression outlined in the HLT. The analysis aims to reveal how students gradually construct an understanding of plane geometry concepts, beginning with engagement in cultural contexts and progressing toward the expression of formal geometric concepts. The results of this evaluation are expected to provide a clearer depiction of the effectiveness of the LKPD design in facilitating the construction of mathematical concepts grounded in cultural contexts.

METHODS

This study employed a qualitative approach using the design research method. The research was conducted at SDN Mejoyo, Mojokerto Regency, involving second-grade elementary school students as research participants, along with the classroom teacher. The research procedure followed three main stages of design research, namely *preparing for the experiment*, *teaching experiment*, and *retrospective analysis*.

The preliminary design stage included a literature review, an analysis of the cultural context, and the development of a Hypothetical Learning Trajectory (HLT) based on the principles of Realistic Mathematics Education (RME). The teaching experiment stage was carried out through the implementation of learning activities to observe students' thinking processes and responses, which subsequently resulted in the Actual Learning Trajectory (ALT). The retrospective analysis stage focused on examining the relationship between the HLT and the ALT in order to reflect on the quality and coherence of the designed learning activities.

Data were collected through observations, interviews, documentation, and students' work, and were analyzed using descriptive qualitative methods to obtain an in-depth understanding of the role of cultural contexts in supporting students' understanding of triangle and circle.

RESULTS AND DISCUSSION

Result

Preparing For The Experiment

Prior to the implementation of the learning activities, the researcher conducted the *preparing for the experiment* stage through classroom observations in Grade II at SDN Mejoyo, teacher interviews, a literature review, the development of a Hypothetical Learning Trajectory (HLT), instrument development and validation, and the preparation of learning media. The observations and interviews revealed that plane geometry instruction was still teacher-centered, lacked cultural context, and caused students to experience difficulties in understanding plane shapes in real-life situations. Therefore, the learning design was developed based on the principles of Realistic

Mathematics Education (RME), ethnomathematics, and the Phase A Learning Outcomes of the Merdeka Curriculum, with the Surya Majapahit symbol employed as the learning context due to its relevance to fundamental geometric elements.

Table 1. Hypothetical Learning Trajectory 1

No	Activity	Activity Description	Mathematical Goal	Hypothetical Learning Trajectory 1
1	Introducing the Surya Majapahit Symbol	Students read a story about the Surya Majapahit and observe the image of the symbol.	1. Identifying geometric objects within a cultural context. 2. Introducing triangles and circles from real-life environments.	Students understand the cultural and historical context and identify the presence of plane shapes, such as circles and triangles, within the symbol.
2	Drawing Plane Shapes within the Symbol	Students are asked to draw the plane shapes found in the Surya Majapahit symbol.	Developing the ability to visualize plane shapes in a simple manner.	Students draw several simple plane shapes; however, some students still depict the symbol as a whole rather than isolating individual shapes.
3	Cutting the Surya Majapahit Image	Students cut the Surya Majapahit symbol according to the geometric shapes they identify.	Recognizing that the symbol is composed of multiple geometric shapes.	Students still perceive the symbol as a single unified shape and experience difficulty in accurately separating triangles or circles.
4	Pasting the Cut-Out Shapes into the Identification Table of Plane Shape Characteristics	Students paste the cut-out shapes into the appropriate columns of the identification table.	1. Classifying shapes according to plane geometry categories. 2. Recognizing basic differences among plane shapes.	Students place the shapes into the provided columns; however, they have not yet fully understood the specific characteristics of each plane shape.

5	Stating and Identifying Plane Shape Characteristics Accurately	Students state the characteristics of plane shapes based on their observations.	Identifying the basic characteristics of triangles and circles..	Students mention simple knowledge such as “a triangle has three sides”; however, their responses are not yet consistent, and some misconceptions are still observed.

