



Hypothetical Learning Trajectory Strategy in Ethno-Realistic Mathematics Education: An Exploration of Damar Kurung

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ABSTRACT

This study investigates the use of Damar Kurung Gresik, a traditional Indonesian art form, to enhance mathematics education for 4th-grade students through the Hypothetical Learning Trajectory strategy within Ethno-Realistic Mathematics Education. The aim is to integrate local cultural elements into the curriculum to foster better student engagement and understanding through contextual learning. Employing a Design Research methodology, the study was conducted with 32 elementary students. Data collection methods included classroom observations, interviews with teachers and students, and document analysis. The Hypothetical Learning Trajectory framework was applied to teach geometry, measurement, and pattern recognition, using Damar Kurung as a pedagogical tool to connect mathematical concepts with the art-making process. Findings indicate that the familiar context of Damar Kurung significantly increased student interest and motivation. Moreover, students exhibited improved comprehension and application of mathematical concepts, demonstrating considerable progress along the learning trajectory. Teachers reported that the structured approach provided by the Hypothetical Learning Trajectory facilitated more effective lesson planning and delivery, leading to enhanced learning outcomes. The study concludes that incorporating Damar Kurung into mathematics education through the Hypothetical Learning Trajectory strategy within the Ethno-Realistic Mathematics Education framework holds substantial promise for improving the quality of learning and mathematical understanding among 4th-grade students. This approach not only enriches the educational experience by making it more relevant to students' cultural backgrounds but also supports the development of critical thinking and problem-solving skills in mathematics.

Keywords: Damar Kurung; Ethno-Realistic Mathematics Education; Hypothetical Learning Trajectory

ABSTRAK

Penelitian ini mengeksplorasi potensi seni tradisional Damar Kurung Gresik dalam pembelajaran matematika untuk siswa kelas 4 SD dengan menerapkan strategi Hypothetical Learning Trajectory dalam konteks Ethno-Realistic Mathematics Education. Tujuan penelitian ini adalah mengintegrasikan elemen budaya lokal ke dalam kurikulum untuk meningkatkan keterlibatan dan pemahaman siswa melalui pembelajaran kontekstual. Metode Design Research digunakan dengan melibatkan 32 siswa SD di Gresik sebagai subjek penelitian. Data dikumpulkan melalui observasi kelas, wawancara dengan guru dan siswa, serta analisis dokumen pembelajaran. Dalam penerapan

Hypothetical Learning Trajectory, seni Damar Kurung digunakan sebagai media untuk mempelajari konsep geometri, pengukuran, dan pola melalui eksplorasi kreatif. Hasil penelitian menunjukkan bahwa konteks familiar dari Damar Kurung secara signifikan meningkatkan minat dan motivasi belajar siswa. Selain itu, siswa menunjukkan peningkatan pemahaman dan penerapan konsep matematika, yang mencerminkan kemajuan yang signifikan dalam lintasan belajar mereka. Guru melaporkan bahwa pendekatan terstruktur yang disediakan oleh Hypothetical Learning Trajectory membantu mereka merancang dan menyampaikan pembelajaran secara lebih efektif, yang pada gilirannya meningkatkan hasil belajar siswa. Penelitian ini menyimpulkan bahwa integrasi seni Damar Kurung dalam pembelajaran matematika melalui strategi Hypothetical Learning Trajectory dalam kerangka Ethno-Realistic Mathematics Education memiliki potensi besar untuk meningkatkan kualitas pembelajaran dan pemahaman matematika pada siswa kelas 4 SD. Pendekatan ini tidak hanya memperkaya pengalaman pendidikan dengan membuatnya lebih relevan dengan latar belakang budaya siswa, tetapi juga mendukung pengembangan keterampilan berpikir kritis dan pemecahan masalah dalam matematika.

