



# ISLAMIC CULTURAL ETHNOMATHEMATICS USING THE MATH CITY MAP APPLICATION ON GEOMETRY MATERIAL FOR JUNIOR HIGH SCHOOL IN SOUTH SULAWESI

**Arif Tirtana Gaffar<sup>1</sup>, Sitti Mania<sup>2</sup>, Misykat Malik Ibrahim<sup>3</sup>, & Saprin<sup>4</sup>**

<sup>1,2,3,4</sup>Postgraduate Program of Universitas Islam Negeri Alauddin Makassar, Indonesia

Correspondence Email: [ariftirtana041185@gmail.com](mailto:ariftirtana041185@gmail.com)

## ABSTRACT

This research aims to analyze the need level and test the validity, practicality, and effectiveness of developing teaching materials based on Islamic cultural ethnomathematics using the math city map application on geometry material for junior high school in South Sulawesi, which applies the Four-D development model. The needs analysis in developing teaching materials in this research involves junior high school mathematics teachers in four districts (Gowa, Takalar, Jeneponto, and Bantaeng) around the Islamic cultural heritage of old mosques in South Sulawesi. Data were collected through questionnaires, learning outcome tests, interviews, and documentation and analyzed qualitatively and quantitatively. The analysis in this research focuses on the level of need, validity, practicality, and effectiveness of the developed teaching materials. The data sources for this research are documents, students, subject teachers, and experts/validators, and this research involves small group trials and field trials at UPT SMPN 2 Tarawang. The research results show that the developed teaching materials have a need level of 78%, with the validity level of the instruments used falling into the valid category. The practicality level based on teacher responses is 93%, and the effectiveness level is indicated by the increase in the average score from the pretest (76.3) to the post-test (89.1) with an N-Gain of 0.58, which is categorized as effective. The research results show that the Islamic ethnomathematics-based teaching materials assisted by the Math City Map application on geometry topics in junior high school are suitable for use because they effectively improve students' mathematics learning outcomes.

**Keywords:** Ethnomathematics; Islamic culture; Math City Map; geometry

## 1. INTRODUCTION

The performance of Indonesian students in mathematics subjects is still a serious concern. Based on various educational assessments, such as TIMSS and PISA, Indonesian students' critical thinking and mathematical problem-solving abilities are still considered low. (Sitti, 2020). This condition is further clarified by educational report data from several districts in South Sulawesi, which show that students' achievements in numeracy and literacy are still below standard.

(Kemendikbudristek; 2022). One of the factors affecting the low achievement of students in numeracy is the lack of relevant and engaging teaching materials. Suitable teaching materials motivate students to learn, connect mathematical concepts with real life, and develop critical thinking skills. One of the subjects that requires essential, logical, and systematic thinking skills is mathematics. Glazer argues (Ulfah, 2014) that critical thinking in mathematics is the ability to generalize, prove, or recursively evaluate unknown mathematical situations by combining existing knowledge, mathematical reasoning, and cognitive strategies. Critical thinking is one of the aspects of the quality of educational achievement that enlightens the nation's life and builds character. (Tan, 2017). Critical thinking is an important aspect of students' academic achievement.

One of the meaningful innovations in mathematics education for students is realistic learning. In this learning process, achieving educational goals includes critical thinking skills and placing students' realities and experiences as the starting point of learning, where students can build formal mathematical knowledge through real-life problems. If we look at meaningful life activities, they are inseparable from culture. This Indonesian anthropologist defines culture as the entire system of ideas, emotions, actions, and works created by humans in social and academic life by Koentjaraningrat (2000). A culture-based curriculum implies that the curriculum is designed based on standard practices within society, whether in the form of ideas, actions, or human creations. At the philosophical level, a culture-based mathematics education curriculum serves as an instrument or tool used to teach mathematics while also serving as a means to preserve and develop the nation's culture. Mania argues that teachers can use various media in teaching mathematics based on the culture and background of the students, as Indonesia has a diverse range of ethnicities, cultural sites, modes, buildings, traditional cuisine, and traditional games. (Mania, 2021).

As an effort to address these issues, this research proposes the development of ethnomathematics-based teaching materials. Ethnomathematics is a learning approach that connects mathematical concepts with local culture. By integrating Islamic cultural values and local wisdom into mathematics education, student motivation and learning outcomes can be improved, concept understanding can be facilitated, and critical thinking skills can be developed. In addition to ethnomathematics, this research utilizes information technology, specifically the Math City Map application. This application allows students to learn mathematics more interactively and enjoyably by exploring the surrounding Islamic environment and culture. Combining ethnomathematics and technology can produce more effective and engaging student teaching materials.