The HLT was designed in a progressive manner to facilitate students in recognizing, representing, classifying, and describing plane shapes through contextual activities. Research instruments and concrete learning media were prepared and validated to accommodate the characteristics of students at the concrete operational stage and to ensure that the implementation of the experiment was conducted systematically and yielded valid data.

Pilot Experiment

The pilot experiment stage was conducted to test Hypothetical Learning Trajectory (HLT) 1 with a small group of second-grade students representing high, medium, and low ability levels.

Table 2. Pilot Experiment Subjects

Student Code	Student Ability Level
AY	High
SF	High
RL	Medium
AV	Medium
AG	Low
AL	Low

Activity 1: Introducing the Surya Majapahit Symbol

Figure 1. Reading a Story about the Surya Symbol

In the first activity, students were asked to observe the Surya Majapahit symbol and describe the shapes they observed. The observation results indicated that most students were able to recognize the symbol as an image of the sun with rays; however, they had not yet identified the plane shapes using formal mathematical terms. Instead, students tended to use general descriptors such as "round" and "pointed."

Activity 2: Drawing Plane Shapes within the Symbol

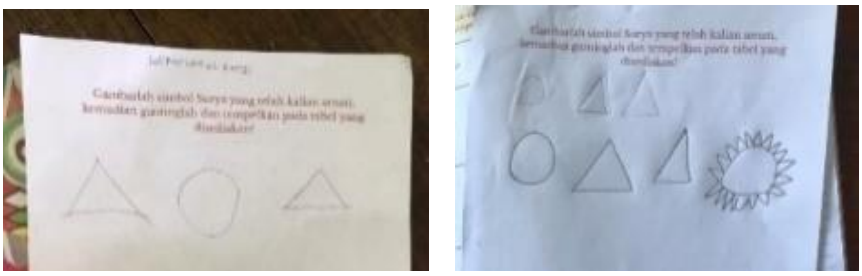

Figure 2. Students' Drawing Results

Researcher : "Please observe this Surya Majapahit symbol. In your opinion, what plane shapes can be found in it?"

AY : "I can see a circle, Ma'am."

Researcher : "Good. Besides the circle, are there any other shapes?"

RL : "I see a shape like a triangle, Ma'am, in the rays."

Researcher : "That's correct. Now, try to draw only the basic shapes."

AV : "Ma'am, may I draw the rays as well?"

Researcher : "For now, let's focus only on the circle and the triangle."

AG : "I'm confused, Ma'am, so I drew the whole symbol."

Researcher : "That's okay. Later, we will identify together which parts are plane shapes and which are decorative elements."

During the drawing activity, most students reproduced the Surya Majapahit symbol as a whole, including its ornamental elements, rather than drawing the circle and triangle as separate plane shapes. Some students began to draw circles and triangles; however, the proportions were not yet accurate. Interview results revealed that students perceived the drawing task as redrawing the symbol instead of simplifying it into basic plane shapes. The teacher also indicated that the instructions provided in the LKPD needed to be clarified.

Activity 3: Cutting the Surya Majapahit Image

During the cutting activity, it was found that some students cut out the symbol as a whole without separating the plane shapes, while others experienced difficulty following the boundary lines. Observations indicated that students' fine motor skills varied.

Activity 4: Pasting the Cut-Out Shapes into the Identification Table of Plane Shape Characteristics

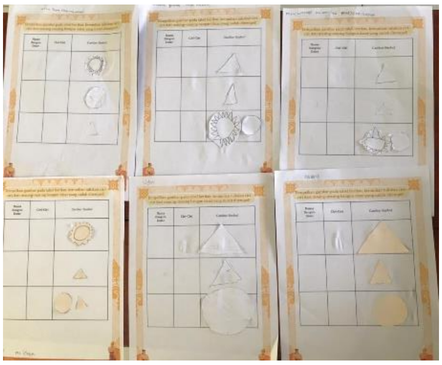

Figure 3. Students' Results of Pasting Plane Shapes

Observation results indicated that some students pasted more than one type of plane shape into a single column of the table. This finding suggests that students had not yet understood the function of the table as a classification tool. Interview data revealed that students were not aware that each column represented a specific type of plane shape. The teacher also noted that students still required explicit guidance regarding the rules for grouping shapes.

