

The Dynamics of Traditional Knowledge in the Context of Ethnomatematics: A Literature Review

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Abstract: Traditional knowledge plays a crucial role in preserving biodiversity and public health and can be utilized to teach mathematical concepts. This study aims to examine the dynamics of traditional knowledge in the context of mathematics through a literature-based approach. Traditional knowledge is often overlooked in the development of modern mathematics curricula, yet it holds significant value in understanding the origins and mathematical thinking across various cultures. Through a qualitative approach and Systematic Literature Review (SLR) method, this research investigates the participation and influence of traditional knowledge on the development of mathematical concepts. Analysis is conducted on various scholarly works, literature, and journals to understand how traditional knowledge informs and shapes current mathematical practices. The findings of this study reveal that traditional knowledge plays a role in the development of mathematics through ethnomatematics, which utilizes mathematical concepts within different cultures, and through mathematical activities in traditional games, providing an alternative foundation in elementary school mathematics education, and a strong connection between mathematics, traditional culture, and mathematics learning. Our result of this paper can provide new insights into how traditional knowledge remains relevant in the context of modern mathematics education and provide a basis for further research in enriching inclusive and culturally-based mathematics learning approaches. This research has important implications for appreciating and understanding the diversity of mathematical knowledge worldwide.

Keywords: Ethnomatematics; Traditional Knowledge; Mathematical Concepts.

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A. INTRODUCTION

Ethnomatematics is a scholarly discipline that integrates ethnographic approaches with mathematics (Ledi et al., 2020). This approach enables researchers to study and analyze mathematical thinking within specific cultural contexts. By employing ethnographic methods, researchers can observe the values, norms, and practices of mathematics within those cultures. Meanwhile, through mathematical approaches, they can identify patterns, structures, and mathematical concepts inherent in those cultures. Meyundasari et al. (2023) assert that ethnomatematics is a field that combines mathematics and culture, exploring the

relationships between the two. Thus, ethnomathematics offers a fresh perspective for appreciating the diversity and richness of mathematical thought across cultures. Ethnomathematics studies highlight the development and practice of mathematics within traditional cultures (Saparuddin et al., 2019), as well as its role in understanding how mathematical knowledge is applied in everyday life. This includes understanding how mathematical concepts such as counting, measurement, and geometry are understood and utilized by various cultural groups. Overall, ethnomathematics provides insights into the evolution and adaptation of mathematics and human logical thinking, reflecting cultural diversity and creativity.

Traditional knowledge plays a crucial role in safeguarding cultural heritage and local knowledge as it constitutes an integral part of a community's cultural identity (Widayati et al., 2023). This knowledge encompasses an understanding of technologies, methods, philosophies, and values that have been passed down from generation to generation. By preserving and conserving traditional knowledge, we contribute to maintaining the cultural and intellectual diversity of the world, while also fostering respect for diverse cultural heritage. Additionally, traditional knowledge often provides solutions to contemporary challenges, such as climate change and natural resource management, rooted in a deep understanding of the local environment and sustainable lifestyles. Traditional knowledge can serve as a source of inspiration for the development of inclusive and contextual mathematical approaches. In various traditional societies, mathematical concepts are embedded in various aspects of life, including agriculture, architecture, and craftsmanship (Natun et al., 2021). Recognizing these knowledge and skills can facilitate more relevant and culturally diverse approaches in mathematics education. This recognition can also aid in the creation of more inclusive mathematics curricula that acknowledge and appreciate local knowledge and skills.

The development of mathematical concepts can be influenced by cultural contexts. Mathematics instruction that leverages the cultural environment surrounding students can assist them in better understanding mathematical concepts (Wahyuni et al., 2013). Mathematical knowledge can also be acquired outside structured mathematics learning systems such as schools. Integrating cultural values into mathematics instruction can help cultivate a sense of patriotism and national spirit among students. Studies on ethnomathematics indicate that mathematics, or mathematical knowledge, exists within all cultures. Mathematics has the power to preserve and develop culture. Mathematical representation in traditional society contexts can be enhanced through culturally-based realistic approaches, such as using traditional games as media for conveying mathematical learning materials (Khairunnisa, 2019). However, several challenges emerge, such as the discontinuity between cultural mathematics and school mathematics, and concerns that ethnomathematical approaches may disrupt traditional curriculum demands. Therefore, it is essential to understand the role and influence of ethnomathematics in helping students grasp mathematical content while considering potential challenges that may arise.

