Anatolian Journal of Education
e-ISSN: 2547-9652

April 2024 ● Vol.9, No.1
www.e-aje.net
pp. 69-80

Development of PBL STEM-Based Teaching Materials with Ethnomatematics Nuances for Students' Creative Thinking Ability

Abdil Munir Pangestu
Universitas Negeri Semarang, Indonesia, *abdilmunir91@students.unnes.ac.id*

Isti Hidayah
Universitas Negeri Semarang, Indonesia, *isti.hidayah@mail.unnes.ac.id*

The ability to think creatively is the ability to generate new ideas, innovative solutions, and unconventional thoughts in response to a situation or problem. Creative thinking involves many aspects, including imagination, association of ideas, mental flexibility, and views that are different from the usual. Creative thinking needs to be grown in students because creative thinking is very important in learning which will greatly assist students in solving problems with various solutions. The use of appropriate learning model equipment can support the development of students' critical thinking skills. One effort that can be done is to use innovative teaching materials that combine various activities to develop students' creative thinking abilities. The purpose of this study is to describe the process of developing STEM-based teaching materials with a problem-based learning model on three-dimensional material, namely distance. This study uses the development method or the Research and Development method, namely 4D (define, design, develop, disseminate) but is limited to the develop stage. The data analysis technique of this research uses descriptive analysis techniques both qualitatively and quantitatively. Data collection uses a feasibility validation sheet, readability and student response questionnaires. The results showed that the average score of the eligibility of teaching materials was 81.66% in the appropriate category, the average score of readability of teaching materials was 90% in the easy-to-understand category, and the average student response score to teaching materials was 99% with very good criteria. Thus, from this assessment it can be concluded that the teaching materials developed are feasible to use, easy to understand, and have a good response from students. The suggestions put forward are that other teachers/researchers are expected to be able to carry out the same research but develop teaching materials with different materials or abilities.

Keywords: teaching materials, problem based learning, STEM, ethnomatematics, creative thinking, thinking ability

INTRODUCTION

Education is key in preparing young people to face challenges and changes in the future. In this era of rapid technological development, students are required to have the ability to think creatively in order to compete and adapt to a constantly changing environment. However, there are still many problems faced by students in everyday life that can affect their creative thinking skills.

PBL is a learning approach that focuses on solving real problems in contests that are relevant to students' lives. In PBL, students are invited to identify, analyze, and solve problems actively and collaboratively. In the PBL approach, students are given complex questions or challenges that require critical thinking, in-depth analysis, and the ability to think creatively to find solutions. Students must seek information, conduct research, and integrate knowledge from various sources to find the best

Citation: Pangestu, A. M., & Hidayah, I. (2024). Development of PBL STEM-Based teaching materials with ethnomatematics nuances for students' creative thinking ability. *Anatolian Journal of Education*, 9(1), 69-80. https://doi.org/10.29333/aje.2024.915a

solution. During this process, students play an active role as independent learners while the teacher acts as a facilitator who guides and provides support.

The STEM (Science, Technology, Engineering, and Mathematics) approach is a learning strategy that integrates the four disciplines into one unit in an effort to teach science-based concepts and skills holistically. The main goal of this approach is to provide education that is relevant to the real world and teach students how to integrate knowledge and skills from various disciplines to solve complex real-life problems.

Ethnomatematics is an approach to learning mathematics that emphasizes the understanding and application of mathematical concepts in the cultural context of society. This approach views mathematics as a cultural product derived from the practices, knowledge, and perspectives of a particular society. Through ethnomathematics, students are invited to recognize, understand, use, and appreciate various ways to utilize mathematics from various cultures in their daily lives. This can increase students' interest in mathematics and help them to feel more connected to the learning material.

The ability to think creatively is the ability to generate new ideas, innovative solutions, and think "out of the box" to solve the problems at hand. This ability involves complex thinking processes, such as thinking flexibility, idea association, in-depth analysis, and the ability to see problems from multiple perspectives. The ability to think creatively is very important in an era that is all dynamic and complex, because it is able to produce innovations and better solutions.