Activity 5: Stating and Identifying Plane Shape Characteristics Accurately

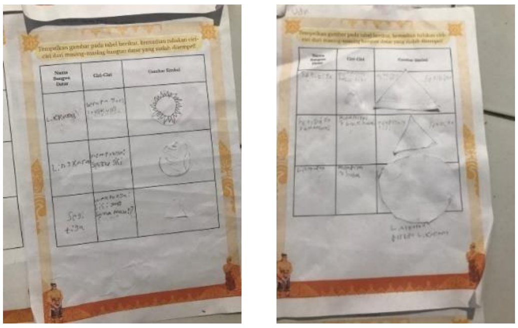

Figure 4. Students Stating the Characteristics of Plane Shapes

Researcher : "Please observe the shapes you have pasted. Who can mention the characteristics of a circle?"

AY : "A circle has one side, Ma'am… and all of its edges are curved."

Researcher : "Good. What about the triangle you found? What are its characteristics?"

AV : "A triangle has three sides and three angles."

In the final activity, some students still wrote the names of plane shapes in the characteristics column or mentioned only a single attribute, such as "round" or "three." Interview findings indicated that students experienced difficulty distinguishing between the name of a shape and its characteristics. The researcher noted that students were not yet accustomed to expressing the characteristics of plane shapes in a complete and systematic manner.

Teaching Experiment

The teaching experiment stage was conducted after revising HLT 1 into HLT 2 based on the findings from the pilot experiment. The learning activities were implemented in Grade II at SDN Mejoyo, involving all students in the class. At this stage, the researcher acted as the instructor, while the classroom teacher served as an observer. Data were collected through observations of students' activities, students' work on the LKPD, and brief interviews with both students and the teacher. The following section presents HLT 2 developed based on the findings from the pilot experiment.

Table 3. Hypothetical Learning Trajectory 2

No	Activity	Activity Description	Mathematical Goal	Hypothetical Learning Trajectory 2
1	Introducing the Surya Majapahit Symbol	Students read a story about the Surya Majapahit and observe the image of the symbol.	1. Identifying basic shapes more clearly through context. 2. Connecting cultural symbols with plane shapes.	Students read enthusiastically; some do not immediately recognize geometric shapes, but several mention terms such as "round" and "triangle."
2	Drawing Plane Shapes within the Symbol	Students use guiding lines and redraw circles and triangles separately.	Identifying circles and triangles more precisely.	Students begin drawing shapes separately; some drawings are still imprecise, while others already include the names of the plane shapes.
3	Cutting the Surya Majapahit Image	Students cut parts of the symbol based on plane shapes.	Systematically separating plane shapes.	Students are able to separate the shapes, although the results are not yet neat; they can already recognize circles and triangles during the cutting process.
4	Pasting the Cut-Out Shapes into the Identification Table of Plane	Students paste the cut-out shapes and write the names	Classifying shapes into the correct categories.	Students group the shapes more accurately; some paste both the shapes and the corresponding names.

	Shape Characteristics	of the plane shapes.		
5	Stating and Identifying Plane Shape Characteristics Accurately	Students write and state the characteristics of plane shapes in a formal manner.	Expressing the properties of triangles and circles mathematically.	Students are able to write the characteristics of plane shapes, although some responses are still incomplete or incorrect (e.g., "a triangle has no angles").

Activity 1: Introducing the Surya Majapahit Symbol

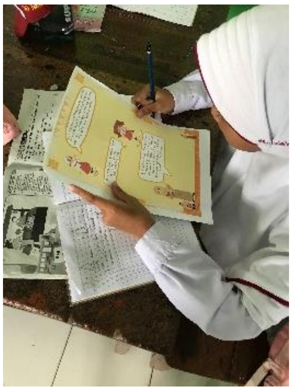

Figure 5. ALT 2: Introducing the Surya Majapahit Symbol

In the first activity, students were asked to observe the Surya Majapahit symbol and identify the plane shapes contained within it. Unlike the pilot experiment, most students were able to verbally identify circles and triangles. Students began to use appropriate mathematical terminology, although a few still referred to the shapes using general descriptors.