The main objective of this research is to develop mathematics teaching materials based on Islamic cultural ethnomathematics integrated with the Math City Map application, specifically for geometry material in junior high school. These teaching materials are expected to enhance students' motivation and learning outcomes in mathematics, help students understand mathematical concepts more deeply, develop students' critical thinking and problem-solving skills, and, most importantly, preserve Islamic cultural values and local wisdom. Based on the background above, the formulation of the problem in this research is:

1. What level do teachers need to develop learning materials based on Islamic cultural ethnomathematics, assisted by the Math City Map application, in geometry subjects at junior high schools?
2. What is the validity, practicality, and effectiveness of the ethnomathematics-based Islamic cultural teaching materials assisted by the Math City Map application in geometry subjects at junior high schools?

The results of this research are expected to contribute to developing more relevant and effective mathematics teaching materials. Additionally, this research can serve as a reference for teachers, researchers, and policymakers in improving the quality of mathematics education in Indonesia.

## 2. METHODS

### Type of Research

The type of research is development research (research and development) that applies the 4-D model (Four D) focused on developing teaching materials. This model was developed by S. Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel (1974). The 4-D model (Four D) is a development model consisting of four stages: definition, design, development, and dissemination. The first stage, definition, is the initial stage where researchers conduct a needs analysis, set objectives, and formulate problems. In the second stage, design, researchers design the product, strategies, and procedures for developing the teaching materials. The third stage, development, is where the designed product is created and tested on a limited scale. In the final stage, dissemination, the product is produced and distributed to users.

In the 4-D model, each stage must be carried out in a planned and systematic manner to produce an effective and efficient product. Researchers must also conduct evaluations at each stage to assess the product's effectiveness and efficiency. These evaluations help researchers make improvements and adjustments to the created product, ensuring that the resulting product meets user needs and is effectively used in learning.

The product created from this development research is a teaching module designed explicitly for geometry mathematics learning at the junior high school level with an ethnomathematics and Islamic culture approach. This module will help teachers present geometry mathematics concepts in a more engaging and relevant way for students, thereby increasing students' interest in learning and understanding mathematics.

This teaching module and project module are also equipped with the Math City Map application, which can help students understand geometric mathematics concepts interactively and enjoyably. This application will assist students in applying mathematical concepts in their daily lives by utilizing Islamic culture and history, thereby enhancing students' pride in Islamic culture and history. Thus, the development of Islamic cultural ethnomathematics teaching materials in the form of teaching modules supported by the Math City Map application on geometry topics in junior high school is expected to help improve the quality of mathematics

education in schools and provide a positive impact on students' understanding of Islamic culture and history.

### **Research Location**

The research and development location is at a junior high school in the South Sulawesi region. It is located near the research objects at 5 (five) of the oldest Islamic cultural heritage mosques in South Sulawesi, namely the Masjid Besar Taqwa Tompong (1955) in Bantaeng Regency, the Masjid Tua Jerrae (1609) in Sidenreng Rappang Regency (Sidrap), the Masjid Jami Tua Palopo (1604) in Palopo City, the Masjid Tua Katangka (1603) in Gowa Regency, and the Masjid Tua Gantarang (16th Century) in Bulukumba Regency. However, due to the limitations of the researchers and representation, UPT SMPN 2 Arungkeke School in Jeneponto Regency was selected with the study object of ethnomathematics of Islamic culture at the Masjid Besar Taqwa Tompong (1955) in Bantaeng Regency, and UPT SMPN 1 Bontomarannu School in Gowa Regency with the study object of ethnomathematics of Islamic culture at the Masjid Tua Katangka (1603) in Gowa Regency. The researcher chose those schools because they have already implemented the independent curriculum in their second year and have never used map-based learning or the Math City Map application. Another supporting factor is that the researcher can efficiently conduct the study in terms of distance, cost, and time to the Islamic cultural heritage site located at the research site.

The participants of this research are eighth-grade students at UPT SMPN 2 Arungkeke, located in Jeneponto Regency. The trial stage involved ten eighth-grade students as a small sample, while the field test stage involved all eighth-grade students of class VIII. A large sample of 25 students is needed, with the learning location being the Great Mosque of Taqwa Tompong (1955) in Bantaeng Regency, one of the Islamic cultural heritage sites in South Sulawesi.