Kata Kunci: Damar Kurung; Ethno-Realistic Mathematics Education; Hypothetical Learning Trajectory

INTRODUCTION

Learning mathematics in elementary school is an integral part of students' intellectual and cognitive development. However, students often experience difficulties in understanding mathematical concepts due to the lack of connection to their daily lives (Freudenthal, 1991). To address this challenge, the Ethno-Realistic Mathematics Education (ERME) approach offers a solution by integrating local cultural elements into the learning process, thus creating a relevant and meaningful context for students. Ethnomathematics, as a branch of research, highlights how different cultures understand and use mathematical concepts in the context of everyday life (Budiarto et al., 2022; Khatimah & Fatimah, 2023; Nurazizah & Nuryami, 2024). Research in this field shows that mathematics is not only universal but also strongly influenced by the cultural context in which it is applied. Mathematics emerges as a result of diverse human cultural activities, developed within the historical, social, and cultural contexts of particular societies (Destrianti, 2019; Natun et al., 2021; Nuh & Dardiri, 2017). Mathematical concepts such as measurement, geometry, and patterns are often embedded in everyday cultural practices, such as in arts, crafts, and architecture (Kurino, Herman, et al., 2023). By understanding mathematics through a cultural lens, students can see how these concepts are applied in real life, which in turn can enhance their understanding and appreciation of mathematics.

In an educational context, an ethnomathematics approach enables students to form deeper connections with mathematical concepts by relating them to their own cultural experiences. Ethnomathematics seeks to view, comprehend, and appreciate mathematics through the lens of diverse cultural activities and practices (Irawan et al., 2022; Purbaningrum et al., 2021; Sirate, 2015). Traditional art, such as the Damar Kurung from Gresik, can serve as a powerful medium for this purpose. Damar Kurung is a traditional painting that portrays everyday life using geometric symbols and patterns significant within the local cultural context (Christianna et al., 2023). This art form not only preserves a rich cultural heritage but also holds great potential for making mathematics learning contextualized and engaging for students (Sri et al., n.d.).

Damar Kurung embodies the social and cultural values of the Gresik community through its geometric patterns, which can be employed to teach fundamental math concepts. For

example, students can explore geometry through the shapes depicted in Damar Kurung paintings, or understand concepts like pattern and symmetry through its designs. By integrating math learning with their cultural heritage, students find the subject more interesting and relevant, while also developing a sense of pride and appreciation for their local culture. Understanding ethno-realistic mathematics is crucial for elementary school students, as it enhances their grasp of mathematical concepts and fosters a deeper connection to their cultural identity (Aikenhead, 2021). This approach makes learning more meaningful and helps students see the value of mathematics in their everyday lives, reinforcing the importance of integrating cultural context into education.

The Hypothetical Learning Trajectory (HLT) approach is a learning strategy designed to anticipate the development of students' understanding of specific mathematical concepts (Clements & Sarama, 2020). HLT involves planning a learning trajectory that allows students to build more complex understandings over time gradually. It describes children's natural mathematical development and plans to extend their understanding and skills (Putrawangsa, 2017). In HLT, teachers predict the series of learning steps students are likely to follow, based on knowledge of how they learn mathematics. This enables teachers to design learning activities that support the development of students' understanding systematically and sustainably. By applying HLT in the context of Ethno-Realistic Mathematics Education (ERME), teachers can create a more structured and purposeful learning experience (Kurino, Tatang Herman, et al., 2023). This approach not only helps students understand mathematical concepts in depth but also allows them to see the relevance of mathematics in their own culture, thus increasing motivation and engagement in learning.

Previous research indicates that integrating cultural contexts into mathematics learning can increase students' interest and motivation and deepen their understanding of mathematical concepts (Machaba & Dhlamini, 2021). Mathematics learning rooted in local culture can enhance student engagement and support the development of their knowledge of abstract concepts (Laksana, 2024; Serepinah & Nurhasanah, 2023). Despite these findings, a gap exists in understanding how specific cultural artifacts, like Damar Kurung, can be systematically integrated into the mathematics curriculum to facilitate learning. This study aims to fill this gap by exploring the potential of Damar Kurung Gresik's art in mathematics learning for 4th-grade students through the application of the ERME-based HLT strategy. This research is novel in its focused application of a specific cultural artifact within a structured pedagogical framework, aiming to enrich mathematics education and enhance students' understanding of mathematical concepts. This study seeks to provide new insights into how local culture can be effectively integrated into education by addressing the gap between cultural context and mathematical learning. The results are expected to contribute significantly to the development of contextual and meaningful mathematics education, supporting the broader field of ethnomathematics and offering practical strategies for educators.