Activity 2: Drawing Plane Shapes within the Symbol

Figure 6. Students Drawing Plane Shapes

During the drawing activity, most students were able to simplify the Surya Majapahit symbol into circles and triangles on the LKPD. The resulting drawings were more structured and better aligned with the mathematical objectives compared to those produced during the pilot experiment.

Activity 3: Cutting the Surya Majapahit Image

Figure 7. Cutting the Surya Majapahit Symbol

During the cutting activity, most students were able to cut the plane shapes according to the forms they had drawn. Students appeared more focused and independent in following the activity steps. Interviews with students indicated that they understood the purpose of the cutting activity, namely to separate plane shapes so that they could be classified.

Activity 4: Pasting the Cut-Out Shapes into the Identification Table of Plane Shape Characteristics

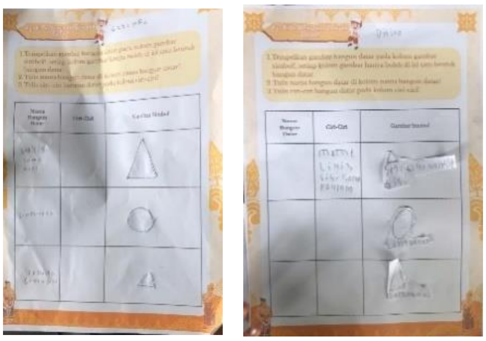

Figure 8. Results of Pasting Plane Shapes

During the classification activity, most students were able to paste the plane shapes into the appropriate columns of the table. The classification errors observed during the pilot experiment were significantly reduced. Classroom observations indicated that students began to discuss their choices with their seatmates.

Activity 5: Stating and Identifying Plane Shape Characteristics Accurately

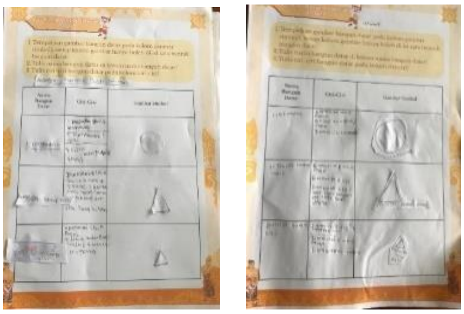

Figure 9. Students Stating the Characteristics of Plane Shapes

Researcher : "Please look again at the circle shape you have pasted. What are its characteristics?"

NF : "The circle is symmetrical, Ma'am."

Researcher : "Symmetry is good, but a circle has other characteristics as well. Does anyone know?"

RL : "A circle does not have any angles, Ma'am."

Researcher : "Good. Now, for the triangle, who can mention its characteristics?"

AZ : "A triangle has three sides and three angles."

In the final activity, most students were able to mention and write more than one characteristic of plane figures, such as the number of sides and angles. Although a few students still required assistance, overall students' use of mathematical language became more accurate. Interviews indicated that whole-class discussions and exemplars of writing shape characteristics helped students distinguish between the names of plane figures and their properties.

Overall, the results of the teaching experiment show that the revised HLT 2 successfully improved students' learning trajectories. Students demonstrated progress in recognizing, representing, classifying, and describing plane figures through the context of the Surya Majapahit symbol. The teacher reported that the learning process became more structured and that students were more active compared to previous lessons. These findings indicate that an RME-based instructional design incorporating local cultural contexts is effective in supporting students' meaningful understanding of plane geometry concepts.