One of the main problems faced by students is the lack of ability to think creatively in solving problems. Many students are accustomed to conventional learning and are fixated on existing mindsets. This makes it difficult for them to think out-of-the-box and come up with innovative solutions. In this context, the development of teaching materials that can stimulate creative thinking skills is very important.

In addition, students also often face difficulties in associating the material studied at school with their daily lives. They tend to see learning as something separate from the real world and less relevant to their needs and interests. As a result, students' learning motivation decreases and they find it difficult to understand the concepts taught in depth. Therefore, the ethnomathematics approach is an important aspect in the development of teaching materials related to cultural diversity. Ethnomatematics relates mathematics to the cultural context and everyday life of society. By integrating ethnomathematics in teaching materials, students can more easily associate mathematical concepts with the realities of their own culture, thus motivating them to be more interested and involved in learning.

Apart from these problems, there are still other problems faced by students, especially in the context of Indonesia which has cultural diversity. One of them is the lack of use of local culture in the learning process. Often, students know and learn cultures from abroad rather than their own local culture. This causes their understanding of their own culture to be limited. Ethnomatematics, which combines mathematics and culture, is an attractive alternative to address this problem.

In this context, the development of STEM (Science, Technology, Engineering, and Mathematics)-based PBL (Problem-Based Learning) teaching materials with ethnomathematics nuances can be an effective solution. PBL STEM is a learning approach that emphasizes solving real problems through collaboration and active student involvement. By integrating elements of local culture in learning mathematics, students can see the relationship between mathematical concepts and their own culture, thus increasing their understanding and interest in the lesson.

Although the PBL STEM approach promises to improve students' creative thinking abilities, its implementation does not always run smoothly. Some of the problems that may be encountered are (1) Lack of Cultural Integration in Learning: Often, learning mathematics in an ethnomathematics context

is not well integrated in the PBL STEM approach. As a result, students may miss opportunities to develop creativity and a deeper understanding of the relationship between mathematics and culture. (2) Teachers' Challenges in Dealing with Cultural Diversity: Teachers may face difficulties in dealing with the cultural diversity of students in the classroom. The PBL STEM approach with ethnomathematics nuances requires an in-depth understanding of the various cultures that exist in the classroom, so as to create an inclusive and supportive learning environment.

To overcome these problems, a holistic approach is needed that involves various related parties. Several solutions that can be implemented include: (1) Development of Relevant Teaching Materials, namely by developing teaching materials that integrate STEM PBL with relevant ethnomathematics nuances and arouse the interest of students from various cultural backgrounds. This can be done through cooperation between mathematicians, culture, and education. (2) Teacher Training: Teachers need to get the right training to be able to integrate the ethnomathematics approach in STEM PBL learning. This training should provide insight into cultural diversity, as well as strategies for creating an inclusive learning environment and encouraging student creativity. (3) Application of a Collaborative Approach: Involving various stakeholders, such as teachers, mathematicians, culture, and students, in the process of developing teaching materials and implementing the PBL STEM approach with ethnomathematics nuances. This collaboration can result in a richer approach and tailored to the needs of students

Previous research has shown that the use of PBL STEM-based teaching materials with ethnomathematics nuances can have a positive impact on students' creative thinking abilities. Learning that involves students actively and connects mathematical concepts with local cultural contexts can stimulate students' critical, innovative and creative thinking skills. Therefore, the development of teaching materials that combine STEM PBL and ethnomathematics needs to be carried out further to optimize students' potential in creative thinking.