### **Data Sources**

This research relies on four primary data sources. The documents used in the research are from educators directly involved in the teaching and learning process, students as research subjects, and experts in mathematics education who serve as validators. According to Hasan (in Hasan; 2006), data is information that can be an assumption or a fact represented by numbers, symbols, and codes. The data collection techniques used in this research are questionnaires, learning outcome tests, interview guidelines, and documentation.

### **Research Instruments**

Research instruments are a crucial first step in the data collection process. This instrument is designed as a map or blueprint that guides researchers in formulating relevant and valid questions or statements to measure research variables. In other words, this instrument ensures that each question in the questionnaire has a clear purpose and aligns with the indicators to be measured. This study used nine instruments to obtain research data in developing teaching materials based on Islamic cultural ethnomathematics, assisted by the Math City Map application.

## Data Analysis Techniques

Data analysis in this study was conducted qualitatively and quantitatively. Qualitatively, the data were analyzed to measure the level of need, validity, and practicality of the teaching materials. Quantitative analysis was used to measure the effectiveness of the teaching materials in improving students' learning outcomes by comparing pre- and post-learning outcome tests. The data analysis in this study was conducted in stages, namely Validity Data Analysis, Practicality Data Analysis, and Effectiveness Data Analysis. A T-test and N-gain test were conducted to test the effectiveness of the teaching materials in this study.

## 3. RESULTS AND DISCUSSION

To discuss the research method, the product resulting from this research and development is a teaching material book based on Islamic cultural ethnomathematics assisted by the Math City Map application on geometry material. The results of developing this teaching material are presented as stipulated in the research method. According to the Thiagarajan model (1974), the development stages consist of four: Define, Design, Develop, and Disseminate.

### Definition Stage (Define)

The define stage is the initial stage in designing educational material. At this stage, the researcher conducts several analyses, including initial analysis, learning analysis, concept analysis, task analysis, and learning objective analysis. Based on the initial research observations from 66 mathematics teachers spread across 4 (four) districts, namely Gowa District, Takalar District, Jeneponto District, and Bantaeng District, which are close to the learning objects of Islamic cultural ethnomathematics, the Taqwa Tompong Grand Mosque in Bantaeng District and the Old Katangka Mosque in Gowa District, have never implemented Islamic cultural ethnomathematics learning assisted by the Math City Map application. The initial research observations also conclude that all the schools studied have implemented the Merdeka curriculum for at least two academic years, and approximately 95% have used the teaching modules provided by the government or modified those modules. This shows a firm commitment from the schools and teachers to implementing the new curriculum.

In addition, the initial observation results also indicate that 78% of teachers have used varied teaching strategies, especially for geometry material. The use of varied teaching strategies can enhance students' motivation and understanding. However, teachers' knowledge of Islamic cultural-based mathematics learning and using the Math City Map application is still low. Only a few teachers have implemented ethnomathematics-based learning or used the Math City Map application. This indicates a significant potential to develop mathematics education by integrating Islamic cultural values and utilizing technology or developing ethnomathematics-based teaching materials with the help of the Math City Map application in geometry subjects at junior high schools (SMP). This is further supported by the results of interviews with mathematics teachers during the continued needs analysis of teachers from 2 schools at UPT SMPN 1 Bontomarannu and UPT SMPN 2 Tarawang, who stated that they have never known or used ethnomathematics learning and the utilization of the Math City Map application in mathematics teaching.

Shifting from the initial observation conducted by the researcher for teachers, the analysis of student needs shows that most students have difficulty understanding geometric concepts. The graph indicates that 68% of students struggle to understand geometric concepts through classroom learning. Furthermore, in terms of overcoming difficulties in geometry learning, there is a relatively high percentage at a score of 80%, based on the limited teaching aids and media available at the school. Based on the initial research observation data and student needs assessment, the concept analysis indicates that developing teaching materials based on Islamic cultural ethnomathematics with the help of the Math City Map application is the right step.

### **Design Phase Results (Design)**

The design phase in developing teaching materials based on Islamic cultural ethnomathematics, incorporating the Math City Map application in geometry learning, has begun. This initial stage is crucial because it will be the foundation for the subsequent development process. Several main activities in the design phase include the initial design of the concept of teaching materials, selecting the most suitable format for delivering geometry material, and selecting learning media to support student understanding.