METHODS

Type and Design

This study employs a Design Research methodology, which is a systematic approach to designing, implementing, and evaluating learning processes to develop more effective theories and practices (McKenney & Reeves, 2014). Design Research allows for the iterative testing and

modification of learning strategies within a real classroom context. The subjects of this study were 32 fourth-grade students at an elementary school in Gresik, selected based on availability and consent from both the school and parents. The research procedure comprised three main stages: planning, implementation, and evaluation. In the planning stage, a Hypothetical Learning Trajectory (HLT) based on Ethno-Realistic Mathematics Education (ERME) was designed using Damar Kurung art as the learning context. The lesson plan was developed to cover basic math concepts such as geometry, measurement, and patterns. During the implementation stage, this lesson plan was executed in the classroom, with students engaging in activities related to Damar Kurung art, including observing, analyzing, and creating Damar Kurung artworks. Each activity was designed to help students understand targeted mathematical concepts. The evaluation stage involved assessing the learning process and outcomes through various methods. The Design Research approach aims to generate deeper knowledge about the learning process and develop better learning approaches in practice. Through this approach, the study aims to find innovative learning strategies based on local culture to improve the quality of mathematics learning in elementary schools.

Data and Data Sources

The data for this study were collected from 32 fourth-grade students in Gresik, their teachers, and various learning documents. The primary data sources included direct classroom observations, interviews with both students and teachers and analysis of student work. Observations focused on the classroom dynamics and teaching methods, while interviews explored the perspectives and experiences of both students and teachers. The diverse data sources enabled a thorough analysis of both the learning processes and outcomes.

Data collection technique

Multiple data collection techniques were employed to ensure a robust analysis. Direct classroom observations were conducted to document student interactions, participation, and responses to learning activities. In-depth interviews were carried out with teachers and selected students to gain insights into their perspectives on the implementation of the learning strategy and their understanding of the mathematical concepts taught. Additionally, an analysis of learning documents, such as lesson plans, students' work, and observation notes, was performed to track the development of students' understanding.

Data analysis

The data collected were analyzed using both qualitative and quantitative methods. Qualitative analysis involved examining interview transcripts and observation notes to identify key themes and patterns. This analysis aimed to uncover insights into how students and teachers perceived the ERME-based HLT strategy and its impact on learning. Quantitative analysis involves measuring the development of students' understanding of mathematical concepts using an assessment rubric and descriptive statistical analysis. The results were presented in both descriptive and tabular forms, illustrating the progression of students' understanding, their participation in learning activities, and the responses from both students and teachers to the implemented strategy. By employing a comprehensive Design Research methodology and utilizing multiple data sources and analysis techniques, this study aims to provide a thorough

evaluation of the integration of Damar Kurung art into mathematics education through the ERME-based HLT strategy. The findings are expected to contribute to the development of more effective and culturally relevant mathematics teaching practices.

RESULTS AND DISCUSSION

One of the main findings of this study was the increase in students' interest and motivation in learning mathematics when using Damar Kurung art as a learning medium. The integration of traditional arts in mathematics learning can strengthen students' engagement in the learning process and improve their understanding of mathematical concepts (Schoevers et al., 2020; Simamora et al., 2018). Data from classroom observations showed that students were more actively involved in classroom activities, which was reflected in their increased participation during discussions and practical activities. During the implementation of the activities, students seemed more enthusiastic and actively involved in every stage of learning, from the introduction of concepts to the creation of Damar Kurung artworks.