In this study, the main objective was to develop PBL STEM-based teaching materials with ethnomathematics nuances on students' creative thinking abilities. To achieve the objectives of this research, the development of PBL STEM-based teaching materials with innovative and interesting ethnomathematics nuances will be carried out. These teaching materials will be designed taking into account the local cultural context, as well as integrating mathematical concepts with the context of students' daily lives. In addition, tests will be carried out on the teaching materials developed through a feasibility test, readability test, and student responses

With the results of this study it is hoped that it can contribute to the development of a learning approach that is more contextual and oriented towards empowering students. In addition, this research can also provide valuable information for educators in designing innovative and interesting teaching materials, and can improve students' creative thinking skills in the context of mathematics and culture. Through this research, it is also hoped that the PBL STEM approach with ethnomathematics nuances can be an effective alternative in improving mathematics learning in the future education era.

METHOD

This research uses Research and Development (R&D) type of research. The development of instructional media refers to the 4-D model developed by Thiagarajan, Semmel and Semmel (Rizki, S., & Linuhung, H. 2017). The flowchart of the 4D model used in the research uses images as shown below.

Figure 1
4D model stages
Source: Adapted by Rizki, S., & Linuhung, N. (2017)

Based on Figure 1, it can be modified and briefly described according to Efanudin, A.F. & Wibawa, S.C. (2017) that the define stage aims to establish and define the learning needs by analyzing the objectives and limitations of the material. There are 5 steps in this stage, namely Front-end Analysis, Student Analysis, Concept Analysis, Task Analysis, and Formulation of Learning Objectives.

The design stage aims to design the learning module, in which material arrangement, format selection, and the initial design called Draft 1 need to be prepared.

The develop stage aims to produce the final draft in the form of revised learning materials based on the validation by experts, students, and student responses. It is the development of PBL STEM learning materials on three-dimensional topics, specifically distance, which aims to facilitate students' creative thinking abilities. The research instruments used are validity validation sheets, readability validation sheets, and student response questionnaires. The analysis technique used is descriptive data related to the development process of teaching materials and the quality of teaching materials obtained from the research instruments. The data obtained in this study were analyzed using descriptive percentage techniques. The descriptive percentage technique is done by converting quantitative data into percentage form and then interpreting it with qualitative sentences. The formula used to process the data is as follows:

$$p = \frac{f}{N} x100\% \text{(Niam, M. A. (2020)}$$

Information:
p : percentage score
f : total score obtained
N : maximum number of scores

After obtaining data in the form of percentage scores, the next step is to convert the average scores, which are quantitative data from each aspect, into qualitative descriptive data based on the eligibility criteria for instructional materials according to Akbar in the research conducted by Kurjuriansah (2019), as shown in Table 1.

Table 1
Criteria for the feasibility level of teaching materials

Eligibility Level	Criteria
1 < score < 50	Not Worthy
50 < score < 70	Barely Worthy
70 < score < 85	Worthy
85 < score < 100	Highly Worthy

Readability Level Criteria of Teaching Materials according to Rankin and Culhane, as shown in Table 2.

Table 2
Readability level criteria of teaching materials

Eligibility Level	Criteria
$0 < \text{score} \leq 40$	Difficult to understand
$40 < \text{score} \leq 60$	Quite easy to understand
$60 < \text{score} \leq 100$	Easy to understand

Criteria for students' level of response to instructional materials, according to Sugiono, S.D., Ahied, M., Hadi, W.P., & Wulandari, A. Y. R. (2018), are shown in Table 3.

Table 3
Criteria for students' level of response to instructional materials

Eligibility Level	Criteria
$0 < \text{score} \leq 20$	Very less
$21 < \text{score} \leq 40$	Not enough
$41 < \text{score} \leq 60$	Enough
$61 < \text{score} \leq 80$	Good
$81 < \text{score} \leq 100$	Very good

FINDINGS

The product produced in this research is a PBL STEM teaching material on three-dimensional subjects, specifically distance, aimed at facilitating students' creative thinking abilities. The stages carried out are as follows: Define, Design, Develop.