Additionally, in the design phase, assessment instruments or tests are prepared. These tests will measure students' understanding of the geometry concepts taught through the developed teaching materials. In other words, these tests serve as evaluation tools to determine the effectiveness of the designed teaching materials.

### **Results of the Development Stage (Pengembangan)**

In the development stage, the Islamic cultural ethnomathematics-based teaching materials created with the help of the Math City Map application will be evaluated by experts. This assessment aims to ensure that the teaching materials are suitable for use. The assessment results in numbers (quantitative data) are then translated into words (qualitative data) to serve as a basis for improving the teaching materials. The ultimate goal of this process is to produce a high-quality textbook that can be used as a learning guide.

#### **a. Results of Validity Data Analysis by Experts**

The results of the validity analysis of the nine instruments used to obtain research data in developing teaching materials based on Islamic cultural ethnomathematics assisted by the Math City Map application on geometry material show that the developed teaching materials have met the validity criteria set by the experts. Both in terms of content, language, and presentation of the material, this teaching material is deemed valid and suitable for use in learning. The validation results also indicate that the research instruments used, such as the initial research observation sheet, the observation sheet for analyzing the needs of teachers and students, the validation sheet for teaching materials by subject matter and media experts, the learning outcome test sheet, the module/app validation sheet, the teacher and student response questionnaire sheet, and the implementation observation sheet, have been well designed and are reliable. Overall, the instruments fall into the valid category.

b. Results of Practicality Data Analysis

Observations were conducted to test the feasibility of the Islamic cultural ethnomathematics-based teaching materials utilizing the Math City Map application, including assessments by mathematics teachers and student evaluations. In the limited trial phase, 10 students provided feedback on the teaching materials using the Math City Map application. Next, in the field testing phase located at Masjid Taqwa Tompong, Bantaeng Regency, one of the oldest mosques in South Sulawesi, 25 students participated in the learning process. They provided feedback on the learning that utilized the Math City Map application. This mosque was chosen as the location for learning Islamic cultural ethnomathematics. Here are the results of the teacher's responses to the learning using teaching materials developed with the help of the Math City Map application.