Discussion

The design of learning activities integrating the context of the Surya Majapahit symbol proved effective in facilitating elementary school students' understanding of plane geometry concepts through the Realistic Mathematics Education (RME) approach. This effectiveness is achieved because the Surya Majapahit symbol represents a cultural phenomenon that is closely connected to students' daily lives in Mojokerto, as it appears in school batik, government office fences, and city ornaments. This contextual proximity fulfills the principle of didactical phenomenology in RME, which emphasizes explaining mathematical concepts, structures, and ideas by relating them to meaningful real-world phenomena (Pokhrel, 2025).

The learning design was structured through five systematic stages following the RME iceberg model (Palupi et al., 2022): (1) introducing the symbol through storytelling (situational level), (2) drawing geometric forms (model of), (3) cutting the symbol to support decomposition, (4) pasting the cut-out shapes into a classification table, and (5) identifying the formal characteristics of plane figures *(*model fo*r*). This sequence aligns with the concrete operational stage of Grade II students, who require direct experiences with concrete objects to construct conceptual understanding (Hasriana et al., 2021).

The implementation clearly reflected the three core principles of RME. The principle of *guided reinvention* was evident through guiding questions that supported students in rediscovering mathematical concepts step by step (Gravemeijer, 1994). The principle of *didactical phenomenology* was realized through the use of local cultural symbols as learning contexts. In addition, the principle of self-developed *models* emerged when students independently constructed mathematical representations based on their own strategies to solve the given tasks (Oktavia & Palupi, 2022). The implementation results showed that most students were able to identify, draw, classify plane figures, and describe their formal properties, which is consistent with findings that real-life contexts enhance students' understanding of geometry (Mandasari et al., 2024).

However, several challenges were still encountered, including difficulties in drawing shapes precisely, a tendency to reproduce the entire symbol with decorative elements rather than abstracting geometric forms, and untidy cutting results. These difficulties are related to Bruner's stages of representation, in which students at the iconic stage tend to represent objects visually before being able to abstract their underlying mathematical structures (Supono, 2023). Revisions from HLT 1 to HLT 2 through explicit instructions, visual examples, guiding lines, and structured scaffolding were proven to improve students' understanding. This finding is in line with Vygotsky's *Zone of* Proximal Development, which emphasizes the importance of guided support in the learning process (Gürel, 2025).

This study has two main limitations. First, it focuses only on introducing circles and triangles in accordance with the Phase A Learning Outcomes of the Kurikulum Merdeka, so more advanced geometric concepts such as composite shapes, composition–decomposition, geometric transformations, and symmetry were not explored in depth. This limitation represents a pedagogical choice aimed at strengthening students' understanding of basic shapes as a foundation for subsequent geometry learning. Second, the design assumes that students already possess prior knowledge of the characteristics of plane figures. In practice, this assumption influenced classroom dynamics when students were confronted with complex cultural contexts, as RME-based ethnomathematics learning requires foundational knowledge to support horizontal and vertical mathematization processes.

This study is relevant to the development of RME based instruction on plane geometry. Hadila et al. (2020) emphasized that mathematics learning becomes more effective when it uses real-life contexts that are close to students' experiences. Furthermore, Filahanasari et al. (2022) developed RME-based student worksheets that were valid (82.3%), practical (teachers: 3.75; students: 3.625), and effective in improving learning outcomes from 50.5 to 72.75, with strengths in contextual and meaningful learning.

The novelty of this study lies in the integration of the Surya Majapahit cultural symbol as a real-life learning context. Unlike Hadila et al. (2021), who used concrete objects without cultural content, and Filahanasari et al. (2022), who focused on media development without in-depth cultural exploration, this study not only emphasizes conceptual understanding but also introduces historical and cultural values. These values are integrated into a differentiated learning design aligned with the Kurikulum Merdeka.

By linking mathematical concepts with local cultural symbols, this study enhances students' engagement, activeness, and meaningful conceptual understanding, while also contributing to the development of RME based on local wisdom that not only teaches geometry but also fosters cultural appreciation and strengthens students' identities.