Define

In this stage, the focus is on establishing and defining the learning needs by analyzing the objectives and limitations of the subject matter. This stage is conducted in several ways. Front-End Analysis, where the researchers view the teaching material as the primary source of learning in schools, thus needing to be developed to assist teachers in delivering the material concisely, clearly, and easily understandable for students. Student analysis reveals that students are more interested in using teaching materials with an ethnomathematics approach as it provides a non-monotonous learning experience in the classroom and is easier to comprehend compared to using other printed books. Furthermore, concept analysis shows that many students struggle with determining distances between points, point-to-line distances, and point-to-plane distances. The basic competencies that serve as the foundation for the development of this teaching material are as follows:

Table 4
Basic competencies and competency achievement ındicators

Basic competencies	Indicators of Competence Achievement
3.1 Describing distances in space (between points, points to lines, and points to planes)	3.1.1 describes the distance between point to point 3.1.2 describes the distance between points to lines 3.1.3 describes the distance between points to planes
4.1 Determine the distance in space (between points, point to line, and point to plane)	4.1.1 determine the distance between point to point 4.1.2 determine the distance between the points to the line 4.1.3 determine the distance between the point to the plane

Furthermore, an analysis of tasks was conducted to obtain questions or exercises as an evaluation tool used in developing teaching materials. The formulation of learning objectives resulted in the finding that the objectives to be achieved by the researcher should refer to learning indicators with a three-dimensional material dimension, namely distance. Based on this analysis, these teaching materials were developed for 12th-grade students on the topic of three-dimensional distance. The mathematics

media to be developed is the PBL STEM teaching material on the topic of three-dimensional distance, aiming to facilitate students' creative thinking abilities.

Design

The design phase contains the overall plan of activities to be carried out. The result of this phase is draft 1, which is the initial design of the teaching materials. The chosen media is the PBL STEM teaching material on the topic of three-dimensional distance, aiming to facilitate students' creative thinking abilities. The cover includes the title of the teaching material, a graphical image indicating that the teaching material is about the topic of distance in three dimensions, the concentration of the teaching material for 12th-grade high school students, and the identity of the holders of the teaching material (group members' names and student identification numbers). The design is created by considering the suitability of one color with another to make it visually appealing to students.

Figure 2
Product display draft 1

Development

The development stage will produce the final draft of the revised learning tool based on the validation from experts, readability (students), and student responses. The activities in this stage include revision 1, validation, revision 2, and the final product. Revision 1 is conducted after receiving feedback from the supervising lecturer (course lecturer) and discussing with colleagues about draft 1, resulting in draft 2 of the PBL STEM teaching material on the topic of three-dimensional measurements, specifically distance, aiming to facilitate students' creative thinking skills that are ready for validation. The following are the improvements made according to the review of draft 1.

Table 5
Improvements to Draft 1

Supervisor	Appraiser 1 (colleague)	Appraiser 2 (colleague)	Repair
The writing of equations needs to be improved	It's best not to make the background of the module dark because if you print it, the results won't be optimal	There still is some typos, can be scrutinized return	Fixed writing equations, changing the background color to bright and fixing typos and writing sentences
Insufficient emphasis on STEM integration	It is better if the module is made a little more colorful and cheerful in order to attract students' interest in reading because the target audience is students	Not suitable EYD writing	Features STEM integration, module color change and EYD custom fonts

Draft 2 in the form of developed and validated mathematics teaching materials. There are 3 characteristics in the validation process. Firstly, feasibility validation aims to assess the feasibility of the developed instructional material, namely PBL STEM teaching materials on three-dimensional topics, specifically distance, with the goal of facilitating students' creative thinking abilities. The validators consist of an ethnomathematics lecturer, two mathematics education lecturers, and three practitioners who are high school mathematics teachers. The feasibility validation results from the innovation of mathematics learning lecturer, two mathematics education lecturers, and practitioners can be seen in the following table.