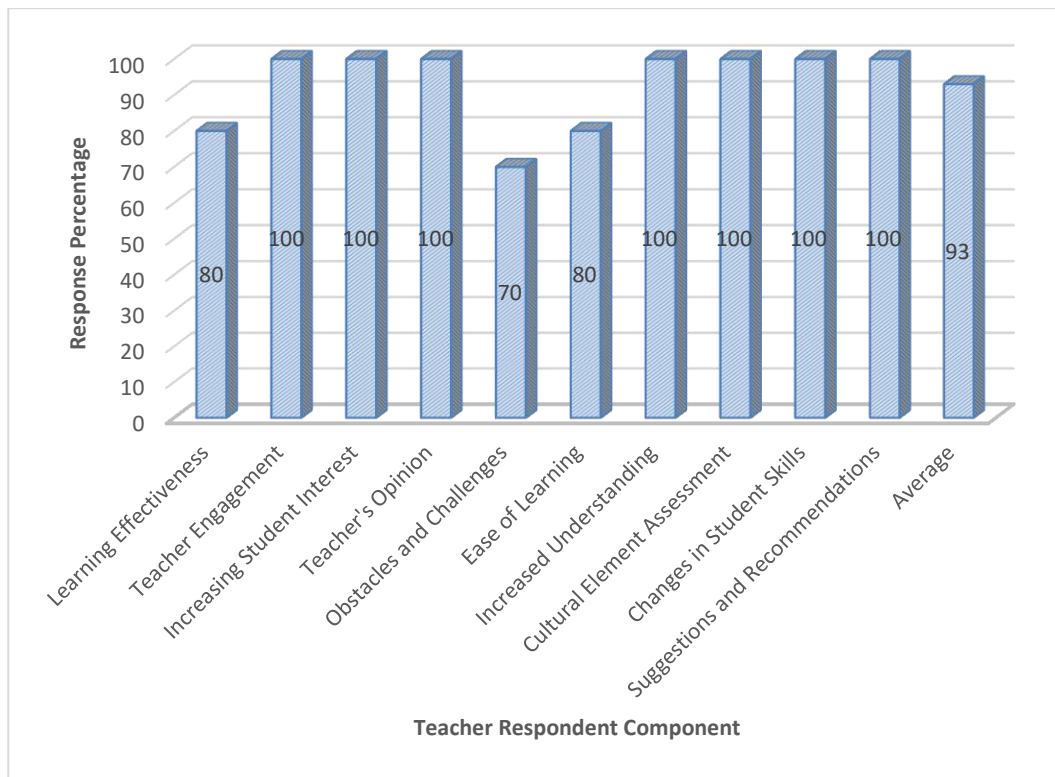
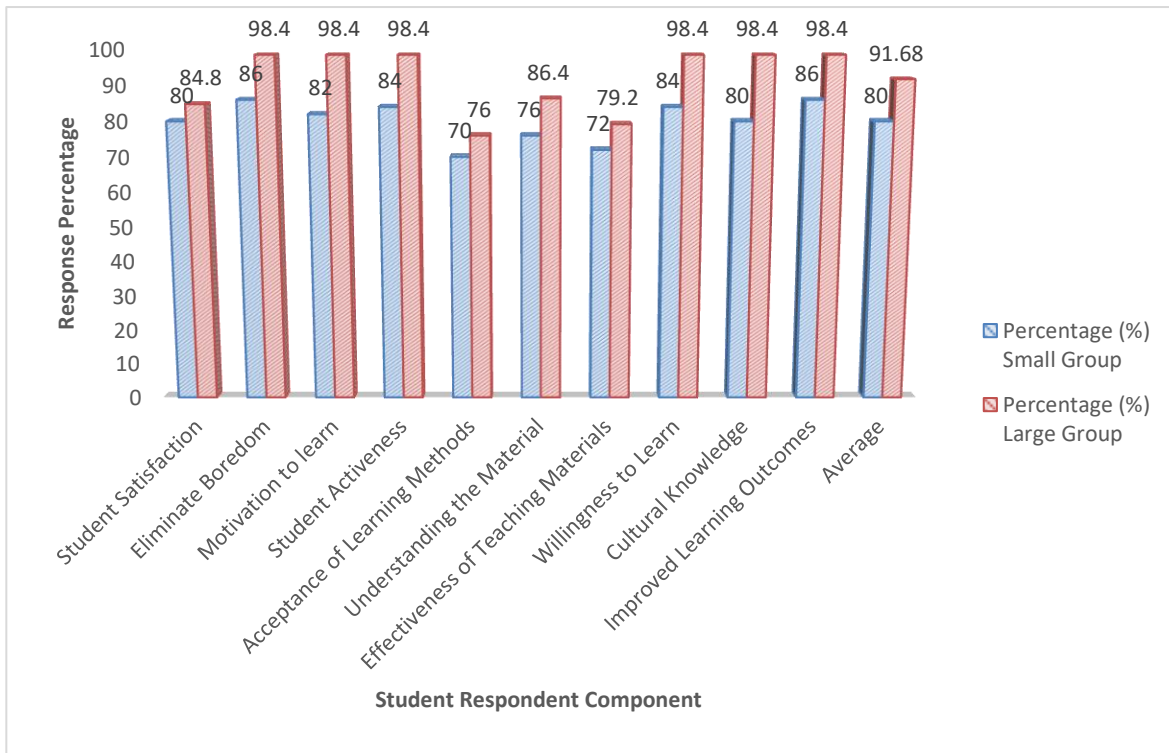


Figure 1. Graph of Teacher Response Survey Results on Learning

Based on Table 4.12, overall, the teacher's response to the learning that uses teaching materials based on Islamic cultural ethnomathematics with the help of the Math City Map application is very positive. All assessment aspects fall into the convenient category and have a perfect score of 100%, except for the learning effectiveness aspect and the learning ease aspect, which have a score of 80%. In comparison, the constraints and challenges aspect scored 70%. The low scores on these three aspects are because the Islamic cultural ethnomathematics teaching materials using the Math City Map application are relatively new to mathematics teachers. However, the scores on these three aspects are still considered practical. Thus, with the help of the Math City Map application, the ethnomathematics-based Islamic cultural teaching

materials have excellent potential to improve the quality of mathematics learning with an average of 93% or fall into the convenient category. Next, the comparison graph of the small group and large group trials;