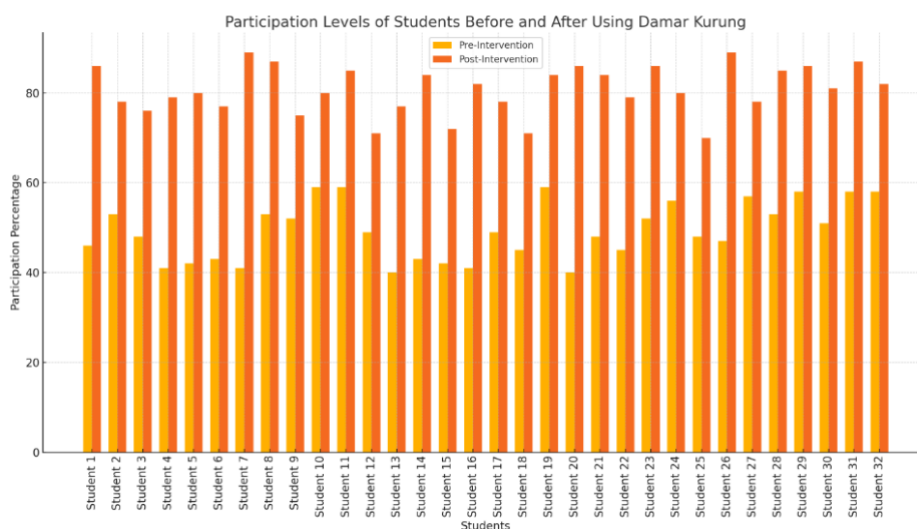


Figure 1. Increased student participation during Damar Kurung-based learning activities

Data from classroom observations showed that the use of Damar Kurung art in mathematics learning successfully increased students' interest and motivation. Student participation during learning activities was noted to increase significantly after the implementation of the Hypothetical Learning Trajectory (HLT) strategy based on Ethno-Realistic Mathematics Education (ERME). Before the intervention, the average student participation was in the range of 40% to 60%. After the intervention, participation increased from 70% to 90%.

Interview results also corroborated these findings, with some students stating that they felt more excited to learn mathematics because the activities were fun and relevant to their daily lives. Mathematics learning integrated with local culture can increase students' motivation to learn and develop a sense of pride in their cultural heritage (Yolanda & Putra, 2022). This shows that the integration of Damar Kurung's art not only makes learning more interesting but also increases students' overall engagement in the learning process.

The implementation of a Hypothetical Learning Trajectory (HLT) based on Ethno-Realistic Mathematics Education (ERME) showed significant development in the understanding of

basic mathematics concepts such as geometry, measurement, and patterns. The ERME approach integrates cultural context and mathematical activities in teaching to improve students' understanding of mathematics (Dahlan, 2018; Hasan et al., 2022; Madu, 2024). Analysis of student work and assessment sheets showed that students were able to identify and apply the mathematical concepts taught through the process of making Damar Kurung.



Figure 2. Students' activities in constructing frameworks, measuring, and making Damar Kurung patterns in Mathematics Learning

In making Damar Kurung, students can understand and apply math concepts well, such as identifying geometric shapes and applying the concept of measurement to calculate the dimensions and proportions of their artwork. Mathematics learning activities integrated with traditional arts can improve students' ability to apply mathematical concepts in a culturally meaningful context (Destrianti, 2019; Febriani et al., 2019; Turmuzi et al., 2022). For example, students were able to determine the correct size for each part of the Damar Kurung based on accurate mathematical calculations, as well as recognize patterns that appeared in their designs. These results suggest that the ERME-based HLT approach not only helps students understand mathematical concepts theoretically but also practices them in a real context that is relevant and meaningful to them.

Table 1. Percentage of Students' Mathematics Concept Understanding

Konsep	Rata-rata (%)
Geometry Understanding	85.53
Measurement Understanding	79.22
Pattern Understanding	81.22

The implementation of a Hypothetical Learning Trajectory (HLT) based on Ethno-Realistic Mathematics Education (ERME) showed significant development in the understanding of basic mathematics concepts such as geometry, measurement, and patterns. ERME aims to incorporate students' cultural experiences in mathematics learning to deepen their understanding of abstract mathematical concepts. Observation data shows that the use of Damar Kurung art in mathematics learning successfully improves students' understanding of the mathematical concepts taught. Students were able to identify and apply these concepts in making Damar Kurung. Mathematics learning integrated with traditional arts can provide

meaningful learning experiences for students while deepening their understanding of mathematical concepts.

The average student's understanding of geometry concepts reached 85.53%, measurement 79.22%, and pattern 81.22%. This data shows a significant increase in understanding compared to before the intervention, where students' understanding of these concepts was below 70%. Thus, it can be concluded that the ERME-based HLT approach that uses Damar Kurung art as a learning medium has great potential to improve the understanding of mathematics concepts of grade 4 students. This implementation also helps students learn math in a more relevant and meaningful context, and provides a more structured guide for teachers in teaching math concepts.