Table 6
Validation results by experts and practitioners

		Name	Aspect Appropriateness Fill	Aspect Appropriateness Presentation	Aspect language	Aspects of Learning Innovation	Score
profession	Lecturer	Lecturer 1	78	47	44	22	79,59%
		Lecturer 2	80	53	45	22	83,33%
		Lecturer 3	74	48	43	24	78,75%
	Teacher	Teacher 1	79	48	46	23	81,66%
		Teacher 2	86	50	43	21	83,33%
		Teacher 3	78	51	47	24	83,33%
Amount							489,99%
Average							81,66%

Based on the validation results by the Ethnomathematics lecturer, two mathematics education lecturers, and practitioners, an average validation percentage of 81.66% was obtained, leading to the conclusion that the instructional material of PBL STEM on three-dimensional topics, specifically distance, aimed at facilitating students' creative thinking abilities, is suitable for use in mathematics learning. Secondly, readability validation aims to test the readability of the developed tool, which is the instructional material of PBL STEM on three-dimensional topics, specifically distance, with the purpose of facilitating students' creative thinking abilities. The assessors for readability validation consisted of five students from UNNES Mathematics Education Department. The readability validation results from the five UNNES Mathematics Education Department students can be seen in the following table.

Table 7
Readability validation results from users

No	Name	Study program	Assessment Aspects (10 questions)		Score
			Yes	No	
1	Student 1	Mathematics Education	9	1	90%
2	Student 2	Mathematics Education	9	1	90%
3	Student 3	Mathematics Education	8	2	90%
4	Student 4	Mathematics Education	9	1	90%
5	Student 5	Mathematics Education	9	1	90%
Amount					450%
Average					90%

Third, student response questionnaires aim to assess students' responses to the developed tool, which is the PBL STEM teaching material on the topic of three-dimensional space, specifically distance, with the goal of facilitating students' creative thinking abilities. The student response questionnaires were conducted with five students from senior high school (SMA)/vocational high school (MA) in grade XII. The results of the responses from these five SMA/MA students can be seen in the following table.

Table 8
Student response results

No	Name	School	Assessment aspect		Score
			Yes	No	
1	Student 1	State Senior High School 1 Wahau	20	-	100%
2	Student 2	Samarinda Melati Senior High School	19	1	95%
3	Student 3	State Senior High School 1 Wahau	20	-	100%
4	Student 4	Melati vocational high school Samarinda	20	-	100%
5	Student 5	State Senior High School 1 Wahau	20	-	100%
Jumlah					495%
Rata-rata					99%

Based on the students' response in the table above, the average of the fifth high school students' response is shown to be 99%. Therefore, it can be concluded that the students' response to the development of PBL STEM instructional materials on three-dimensional topics, specifically distance, aiming to facilitate students' creative thinking abilities, is excellent.

After the validation stage, input was obtained from expert validators, students, and university students, followed by the second revision stage. In this stage, a final draft development product was produced. The following are suggestions for improvements for draft 2.

Table 9
Suggestions for improvements for Draft 2

Evaluator	Before Revision	After Revision
Expert	Lack of consistency in the use of fontstyle in some parts There are enough typos to be quite annoying.	Equate usage and fontstyle in some parts There are quite a lot of typos so it's quite annoying Fix mistakes in typing
Practitioners	The color of the cover is made according to the needs so that when printed it does not produce dark colors.	Changing the appearance of the cover color to be brighter so that the results are good when printed
Student	In the concept section there are some that are unclear in direction and are able to make students confused in understanding the concept. Can be explained in more detail.	Explain in more detail related to the concept so that students can understand it well

Figure 3
Display on the final product

CONCLUSION, DISCUSSION AND SUGGESTIONS

Creative thinking includes the individual's ability to generate new ideas, innovative solutions, or approaches that have never been thought of before in dealing with certain problems or situations. Creative thinking involves imagination, free association, and problem solving with unconventional problems.

Talking about PBL STEM (Project-Based Learning Science, Technology, Engineering, and Mathematics), creative thinking is very important. Creative thinking skills enable students to face real-world challenges in original and adaptive ways. In an ethnomathematics context, where elements of local culture and traditions are integrated into learning mathematics, creative thinking also helps students to find connections between abstract mathematics and everyday life.