**Figure 2.** Comparison Graph of Small Group and Large Group Trials

The comparison graph of the small and extensive group trial results shows significant improvement after revising the teaching materials. The small and large groups responded positively to the Islamic cultural ethnomathematics teaching materials integrated with the Math City map application. The average trial score for the small group was 80%, falling into the practical category, while the average trial score for the large group was 91.68%, falling into the convenient category. The results of the large group trial generally show higher percentages in almost all indicators, such as student satisfaction, learning motivation, student activity, and understanding of the material. This indicates that the improvements made based on the results of the small group trials have successfully enhanced the practicality of the teaching materials and demonstrate that the developed teaching materials are efficient for application in mathematics learning. Based on the data presented from both analyses above, this teaching material is considered very practical and effective in improving student's learning outcomes and helping students better understand geometric concepts.

c. Results of Data Effectiveness Analysis

Analysis of the Effectiveness Level of Teaching Material Development based on T-test and N-Gain test results shows that the use of this teaching material significantly improves students' learning outcomes in the subject of flat geometric figures. This indicates that integrating Islamic



cultural ethnomathematics and information technology through the Math City Map application is a practical learning approach. Based on the data presented, the ethnomathematics-based Islamic cultural teaching materials integrated with the Math City Map application improve students' learning outcomes in geometry. This can be proven with several important points, namely regarding the implementation of learning, which shows that all learning components, from the initial activities to the closing, have been carried out very well. From the results of the T-Test, there is also a significant difference between the student's pretest and post-test scores, with a significance value of less than 0.01, indicating a very significant impact on the student's learning outcomes. This means the student's learning outcomes statistically improved after using this teaching material. Similarly, in line with the N-Gain Test results, which fall into the moderate or effective category with an N-Gain value of 0.58, it indicates that, on average, students experienced a 58% improvement in learning outcomes. Below are the SPSS statistical results for the normality test and T-test conducted;

**Table 1.** Results of the Normality Test

Variables	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Learning Outcome Pretest	0,195	25	0,015	0,892	25	0,012
Posttest Learning Outcome	0,185	25	0,028	0,918	25	0,046

a. Lilliefors Significance Correction

**Table 2.** Results of Paired Samples T-Test

		Paired Samples Test							
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
Pair 1					Lower	Upper			
	Pretest Hasil Belajar - Posttest Hasil Belajar	-14,00000	4,32049	,86410	-15,78341	-12,21659	-16,202	24	<,001

**Dissemination Results (Deseminasi)**

The final stage of this research is dissemination, which aims to introduce and spread the research results through teaching materials based on Islamic cultural ethnomathematics integrated with the Math City Map application to a broader community, especially junior high school mathematics teachers. Dissemination is done by presenting the research results at several forums of the Mathematics Subject Teacher Consultation (MGMP) for junior high schools. There is also socialization regarding trails in the Math City Map application that can be used as an engaging and relevant learning medium within the local cultural context. Thus, it is hoped that

the results of this research can be adopted by more mathematics teachers and inspire the development of similar teaching materials, thereby contributing to improving the quality of mathematics education in schools.

#### 4. CONCLUSION

Using the Math City Map application, this research aims to develop mathematics teaching materials based on Islamic cultural ethnomathematics. Through the development process based on the 4D model, a textbook has been produced that integrates the concept of flat geometric shapes with elements of Islamic culture found in the Taqwa Tompong Mosque, Bantaeng Regency. Based on the results of this research and development, it can be concluded:

- a. The analysis of the level of need for the development of teaching materials shows a high demand for innovative teaching materials that can connect mathematics content with local cultural contexts. This is indicated by the observation results showing that around 78% of teachers have never implemented Islamic cultural-based ethnomathematics learning or used the Math City Map application. The results of interviews with teachers at UPT SMPN 1 Bontomarannu and UPT SMPN 2 Tarowang also confirm that they are not yet familiar with the concept of ethnomathematics and the application. The results of the student needs analysis indicate that many students still struggle to understand geometric concepts, even though most teachers have used various teaching strategies. However, the limited teaching aids and learning media in schools also challenge improving students' understanding of geometric concepts. The percentage of students who have difficulty overcoming learning difficulties in geometry is relatively high, at around 80%. This indicates a need for more effective and engaging teaching materials to help students better understand geometric concepts. Integrating mathematics and Islamic culture through the Math City Map application offers excellent potential to improve students' learning outcomes and deepen their understanding of mathematical concepts. By utilizing the surrounding environment rich in cultural values, mathematics education can become more meaningful and relevant for students.
- b. The analysis of the validity level of the developed teaching materials shows that the developed materials have met the validity criteria set by the experts. Both in terms of content, language, and presentation of materials, these teaching materials are deemed valid and suitable for learning. The validation results also indicate that the research instruments used, such as the initial research observation sheet, the observation sheet for analyzing the needs of teachers and students, the validation sheet for teaching materials by subject matter and media experts, the learning outcome test sheet, the module/app validation sheet, the teacher and student response questionnaire sheet, and the implementation observation sheet, have been well-designed and reliable. Overall, the instruments are categorized as valid.
- c. The analysis of the practicality level of teaching material development based on teacher and student responses shows that this teaching material is considered very practical and effective in improving student learning outcomes and helping students better understand geometric