Students' learning trajectories were analyzed using observation data, interviews, and student work, revealing a structured progression in their understanding of mathematical concepts. This analysis tracks the evolution of students' thinking, from grasping simple concepts to more complex ones. Initially, students identified basic geometric shapes like triangles, squares, and circles in Damar Kurung art. Over time, they linked these shapes to more complex measurements and patterns. The art of Damar Kurung, with its geometric symbols and patterns rooted in local culture, facilitates the learning of mathematics. By observing and analyzing learning documents, students' learning trajectories can be detailed from early to advanced stages, showcasing how their understanding of mathematical concepts transforms through structured and purposeful art practices (Clements & Sarama, 2020; Penuel et al., 2014).

In the early stages, students recognized and drew basic geometric shapes found in Damar Kurung designs. As they progressed, they began to understand the relationships between shapes and patterns, applying measurement concepts such as length, width, and height in their artwork. Integrating math learning with traditional art like Damar Kurung helps students develop visual skills and creativity while deepening their grasp of basic math concepts. Students then advanced to identifying symmetry and repeating patterns in their designs, enabling them to create Damar Kurung with proper proportions and aesthetic appeal. Damar Kurung not only serves as a visual art form but also embodies deep mathematical aspects through its patterns and symmetry. In the final stage, students were able to integrate various mathematical concepts they had learned, such as the use of scale and comparison, to create more complex and detailed designs. These findings demonstrate that the ERME-based HLT approach enables students to use traditional art to practically and contextually enhance their mathematical understanding (Nursyahidah et al., 2023).

This process illustrates that using Damar Kurung's art in mathematics learning not only improves students' grasp of mathematical concepts but also provides a contextual and meaningful learning experience. Integrating math learning with local cultural contexts teaches mathematical concepts and helps students understand how to apply mathematics in everyday life (Masamah, 2019). The results indicate that the ERME-based HLT strategy effectively assists students in understanding and applying mathematical concepts while encouraging active involvement and creativity in the learning process.

Interviews with teachers revealed that the Hypothetical Learning Trajectory (HLT) strategy based on Ethno-Realistic Mathematics Education (ERME) significantly aids in designing more structured and systematic learning experiences. Integrating cultural elements

into mathematics learning enriches students' experiences and deepens their understanding of mathematical concepts (Andriono, 2021; Busrah, 2023; Khairizka & Wandini, 2024). Teachers found that using Damar Kurung's art not only makes learning more engaging for students but also facilitates a more relevant and meaningful understanding of mathematical concepts. ERME allows students to perceive mathematics within their cultural context, enhancing the meaning and relevance of mathematical ideas.

Teachers also noted that integrating local cultural elements like Damar Kurung into math lessons boosts student engagement and makes abstract concepts more tangible and easier to grasp. They reported that this strategy helps relate the subject matter to students' daily experiences, increasing their interest and motivation to learn. Additionally, teachers appreciated that this approach provides a clear framework for assessing the gradual development of students' understanding, from recognizing basic geometric shapes to applying measurement and pattern concepts in their artwork. This suggests that the ERME-based HLT strategy not only enhances learning quality but also fosters an appreciation of local culture among students.

CONCLUSION

Based on the results of this study, the integration of the traditional art of Damar Kurung Gresik in mathematics learning of grade 4 SD through the application of the Hypothetical Learning Trajectory (HLT) strategy based on Ethno-Realistic Mathematics Education (ERME) showed a significant impact. Students' participation increased significantly in mathematics learning, with higher levels of motivation and interest due to the relevant and familiar learning context. Students successfully developed a better understanding of basic mathematical concepts such as geometry, measurement, and patterns through Damar Kurung's artwork. Teachers also found significant benefits in designing more structured and meaningful learning with this approach. Overall, the integration of local culture in mathematics education paves the way for a more effective and contextualized approach to improving students' understanding and interest in the subject. As a follow-up to these results, further studies could explore the long-term effects of this integrated approach on students' mathematical proficiency and cultural appreciation.