PBL STEM is a learning approach that involves students actively in real projects or challenges that require comprehensive problem solving. Through STEM PBL, students are invited to formulate questions, find solutions, and make decisions based on their acquired knowledge and skills. This encourages the development of creative thinking because students are faced with real situations that require innovation and a creative approach in solving problems

The integration of ethnomathematics in teaching materials provides cultural nuances and local values into mathematics learning. By using an ethnomathematics context, students are faced with problems related to everyday life and local wisdom. This creates opportunities for students to think creatively in finding new ways of dealing with math problems in their own cultural context.

Strategies to Develop Creative Thinking in Learning: (1) Imagination Stimulation: Encourage students to imagine and think out-of-the-box through open-ended questions and unusual assignments. (2) Promotion of Openness: Create a supportive classroom environment, where students feel comfortable sharing ideas and creative solutions without fear of being wrong. (3) Brainstorming: Invite students to collaborate in brainstorming sessions to find creative and innovative solutions. (4) Giving Challenges: Give assignments or projects that require creative problem solving, by giving

students the freedom to find their own approaches. (5) Positive Evaluation: Appreciate and appreciate every effort and creative idea produced by students, even if they are not perfect.

Mathematics education has evolved from a traditional approach focused on imparting knowledge to students to a more interactive approach that encourages students to think creatively. One of the interesting approaches to teaching mathematics is the STEM Project-Based Learning (PBL) which integrates the concepts of science, technology, engineering, and mathematics into real-life contexts. In this context, the application of ethnomathematics in teaching mathematics can provide a rich learning experience that is relevant to the culture and everyday life of students. This article discusses the development of PBL STEM-based teaching materials with ethnomathematics nuances and their impact on students' creative thinking skills.

STEM Project-Based Learning (PBL) is a project-centered learning approach, in which students are presented with real challenges, problems, or projects that encourage them to develop knowledge, skills, and understanding through practical and collaborative activities. PBL STEM integrates the concepts of science, technology, engineering, and mathematics, so students can experience contextual and solution-oriented learning.

Ethnomatematics is an approach to learning mathematics that considers cultural aspects and the use of mathematics in cultural contexts. In ethnomathematics learning, students are invited to understand how to think and use mathematics in everyday life and to analyze the role of culture in the development of mathematical concepts.

The development of PBL STEM-based teaching materials with ethnomathematics nuances involves a design process that includes selecting topics that are relevant to student culture, identifying interesting problems, developing activities and projects that require the application of mathematical concepts, and assessments according to learning objectives. Ethno-mathematical nuances can be incorporated through the use of examples or case studies related to the culture, traditions or mathematical practices of various groups of people.

The development of PBL STEM-based teaching materials with ethnomathematics nuances can have a positive impact on students' creative thinking abilities. Through challenging and contextual projects, students are exposed to problems that require creative thinking and innovative solutions. The involvement of students in collaborative and exploratory activities can stimulate their creative thinking skills, such as the ability to think divergently, the ability to connect concepts, and the ability to see problems from various perspectives.

The results showed that the average score of the eligibility of teaching materials was 81.66% in the appropriate category, the average score of readability of teaching materials was 90% in the easy-to-understand category, and the average student response score to teaching materials was 99% with very good criteria. Thus, from this assessment it can be concluded that the teaching materials developed are feasible to use, easy to understand, and have a good response from students.

From the quotation above, it can be seen that the development of PBL STEM teaching materials on three-dimensional material, namely distance, which aims to facilitate students' creative thinking abilities is quite feasible, the readability level is easily understood by students, and the student response rate is very good. Therefore, the device that has been developed is ready to be used for class XII SMA/MA level students.

Previous research has been carried out with the aim of finding maximum results for developing the level of education in an area, such as research that has been carried out by (Tua Halomoan Harahap, et al) with the title "Development of Problem-Based Teaching Materials Against Mathematical Creative Thinking Ability" which results in these teaching materials being suitable for use in classroom learning.