Previous research in the field of ethnomathematics has highlighted various aspects. One area of research has focused on the application of ethnomathematics in the context of mathematics teaching in schools, particularly emphasizing research trends from 2018 to 2022 (Hendriyanto et al., 2023). On the other hand, another area of research has explored the

relationship between mathematics and culture, especially in the context of traditional games, and their role in instilling character values and fostering a love for local culture (Handayani & Suparni, 2022). Additionally, there is research that delves into traditional weaving patterns, original thinking, social structures, and cultural elements such as traditional houses (Anisa et al., 2023). These studies have identified mathematical concepts inherent in cultural practices, including geometry, numeracy, calculations, probability, lines, angles, flat shapes, and geometric transformations. Through Iskandar et al. (2022), research, it can be concluded that several cultural aspects apply geometric concepts, including the architecture of traditional houses, regional dances, regional cuisine, batik and woven fabric motifs, as well as the architecture of temples and mosques.

A recent study conducted by Souther et al. (2023) has examined the integration of Traditional Ecological Knowledge (TEK) in land management, highlighting the potential of (TEK) in enhancing conservation approaches and engaging groups previously underrepresented in land stewardship. Conversely, a bibliometric study has been undertaken to gain a comprehensive understanding of research conditions concerning ethnomathematics topics (Tamur et al., 2023). Furthermore, research has explored the correlation between the philosophy of essentialism in education and ethnomathematics, emphasizing the importance of cultural values in mathematical learning (Astuti et al., 2023). In these practices, cultural values such as moral, historical, and philosophical aspects are integrated as messages intended for future generations. The findings of this research underscore the significance of incorporating traditional knowledge and cultural practices into the mathematics curriculum, thereby rendering the subject more relevant and meaningful to students.

Research in ethnomathematics has provided significant insights over a specific period of time. This research encompasses various aspects, ranging from the application of ethnomathematics in mathematics education in schools to the exploration of the interaction between mathematics and culture, particularly the role of traditional games in shaping character and fostering a love for local culture. Additionally, the research delves into the analysis of traditional weaving motifs, indigenous thought, social structures, and other cultural elements, which reveal mathematical concepts in diverse cultural practices. However, further research is needed to understand the dynamics of traditional knowledge in the context of ethnomathematics, including the integration of cultural values such as morals, history, and philosophy into mathematics education. Efforts are required to broaden the scope of research and delve into untouched aspects of ethnomathematics studies to enrich understanding of the relationship between mathematics, culture, and education.

The aim of this study is to identify patterns and trends in the evolution of traditional mathematical knowledge over time, as well as to explore the contributions of traditional knowledge to the understanding of modern mathematics and mathematics education in diverse cultural contexts. Through an in-depth analysis of the literature, this research also aims to highlight the role of ethnomathematics in promoting cultural heritage, enriching mathematical learning experiences, and preserving cultural diversity in the era of globalization.

B. METHOD

This research employs the Systematic Literature Review (SLR) method. Systematic literature review (SLR) is a systematic research method aimed at gathering, critically evaluating, integrating, and presenting findings from various research studies concerning research questions or topics of interest. The term "systematic" denotes its adherence to consistent and widely accepted methodologies (Arissona Dia Indah Sari et al., 2023). The initial search for articles was conducted on Google Scholar, focusing on publications from the past 10 years. Subsequently, a thorough search was conducted across reputable online databases such as Research Gate, SINTA, DOAJ, and Scopus, using the keywords "Dynamics of Traditional Knowledge in the Context of Ethnomathematics". After obtaining various pertinent articles, duplicate filtering was implemented to ensure the uniqueness of the data used. Following this, the researcher proceeded to analyze the selected articles. The findings were categorized into two major clusters: the influence of social media on change and the role of social media in societal lifestyle. Each cluster was further subdivided based on the specific themes emerging from the research. The number of sub-clusters varied depending on the findings gathered throughout the study.

The protocol review proceeds by formulating research questions through the classification of keywords according to the population, intervention, comparison, outcome, and context strategies from the acquired articles. Inclusion and exclusion criteria are determined by selecting articles that align with the research questions, thereby disregarding the researcher's subjectivity in article selection. Subsequently, for the purpose of organizing the selected articles, Mendeley software is utilized. The process of data extraction and synthesis employs thematic analysis and meta-analysis to present findings systematically and comprehensively. Following this, the researcher reviews and analyzes the articles in depth, particularly focusing on the research outcomes presented in the discussion and conclusion sections. In the final part of the study, the researcher compares the findings presented in the articles and draws conclusions.