REFERENCES

- Aikenhead, G. S. (2021). Resolving Conflicting Subcultures Within School Mathematics: Towards A Humanistic School Mathematics. *Canadian Journal of Science, Mathematics and Technology Education*, 21(2), 475–492. <https://doi.org/10.1007/s42330-021-00152-8>
- Andriono, R. (2021). Analisis Peran Etnomatematika dalam Pembelajaran Matematika. *ANARGYA: Jurnal Ilmiah Pendidikan Matematika*, 4(2). <https://doi.org/10.24176/anargya.v4i2.6370>
- Budiarto, M. T., Masruroh, A., Azizah, A., Munthahana, J., Awwaliya, R., & Yusrina, S. L. (2022). *Etnomatematika teori, pendekatan, dan penelitiannya*. Zifatama Jawa.
- Busrah, Z. (2023). INTEGRASI KONSEP GEOMETRI MELALUI ETNOMATEMATIKA PADA ALAT PERTANIAN TRADISIONAL SUKU BUGIS. *ARITMATIKA: Jurnal Riset Pendidikan Matematika*, 4(1), 18–36.

- Christianna, A., Saidi, A. I., Sihombing, R. M., & Damayanti, N. Y. (2023). Coastal Settlements and Javanese Vernacular Art: A Historical and Cultural Analysis of Damar Kurung Gresik in Indonesia. *International Society for the Study of Vernacular Settlements*, 10(12), 137–162. <https://doi.org/10.61275/ISVSej-2023-10-12-10>
- Clements, D. H., & Sarama, J. (2020). *Learning and Teaching Early Math*. Routledge. <https://doi.org/10.4324/9781003083528>
- Dahlan, J. A. (2018). Integrasi budaya masyarakat dalam pembelajaran matematika: Contoh dalam pembelajaran sistem persamaan linear dua variabel. *Jurnal Penelitian Dan Karya Ilmiah*, 18(1), 15–31.
- Destrianti, S. (2019). Etnomatematika dalam Seni Tari Kejei Sebagai Kebudayaan Rejang Lebong. *Jurnal Equation: Teori Dan Penelitian Pendidikan Matematika*, 2(2), 116. <https://doi.org/10.29300/equation.v2i2.2316>
- Febriani, P., Widada, W., & Herawaty, D. (2019). Pengaruh pembelajaran matematika realistik berbasis etnomatematika terhadap kemampuan pemahaman konsep matematika siswa SMA Kota Bengkulu. *Jurnal Pendidikan Matematika Raflesia*, 4(2), 120–135.
- Freudenthal, H. (1991). *Revisiting Mathematics Education: China Lectures*. Kluwer Academic Publishers.
- Hasan, M. N., Nuroniyah, A., & Anis Silwatud Diyana. (2022). Implementasi Etnomatematika Berbasis Alquran Sebagai Rujukan Pembelajaran Teori Bilangan. *Al Furqan: Jurnal Ilmu Al Quran Dan Tafsir*, 5(1), 143–159. <https://doi.org/10.58518/alfurqon.v5i1.1787>
- Irawan, A., Lestari, M., & Rahayu, W. (2022). Konsep Etnomatematika Batik Tradisional Jawa Sebagai Pengembangan Media Pembelajaran Matematika. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, 12(1), 39–45. <https://doi.org/10.24246/j.js.2022.v12.i1.p39-45>
- Khairizka, W. I., & Wandini, R. R. (2024). An Open-Ended Based Realistic Mathematics Learning Approach To Students' Creative Mathematical Thinking Abilities. *Jurnal Elementaria Edukasia*, 7(2), 2759–2771. <https://doi.org/10.31949/jee.v7i2.9652>
- Khatimah, H., & Fatimah, N. (2023). Pengembangan LKPD Etnomatematika Berbasis Rme Untuk Meningkatkan Literasi Matematika Siswa. *Jurnal Elementaria Edukasia*, 6(4), 1680–1686. <https://doi.org/10.31949/jee.v6i4.7115>
- Laksana, D. N. L. (2024). Pengembangan Media Pembelajaran Literasi Dan Numerasi Berbasis Budaya Lokal Untuk Siswa SD Kelas Rendah. *JKTP: Jurnal Kajian Teknologi Pendidikan*, 7(1), 012. <https://doi.org/10.17977/um038v7i12024p012>
- Machaba, F., & Dhlamini, J. (2021). *Ethnomathematics as a Fundamental Teaching Approach* (pp. 59–76). https://doi.org/10.1007/978-3-030-82723-6_5
- Madu, A. (2024). Merangkul Diversitas Budaya melalui Matematika: Pendekatan Etnomatematika dalam Pembelajaran Matematika di Sekolah. *Jurnal Riset Pembelajaran Matematika*, 6(1), 39–48. <https://doi.org/10.55719/jrpm.v6i1.1097>
- Masamah, U. (2019). PENGEMBANGAN PEMBELAJARAN MATEMATIKA DENGAN PENDEKATAN ETNOMATEMATIKA BERBASIS BUDAYA LOKAL KUDUS. *JURNAL PENDIDIKAN MATEMATIKA (KUDUS)*, 1(2). <https://doi.org/10.21043/jpm.v1i2.4882>