CONCLUSION

The implementation of RME based student worksheets (LKPD) incorporating the cultural context of the Surya Majapahit symbol was proven to effectively facilitate Grade II elementary students' understanding of the plane geometry concepts of triangles and circles. Through a series of systematically designed contextual activities, students were able to construct their understanding of concepts, from recognizing the cultural context to expressing the formal characteristics of plane figures. A comparative analysis between the Hypothetical Learning Trajectory (HLT) and the Actual Learning Trajectory (ALT) indicated that the revised learning trajectory better aligned the anticipated and actual learning processes, particularly in students' abilities to identify, classify, and describe plane figures. Therefore, the integration of RME principles and ethnomathematics in the student worksheets contributed positively to geometry learning that is more contextual, meaningful, and culturally relevant.

REFERENCES

Apriliana, T. F. (2024). Pengembangan soal HOTS matematika materi lingkaran berbasis platform digital Quizizz dengan pendekatan pembelajaran mendalam. Cendekia Pendidikan, 4(4), 50–54. https://doi.org/10.9644/sindoro.v3i9.252

Bahtiar, R. S., Santoso, E., Surabaya, W. K., Matematika, H. B., & Kelas, P. T. (2024). Penggunaan media benda konkret untuk meningkatkan hasil belajar matematika siswa kelas I sekolah dasar. Jurnal SER, 3(2). https://doi.org/10.62759/jser.v3i2.129

Dwi, P. A., & Fitriyani, H. (2024). Analisis kesulitan belajar matematika materi geometri pada siswa kelas IV sekolah dasar. Jurnal Pendidikan Matematika, 2(1), 1–8. https://doi.org/10.47134/ppm.v2i1.1112

Fathir, A. H., Mariana, N., & Alsulami, N. M. (2025). Integrating The Principle of Ukhuwah Islamiyah in Elementary Students through RME-Based Mathematics Learning on Foot Position during Congregational Prayer. *Glocal Praxis in Elementary Education*, *2*(1), 21–33.

Fauziyah, I., & Mariana, N. (2023). Eksplorasi etnomatematika konsep bangun datar pada cagar budaya Balai Pemuda Surabaya. Jurnal Penelitian Pendidikan Guru Sekolah Dasar, 11(9), 49–55.

Filahanasari, E., Fitriyani, N. H., & Putri, S. R. (2022). Pengembangan LKPD berbasis realistic mathematics education pada materi bangun datar di kelas IV SDN 03 Tiumang. JIPPSD, 6, 133–142. https://doi.org/10.24036/jippsd.v6i2.118119

Gravemeijer, K. P. E. (1994). Developing realistic mathematics education. Utrecht University.

Gürel, Z. Ç. (2025). Indication of scaffolding in mathematical modeling. International Journal of Science and Mathematics Education, 23(7), 2597–2628. https://doi.org/10.1007/s10763-025-10576-5

Hadila, R., Sukirwan, & Alamsyah, T. P. (2020). Desain pembelajaran bangun datar melalui pendekatan realistic mathematics education (RME). GAUSS: Jurnal Pendidikan Matematika, 3(1), 49–63. https://doi.org/10.30656/gauss.v3i1.2172

Hasriana, A., Bahrullah, & Basri, M. (2021). Representasi pemahaman konsep pecahan desimal ditinjau dari perbedaan gender pada siswa kelas IV sekolah dasar. Jurnal Pendidikan dan Pengajaran Guru Sekolah Dasar (JPPGuseda), 4, 263–269.