C. RESULTS AND DISCUSSION

1. The Concept of Traditional Knowledge in the Context of Ethnomathematics

Traditional knowledge refers to local or indigenous knowledge that is accumulated, practiced, and orally transmitted from one generation to the next within a specific community or geographical area. It encompasses various aspects such as agricultural practices, cultural values, healing arts, and customary procedures, all of which play a crucial role in preserving and sustainably utilizing biodiversity. Traditional knowledge holds significant importance in food security, public health, and is closely linked to cultural and biological diversity (Sahin & Kırmızıgül, 2023). Acknowledged as a valuable resource in conservation efforts and the sustainable use of global biodiversity (Noris et al., 2021). Traditional games are part of cultural heritage containing various conceptual knowledge, including mathematical concepts. Traditional games can be utilized as a means to teach mathematical concepts to elementary school students, bridging the gap between learning processes in school and play (Ricardo, 2020). Numerical concepts in everyday language can have accurate or inaccurate

interpretations, depending on factors such as the type of approximator and unit used (Zulviansyach et al., 2023).

2. The Concept of Mathematics within Previous Cultures and Societies.

Mathematics has played a pivotal role across various cultures and societies throughout history. The relationship between phylogenesis and ontogenesis in mathematics education holds implications for teacher training (Moretti et al., 2016). The utilization of history in mathematics education aims to establish parallels between ontogenetic and phylogenetic development (Pradhan, 2020). The study of the historical development of mathematics involves understanding the cultural contexts in which mathematical concepts were produced. Mathematics has been integrated into various aspects of society, such as Greek philosophy, Gothic architecture, and 17th and 18th-century societies (Bråting & Pejlare, 2015). Indigenous societies have their own mathematical concepts closely related to their sociocultural environment and traditional ways of life (Mogege, 2017). Comparing the acquisition of mathematical concepts across different cultures can provide insights into cultural differences and inform mathematics education.

3. The Contribution of Traditional Knowledge to the Learning and Understanding of Mathematical Concepts.

Traditional knowledge, such as traditional games, can significantly contribute to the learning and comprehension of mathematical concepts. Integrating traditional games like congklak and catapult into mathematics education can assist students in understanding concepts such as arithmetic operations, measurement, shapes, lines, angles, and arithmetic operations (Tampubolon et al., 2023). By linking mathematics with culture and creating a comfortable learning atmosphere, students become more engaged in learning and find mathematics easier and more enjoyable (Susanto et al., 2020). Ethnomathematics, which explores mathematical concepts within different cultures, including traditional games, has emerged as a growing research topic in mathematics education (Hariastuti et al., 2020). Furthermore, the use of indigenous knowledge, such as native language and practical assessment tasks, can enhance the teaching and learning of mathematical concepts, especially in areas where students struggle to connect abstract concepts with their daily lives (Madimabe et al., 2022).

4. The Role of Traditional Knowledge in the Development of Mathematics.

Traditional knowledge plays a crucial role in the development of mathematics (Ulhusna et al., 2020). Ethnomathematics, referring to mathematical concepts found within different cultures, can serve as a foundation for creating instructional materials for elementary school students. Traditional games have been found to harbor mathematical activities that aid children in developing numeracy skills and understanding shapes (Khoroshikh & Sergievich, 2019). In the realm of mathematical learning, informal mathematical knowledge is transformed into formal mathematical concepts through social interaction, with traditional games providing a platform for such interaction (Yuecheng, 2023). Insights gained from traditional knowledge, such as the practices of Eskimo Yup'ik communities, can inform alternative

learning trajectories and curriculum development in elementary school mathematics (Lipka et al., 2015).

5. The Influence of Traditional Knowledge on the Development of Modern Mathematics.

Traditional Knowledge (TK) developed by indigenous communities and local societies has significantly influenced the development of modern mathematics. TK encompasses the knowledge, skills, and practices transmitted from generation to generation within a community and can be found in various contexts, including the teaching of mathematics. The integration of this knowledge into mathematics instruction, focusing on interconnected and conditioned mathematical concepts, contributes to the development of students' mathematical thinking (Antonijevic & Vujisic, 2015). Moreover, the systematic organization of knowledge for teaching and the use of logical blocks have been employed to teach classification, ranking, and enumeration in mathematics (Santos & França, 2020). Furthermore, the denaturalization of Reason and the crisis of representation have led to a broader conception of rationality, which can incorporate diverse voices and perspectives in mathematics education (San & Kis, 2018). Additionally, insights gleaned from practical activities of Yup'ik Eskimos and other elders, alongside the conceptualization of measurement, have provided alternative learning pathways and curricula for the teaching of mathematics (Nikolić & Hilčenko, 2022).