- McKenney, S., & Reeves, T. C. (2014). Educational Design Research. In *Handbook of Research on Educational Communications and Technology* (pp. 131–140). Springer New York. https://doi.org/10.1007/978-1-4614-3185-5_11
- Natun, A. Y. H., Mamoh, O., & Amsikan, S. (2021). Eksplorasi Etnomatematika Pada Motif Kain Buna Masyarakat Insana Tengah. *MATH-EDU: Jurnal Ilmu Pendidikan Matematika*, 6(2), 31–41. <https://doi.org/10.32938/jipm.6.2.2021.31-41>
- Nuh, Z. M., & Dardiri, D. (2017). Etnomatematika dalam sistem pembilangan pada masyarakat Melayu Riau. *Kutubkhanah*, 9(2), 220–238.
- Nurazizah, S., & Nuryami. (2024). EKSPLORASI ETNOMATEMATIKA PADA WISATA PANTAI PAPUMA JEMBER. *AL JABAR: Jurnal Pendidikan Dan Pembelajaran Matematika*, 3(1), 9–17. <https://doi.org/10.46773/aljabar.v3i1.917>
- Nursyahidah, F., Albab, I. U., & Mulyaningrum, E. R. (2023). Learning design of quadrilateral STEM-based through lesson study. *Eurasia Journal of Mathematics, Science and Technology Education*, 19(11), em2352. <https://doi.org/10.29333/ejmste/13747>
- Penuel, W. R., Confrey, J., Maloney, A., & Rupp, A. A. (2014). Design Decisions in Developing Learning Trajectories–Based Assessments in Mathematics: A Case Study. *Journal of the Learning Sciences*, 23(1), 47–95. <https://doi.org/10.1080/10508406.2013.866118>
- Purbaningrum, M., Cahyani, C. M., Bilad, D. I., Wulandari, E. A., Dewi, D. L., Afifah, N., & Kusuma, R. A. (2021). *Etnomatematika beberapa sistem budaya di indonesia*. Zifatama Jawa.
- Putrawangsa, S. (2017). *Desain Pembelajaran Matemtika Realistik*. CV. Reka Karya Amerta.
- Schoevers, E. M., Leseman, P. P. M., & Kroesbergen, E. H. (2020). Enriching Mathematics Education with Visual Arts: Effects on Elementary School Students’ Ability in Geometry and Visual Arts. *International Journal of Science and Mathematics Education*, 18(8), 1613–1634. <https://doi.org/10.1007/s10763-019-10018-z>
- Serepinah, M., & Nurhasanah, N. (2023). Kajian Etnomatematika Berbasis Budaya Lokal Tradisional Ditinjau Dari Perspektif Pendidikan Multikultural. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, 2, 148–157. <https://doi.org/10.24246/j.js.2023.v13.i2.p148-157>
- Simamora, R. E., Saragih, S., & Hasratuddin, H. (2018). Improving Students’ Mathematical Problem Solving Ability and Self-Efficacy through Guided Discovery Learning in Local Culture Context. *International Electronic Journal of Mathematics Education*, 14(1). <https://doi.org/10.12973/iejme/3966>
- Sirate, S. F. S. (2015). MENGGAGAS INTEGRASI MULTIKULTUR PEMBELAJARAN MATEMATIKA: suatu telaah etnomatematika. *Auladuna: Jurnal Pendidikan Dasar Islam*, 2(2), 246–263.
- Turmuzi, M., Sudiarta, I. G. P., & Suharta, I. G. P. (2022). Systematic Literature Review: Etnomatematika Kearifan Lokal Budaya Sasak. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(1), 397–413. <https://doi.org/10.31004/cendekia.v6i1.1183>
- Yolanda, F. O., & Putra, A. (2022). Systematic Literature Review: Eksplorasi etnomatematika pada motif batik. *Prima Magistra: Jurnal Ilmiah Kependidikan*, 3(2), 188–195.