Mailani, E., Alemina, M., Alya, K., Putri, S., & Gracia, E. (2025). Mengenal konsep dasar geometri dan statistika dasar di tingkat SD. IJEDR, 3(1). https://doi.org/10.57235/ijedr.v3i1.4445

Mandasari, N. K., Apriyanda, A., Nasution, S. H., Elly, H. R., Mailani, E., & Ketaren, M. A. (2024). Peningkatan efektivitas dan pemahaman geometri melalui media konkret berbasis realita pada siswa sekolah dasar. AR-RUMMAN: Journal of Education and Learning Evaluation, 1(2), 752–758. https://doi.org/10.57235/arrumman.v1i2.4424

Maulida, V. N. (2025). Peningkatan hasil belajar bangun datar melalui media benda konkret pada siswa sekolah dasar. Jurnal Pendidikan Dasar, 14(1), 263–270. https://doi.org/10.58230/27454312.1911

Oktavia, S. P., & Palupi, E. L. W. (2022). Pengembangan lembar kerja peserta didik materi teorema Pythagoras kelas VIII dengan pendekatan realistic mathematics education. MATHEdunesa: Jurnal Ilmiah Pendidikan Matematika, 11(2), 606–619. https://doi.org/10.26740/mathedunesa.v12n2.p410-430

Palupi, E. L. W., Kohar, A. W., Ekawati, R., Fiangga, S., & Masriyah, M. (2022). Unpacking primary teachers' initial knowledge of realistic mathematics education: A case of iceberg model of fraction division. Advances in Social Science, Education and Humanities Research, 627, 245–250. https://doi.org/10.2991/assehr.k.211229.038

Pokhrel, T. R. (2025). Innovative pedagogies in realistic mathematics education: What, why, and how of design-based classroom research. Educational Journal, 4(1). https://doi.org/10.3126/ej.v4i1.86169

Pratiwi, K. R., Nurmaina, M., & Aridho, F. F. (2022). Penerapan etnomatematika dalam pembelajaran matematika pada jenjang sekolah dasar. Himpunan: Jurnal Ilmiah Mahasiswa Pendidikan Matematika, 2(1), 99–105.

Pujilestari, P., & Juliangkary, E. (2025). Realistic mathematics education as a contextual approach in overcoming learning difficulties circle. JUPE: Jurnal Pendidikan Mandala, 10(2), 569. https://doi.org/10.58258/jupe.v10i2.8913

Putra, A. P., & Prasetyo, D. (2022). Peran etnomatematika dalam konsep dasar pembelajaran matematika. Intersections, 7(2), 1–9. https://doi.org/10.47200/intersections.v7i2.1312

Putri, A. R. H., Wiryanto, Ekawati, R., & Srinivasarao, U. (2024). The implementation of ethnomathematics-based student worksheet "Surya Majapahit" on the circle elements material to build creative thinking of elementary students. IJORER: International Journal of Recent Educational Research, 5(6), 1522–1541. https://doi.org/10.46245/ijorer.v5i6.712

Simanjuntak, J., Simangunsong, M. I., Tiofanny, & Naibaho, T. (2021). Perkembangan matematika dan pendidikan matematika di Indonesia. Sepren, 2(2), 32–39. https://doi.org/10.36655/sepren.v2i2.512

Suhermi, L., Barokah, N., & Kamal, R. (2025). Pembelajaran kontekstual sebagai inovasi kreatif. JISPENDIORA: Jurnal Ilmu Sosial, Pendidikan dan Humaniora, 4, 94–103. https://doi.org/10.56910/jispendiora.v4i2.2197

Syabrina, F. A., & Mariana, N. (2024). Desain aktivitas pembelajaran nilai tempat berbasis RME dengan model PBL melalui media kancing di kelas II SD. Jurnal Penelitian Pendidikan Guru Sekolah Dasar (JPPGSD), 12, 433–447.

Wulandari, E., & Fitrianawati, M. (2022). Lembar kerja peserta didik kelas V pada materi geometri berbasis etnomatematika. Indiktika: Jurnal Inovasi Pendidikan Matematika, 4(1), 73–82. https://doi.org/10.31851/indiktika.v4i1.6496

Zamania, Z. Z., Mariana, N., & Sriboonruang, O. (2025). Realizing the Urgency of Microplastic Issues Through Mathematics Realistic Education : A Hypothetical Learning Trajectory Based on ESD. *Glocal Praxis in Elementary Education*, *2*(1), 1–20.