Analysis of the research findings indicates that traditional knowledge (TK) plays a significant role in the context of teaching and understanding mathematical concepts. The integration of traditional knowledge in mathematics education can help enhance students' interest and engagement in learning mathematics, as well as provide a relevant context for understanding these concepts. However, there are several gaps that need to be addressed in the existing research. There is a need for further research to deepen understanding of how traditional knowledge can be effectively integrated into existing mathematics curricula, particularly at the elementary school level. These studies could involve the development and assessment of teaching materials that utilize traditional knowledge effectively in mathematics instruction. There is a pressing need for more in-depth research on the impact of using traditional knowledge in mathematics instruction on students' academic achievement, both in the short and long term. These studies can help provide strong empirical evidence of the concrete benefits of integrating traditional knowledge into mathematics instruction.

This research is primarily focused on the identification and documentation of traditional mathematical knowledge across various cultures and societies worldwide. Such endeavors can significantly contribute to broadening insights into the diversity of mathematical concepts existing within indigenous communities, thus enabling the development of more inclusive and diverse learning strategies. Furthermore, there is a pressing need for research that delves deeper into understanding the interaction between traditional knowledge and modern mathematical concepts. This can aid in identifying the potential adoption and adaptation of traditional mathematical concepts within the context of modern mathematical education. Additionally, exploring how traditional knowledge can offer new insights or valuable perspectives for mathematical development is crucial. In the context of ethnomathematics research, it is imperative to also consider studies that delve deeper into the contributions of traditional knowledge to the development of mathematical concepts and how their utilization

can enrich students' learning experiences. Overall, more in-depth and diverse research is needed to comprehend the role and potential of traditional knowledge in the context of mathematics education, as well as to address gaps in existing knowledge and teaching practices.

D. CONCLUSIONS AND SUGGESTIONS

Based on the findings of research in the field of ethnomathematics, it can be concluded that there exists a strong correlation between mathematics, traditional culture, and mathematics education. The research indicates that ethnomathematics provides a foundation for understanding mathematical concepts within cultural contexts, promotes the preservation of traditional knowledge, and enhances students' mathematical learning experiences. However, there are still gaps that need further investigation, such as reflecting mathematical concepts in specific cultural practices and their impact on mathematics learning, as well as how the interaction between mathematics education and cultural understanding influences students' cognitive development. Further research can delve into these aspects to generate culturally responsive and effective approaches to mathematics education.

REFERENCES

- Anisa, Y., Siregar, R. F., & Hafiz, M. (2023). Ethnomathematics as an Exploration of Cultural Mathematical Concepts in Traditional Indonesian Engklek Games. *Asian Research Journal of Mathematics*, 19(7), 65–75. <https://doi.org/10.9734/arjom/2023/v19i7680>
- Antonijevic, R., & Zivkovic-Vujisic, N. (2015). Influence of interconnecting knowledge in mathematics teaching on development of mathematical thinking. *Inovacije u Nastavi*, 28(1), 42–50. <https://doi.org/10.5937/inovacije1501042a>
- Arissona Dia Indah Sari, A. D. I. S., Tatang Herman, Wahyu Sopandi, & Al Jupri. (2023). A Systematic Literature Review (SLR): Implementasi Audiobook pada Pembelajaran di Sekolah Dasar. *Jurnal Elementaria Edukasia*, 6(2), 661–667. <https://doi.org/10.31949/jee.v6i2.5238>
- Astuti, Jimmi Copriady, & Firdaus, L. N. (2023). Etnomatematika Dalam Pandangan Aliran Filsafat Esensialisme. *Jurnal Filsafat Indonesia*, 6(1), 1–9. <https://doi.org/10.23887/jfi.v6i1.50865>
- Bråting, K., & Pejlar, J. (2015). On the relations between historical epistemology and students' conceptual developments in mathematics. *Educational Studies in Mathematics*, 89(2), 251–265. <https://doi.org/10.1007/s10649-015-9600-8>
- dos Santos, E. S. C., & França, D. M. (2020). Knowledge of “Pre mathematics” in Times of the Modern Mathematics Movement (1960-1980). *Pedagogical Research*, 5(3), em0071. <https://doi.org/10.29333/pr/8282>
- Gün Sahin, Z., & Kırmızıgül, H. G. (2023). Teaching Mathematics through Micro-Learning in the Context of Conceptual and Procedural Knowledge. *International Journal of Psychology and Educational Studies*, 10(1), 241–260. <https://doi.org/10.52380/ijpes.2023.10.1.1009>
- Handayani, S. T., & Suparni, S. (2022). Nilai-Nilai Karakter Dan Etnomatematika Dalam Permainan Tradisional Ingkling. *Sigma: Jurnal Pendidikan Matematika*, 14(2), 140–147. <https://doi.org/10.26618/sigma.v14i2.7014>
- Hariastuti, R. M., Budiarto, M. T., & Manuharawati, M. (2020). Incorporating Culture and Mother Tongue in Mathematics Learning : Counting Operation in Traditional Houses Using Banyuwangi. *Malikussaleh Journal of Mathematics Learning (MJML)*, 3(2), 62. <https://doi.org/10.29103/mjml.v3i2.2482>