concepts. Based on the data presented, the Islamic cultural ethnomathematics-based teaching materials integrated with the Math City Map application have a very high level of practicality. This can be proven by several points, namely from the teachers' responses, where almost all aspects of the evaluation of the teaching materials by the teachers received high scores, with an average reaching 93%. This indicates that the teachers find the teaching materials easy to use, relevant to the curriculum, and capable of increasing students' learning motivation. Although some mentioned obstacles, such as being new to using the Math City Map application, overall, the teachers gave a very positive assessment. Next, the students' responses, both in small and large group trials, were very positive towards the teaching materials. The average student assessment reached over 80%, indicating that students are satisfied with the teaching materials, find them interesting, and believe they can help them understand mathematical concepts better.

- d. Analysis of the Effectiveness Level of Teaching Material Development based on T-test and N-Gain test results shows that using this teaching material significantly improves students' learning outcomes in flat geometry. This indicates that integrating Islamic cultural ethnomathematics and information technology through the Math City Map application is a practical learning approach. Based on the data presented, the ethnomathematics-based Islamic cultural teaching materials integrated with the Math City Map application improve students' learning outcomes in geometry. This can be proven by several important points, namely regarding the implementation of the learning process, which shows that all learning components, from the initial activities to the closing, have been carried out very well. From the results of the T-Test, there is also a significant difference between the pretest and post-test scores of the students, with a significance value of less than 0.01, indicating a very significant effect on the student's learning outcomes. This means the student's learning outcomes statistically increased significantly after using this teaching material. Similarly, the results of the N-Gain Test fall into the moderate or effective category, with an N-Gain value of 0.58, indicating that, on average, students experienced a 58% improvement in learning outcomes.

## REFERENCES

- \_\_\_\_\_. (2024). *Math City Map*. IDMI, Goethe-Universität Frankfurt a.M., n.d. <https://mathcitymap.eu/id/>.
- Afifah, S. A., & Agoestanto, A. (2020). *Mathematical Critical Thinking Ability in Solving Open-Ended Questions Viewed from Students Curiosity*. Unnes Journal of Mathematics Education, 9(1), 36–42. <https://doi.org/10.15294/ujme.v9i1.38099>
- Agus, Bustanuddin (2006). *Agama Dalam Kehidupan Manusia: Pengantar Antropologi Agama*. Rajawali Press: Jakarta.
- Awaluddin (2017). *Pengembangan Buku Tes Sintaksis Bahasa Indonesia*. Deepublish: Yogyakarta.
- Badrudin (2014). *Antara Islam Dan Kebudayaan*. IAIN Sultan Maulana Hasanuddin: Banten. H. 208–26.
- Borich, G. D (1994). *Observation Skill for Effective Teaching*. Mac Millian Publishing company: New York.