- Hendriyanto, A., Priatna, N., Juandi, D., Dahlan, J. A., Hidayat, R., Sahara, S., & Muhaimin, L. H. (2023). Learning Mathematics Using an Ethnomathematics Approach: A Systematic Literature Review. *Journal of Higher Education Theory and Practice*, 23(7), 59–74. <https://doi.org/10.33423/jhetp.v23i7.6012>
- Iskandar, R. S. F., Karjanto, N., Kusumah, Y. S., & Ihsan, I. R. (2022). *A systematic literature review on ethnomathematics in geometry*. 1990. <http://arxiv.org/abs/2212.11788>
- Khairunnisa, K. (2019). Peningkatan Kemampuan Representasi Matematis Dan Minat Belajar Matematika Peserta Didik Melalui Pendekatan Realistik Berbasis Budaya Melayu Langkat di MTS Negeri Tanjung Pura Kabupaten Langkat. *EduTech: Jurnal Ilmu Pendidikan Dan Ilmu Sosial*, 5(2), 150–162. <https://doi.org/10.30596/edutech.v5i2.3397>
- Khoroshikh, P. P., & Sergievich, A. A. (2019). Fundamentals of Mathematical Knowledge in the Traditional Culture of Evenks. *Journal of Language and Cultural Education*, 7(1), 70–83. <https://doi.org/10.2478/jolace-2019-0005>
- Ledi, F., Kusmanto, B., & Agustito, D. (2020). Identifikasi Etnomatematika pada Motif Kain Tenun Sumba Barat. *UNION: Jurnal Ilmiah Pendidikan Matematika*, 8(1), 87–95. <https://doi.org/10.30738/union.v8i1.5338>
- Lipka, J., Andrew-Ihrke, D., Koester, D., Zinger, V., Olson, M., Yanez, E., & Rubinstein, D. (2015). Indigenous Knowledge Provides an Elegant Way To Teach the Foundations of Mathematics. *Proceedings of the 37th Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, 2–18. <https://files.eric.ed.gov/fulltext/ED584219.pdf>
- Madimabe, M. P., Omodan, B. I., & Tsotetsi, C. T. (2022). Incorporation of Indigenous Knowledge in the Mathematical Geometry Discipline at a TVET College. *Journal of Research in Mathematics Education*, 11(3), 296–312. <https://doi.org/10.17583/redimat.7890>
- Meyundasari, M. D., Gustina, R., Hastuti, I. D., & ... (2023). Pembelajaran Matematika Berbasis Etnomatematika dengan Konteks Rumah Adat Istana dalam Loka di Kota Sumbawa. *Seminar Nasional ...*, 3, 129–139. <https://journal.ummat.ac.id/index.php/fkip/article/view/16391>
- Mogege, M. (2017). Mathematical concepts from community elders: exploring the connection between ethnomathematical contexts and classroom practices. *ETD - Educação Temática Digital*, 19(3), 667. <https://doi.org/10.20396/etd.v19i3.8648368>
- Moretti, V., Radford, L., Moretti, V. D., & Radford, L. (2016). *Towards a culturally meaningful history of concepts and the organization of mathematics teaching activity* To cite this version : HAL Id : hal-01349257 *Towards A Culturally Meaningful History Of Concepts And The Organization Of Mathematics Teaching Activit.*
- 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>
- Nikolić, S., & Hilčenko, S. (2022). Learning Mathematics Through the Modern Didactic Principle of Polyformity. *Journal of Education, Technology and Computer Science*, 33(3), 35–45. <https://doi.org/10.15584/jetacomps.2022.3.3>
- Noris, M., Saputro, S., & M. (2021). *European Journal of Mathematics and Science Education. Science Education*, 3(1), 35–47. https://pdf.ejmse.com/EJMSE_2_1_47.pdf
- Pradhan, J. B. (2020). Cultural artefacts as a metaphor to communicate mathematical ideas Artefatos culturais como uma metáfora para comunicação de ideias matemáticas. In *Portal.Amelica.Org*. <http://portal.amelica.org/ameli/jatsRepo/388/3881871030/3881871030.pdf>
- Ricardo, J. (2020). Challenging the traditional curriculum by traditional knowledges : from ethnomathematical fieldwork to classroom practices Desafiando el currículo tradicional por los conocimientos tradicionales : del trabajo de campo etnomatemático a las prácticas

- en el. *Revemop*, 1–21.
- San, I., & Kis, A. (2018). Effect of traditional methods in geometry and numbers learning domains on academic achievement: A meta-analysis study. *International Journal of Research in Education and Science*, 4(2), 544–554. <https://doi.org/10.21890/ijres.428950>
- Saparuddin, A., Sukestiyarno, Y. L., & Junaedi, I. (2019). Etnomatematika Dalam Perspektif Problematika Pembelajaran Matematika : Tantangan Pada Siswa Indigenous. *Universitas Negeri Semarang*, 910–916.
- Souther, S., Colombo, S., & Lyndon, N. N. (2023). Integrating traditional ecological knowledge into US public land management: Knowledge gaps and research priorities. *Frontiers in Ecology and Evolution*, 11(March). <https://doi.org/10.3389/fevo.2023.988126>
- Susanto, A., Kustati, M., Yusna, N. E., Islam, U., & Imam, N. (2020). *Global Conferences Series : Social Sciences , Education and Humanities (GCSSSEH) , Volume 6 , 2020 International Conference Fakultas Tarbiyah dan Keguruan Universitas Islam Negeri Imam Bonjol Padang (ICFTKUIINIBP) 2020 Contribution of Learning Model Stu. 6*, 209–215.
- Tampubolon, T., Sibarani, S., Zuhri, Efendi, Zakiah, N., & Zaini, H. (2023). Ethnomathematics Learning to Improve Students' Understanding for Numeracy Concepts. *JPI (Jurnal Pendidikan Indonesia)*, 12(2), 358–366. <https://doi.org/10.23887/jpiundiksha.v12i2.60716>
- Tamur, M., Wijaya, T., Nurjaman, A., Siagian, M., & Perbowo, K. (2023). *Ethnomathematical Studies in the Scopus Database Between 2010-2022: A Bibliometric Review*. <https://doi.org/10.4108/eai.21-10-2022.2329666>
- Ulhusna, M., Diana Putri, S., & Zakirman. (2020). 23050-44380-8-Pb. *International Journal of Elementary Education*, 4(2), 130–137.
- Wahyuni, A., Tias, A. A. W., & Sani, B. (2013). 18454275. *Prosiding Seminar Nasional Matematika Dan Pendidikan Matematika FMIPA UNY*, 1(1), 113–118.
- Widayati, S., Setiyaningsih, L. A., Affandi, A. S., & Cahyaningsih, D. S. (2023). Peran Budaya Jaranan dalam Upaya Pemberdayaan Komunitas untuk Melestarikan Warisan Budaya. *Seminar Nasional Pengabdian Masyarakat Ma Chung 2023: Bagaimana Indonesia Tahun 2024 Di Tengah-Tengah Isu Resesi Ekonomi Global?*, 159–170. <https://ocs.machung.ac.id/index.php/senam/article/view/405>
- Yuecheng, W. (2023). How to Integrate Traditional Culture into STEM Teaching. *Frontiers in Educational Research*, 6(7), 26–31. <https://doi.org/10.25236/fer.2023.060705>
- Zulviansyach, A. N. Z. I., Risaldi, F. K., Hartini, S., & Hariastuti, R. M. (2023). Slingshot: Between Traditional Games and Learning Mathematics. *Journal of Mathematics Instruction, Social Research and Opinion*, 2(1), 75–88. <https://doi.org/10.58421/misro.v2i1.68>