- BSNP, Badan Standar Nasional Pendidikan (2006). *Instrumen Penilaian Tahap II*. Buku Teks Pelajaran SMP/MTs Dan SMA/MA: Jakarta.
- Chomsin, Widodo S. dan Jasmadi (2008). *Panduan Menyusun Bahan Ajar Berbasis Kompetensi*. PT Elex Media Komputindo: Jakarta.
- Dahlan, Jarnawi Afgani, and Revina Permatasari (2018). *Pengembangan Bahan Ajar Berbasis Etnomatematika Dalam Pembelajaran Matematika Sekolah Menengah Pertama*. JNPM (Jurnal Nasional Pendidikan Matematika) 2. No. 1 ( ): 133–50.
- Farda, U. J. F. J., Binadja, A., & Purwanti, E. (2016). *Validitas pengembangan bahan ajar ipa bervisi sets*. Journal of Primary Education, 5(1), 36-41.
- Fitria, M. I. (2019). *Pengembangan Pembelajaran Matematika Kontekstual Berbasis Etnomatematika Kultur Arek untuk Meningkatkan Kemampuan Koneksi Matematika*. UIN Sunan Ampel Surabaya.
- Hanafi, H (2017). *Konsep Penelitian R&D Dalam Bidang Pendidikan*. Jurnal Kajian Keislaman: Jakarta. Hal. 4.2 ( ): 138.
- Hasan, I (2006). *Analisis Data Penelitian Dengan Statistik*. Bumi Aksara: Jakarta.
- Ismaya, Bayu Fajar, Adi Nur Cahyono, and Scolastika Mariani (2020). *Kemampuan Penalaran Matematika Dengan Math Trail Project Berbantuan MathCityMap*. Seminar Nasional Pendidikan Matematika Ahmad Dahlan: Yogyakarta.
- Kemendikbudristek, Badan Standar Kurikulum, dan Asesmen Pendidikan (2022). *Raport Pendidikan Publik*. [https://pusmendik.kemdikbud.go.id/profil\\_pendidikan/profil-wilayah.php](https://pusmendik.kemdikbud.go.id/profil_pendidikan/profil-wilayah.php).
- Koentjaraningrat (2000). *Kebudayaan, Mentalitas Dan Pembangunan*. PT Gramedia: Jakarta.
- Mania, Sitti, and Samsu Alam (2021). *"Teachers' Perception toward the Use of Ethnomathematics Approach in Teaching Math."* International Journal of Education in Mathematics, Science and Technology 9, no. 2: 282–98. <https://doi.org/10.46328/IJEMST.1551>.
- Muhaimin, A. M., & Mudzakkir, J. (2005). *Kawasan dan Wawasan Studi Islam*. Jakarta: Kencana.
- Nio, T. H., Sukestiyarno, Y. L., Waluya, B., Rochmad, I., & Manullang, B. (2017). *Study on Critical Thinking Skills Basic Prospective Students Primary School Teacher*. International Journal of Contemporary Applied Sciences, 4(1), 2308-1365.
- Nuh, Z. M., & Dardiri, D. (2017). *Etnomatematika dalam sistem pembilangan pada masyarakat Melayu Riau*. Kutubkhanah, 19(2), 220-238.
- Putrawangsa, S. (2018). *Desain pembelajaran: Design research sebagai pendekatan desain pembelajaran*. CV. Reka Karya Amerta.
- Putri, L. I. (2017). *Eksplorasi etnomatematika kesenian rebana sebagai sumber belajar matematika pada jenjang MI*. Jurnal Ilmiah pendidikan dasar, 4(1).
- Rahmawati, F. D. (2017). *Pengembangan Bahan Ajar Berbasis Etnomatematika untuk Meningkatkan Prestasi dan Motivasi Belajar Siswa SMP*. Jurnal Pedagogi Matematika, 6(6), 69-76.
- Rahmawati, Y., & Muchlian, M. (2019). *Eksplorasi etnomatematika rumah gadang minangkabau Sumatera Barat*. Jurnal Analisa, 5(2), 123-136.
- Richmond, R. (2012). *Desain model pengembangan perangkat pembelajaran matematika*. Kreano, Jurnal Matematika Kreatif-Inovatif, 3(1), 59-72.
- Sa'adah, R. N. (2021). *Metode Penelitian R&D (Research and Development) Kajian Teoretis dan Aplikatif*. CV Literasi Nusantara Abadi.

- Setyosari, P. (2013). *Metode penelitian pengembangan*. Jakarta: Kencana.
- Snounu, Y. (2019). *Defying Exclusionary Democracy through Resilience in Palestinian Higher Education*". *Journal of Culture and Values in Education*, 2(3), 61–78.
- Sofyana, A. U. (2013). *Profil keterampilan geometri siswa SMP dalam memecahkan masalah geometri berdasarkan level perkembangan berfikir Van Hiele*. *MATHEdunesa*, 2(1).
- Sugiyono (2011). *Metode Penelitian Kuantitatif, Kualitatif Dan R&D*. Alfabeta: Jakarta.
- Thiagarajan, S. (1974). *Instructional development for training teachers of exceptional children: A sourcebook*.
- Waryanto, N. H. (2006). *Online learning sebagai salah satu inovasi pembelajaran*. *Pythagoras*, 2(1), 10-23.
- Wijayanto, Z. (2017). *Pengembangan perangkat pembelajaran matematika berbasis etnomatematika pada keraton yogyakarta*. *SOSIOHUMANIORA: Jurnal Ilmiah Ilmu Sosial Dan Humaniora*, 3(1).