From some of the quotations above, it can be concluded that the development of innovative ethnomathematics nuanced teaching materials can help develop students' creative thinking skills in solving problems and assisting the teaching and learning process in class.

The suggestions put forward are that other teachers/researchers are expected to be able to carry out the same research but develop teaching materials with different materials or abilities

REFERENCES

Faturochman. (2017). Etnomatematika sebagai pendekatan pendidikan matematika untuk mengoptimalkan kearifan lokal. *Eduhumaniora, 4*(3), 216-225.

Junaedi, I., Rohaeti, E., & Sujadi, I. (2019). Etnomatematika dalam pembelajaran matematika di sekolah dasar. *Jurnal Riset Pendidikan Matematika, 6*(1), 1-12.

Hassan, Z., Azmi, A., & Ayub, A. F. M. (2021). The effectiveness of problem-based learning (PBL) in enhancing critical thinking skills among engineering students. *Journal of Engineering Science and Technology, 16*(2), 950-967.

Haryanto, A., & Kurniasih, A. W. (2018). Pembelajaran matematika berbasis budaya di sekolah dasar. *Jurnal Bimbingan Konseling, 7*(2), 56-63.

Suparman, M. A., & Rosita, S. (2018). Pengaruh pembelajaran berbasis masalah terhadap kemampuan berpikir kreatif matematika ditinjau dari gaya kognitif siswa. *Jurnal Pendidikan Matematika, 12*(2), 112-126.

Kurniawan, A., & Karyanto, P. (2020). Pengembangan perangkat pembelajaran IPA terpadu berbasis STEM bermuatan karakter untuk meningkatkan kemampuan berpikir kreatif siswa SMP. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan, 5*(1), 36-46.

Sumarmo, U. (2019). Memahami Pembelajaran Kreatif Inovatif. Bandung: PT Remaja Rosdakarya.

Syah, M. (2015). *Psikologi pendidikan dengan pendekatan baru*. Bandung: PT Remaja Rosdakarya.

Jupri, A. (2014). Etnomatematika dalam pembelajaran matematika realistik. *Infinity Journal, 3*(1), 61-70.

NCTM. (2000). *Principles and standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics.

Prahmana, R. C. I., & Suwarsono, S. T. (2017). Etnomatematika: Peluang, tantangan, dan permasalahannya dalam pembelajaran matematika. *Jurnal Riset Pendidikan Matematika, 4*(2), 153-166.

Putra, N., & Hermawan, H. (2020). Penerapan pendekatan pembelajaran saintifik dalam meningkatkan kemampuan berpikir kreatif siswa. *Jurnal Inovasi Pendidikan Kimia, 14*(1), 73-84.

Sadikin, A., & Budayasa, I. K. (2015). Peningkatan kemampuan pemecahan masalah matematika melalui pendekatan pendidikan matematika realistik. *Jurnal Penelitian dan Pembelajaran Matematika, 8*(2), 142-150.

Siswono, T. Y. E., & Syaodih, E. (2016). Pendidikan matematika realistik untuk mengembangkan kemampuan berpikir kreatif siswa. *Eduma: Mathematics Education Learning and Teaching, 5*(2), 99-112.

Supriadi, D. (2019). Pengembangan bahan ajar matematika realistik berbasis etnomatematika untuk meningkatkan kemampuan pemecahan masalah siswa. *Journal on Education, 4*(2), 1-9.

Ulya, R. (2017). Pengembangan bahan ajar berbasis etnomatematika pada materi perbandingan. *Jurnal Riset Pendidikan Matematika, 4*(2), 189-199.

Utomo, S. B., & Aminah, N. S. (2020). Etnomatematika sebagai sarana peningkatan kreativitas dalam pembelajaran matematika. *Journal of Research and Advances in Mathematics Education, 4*(2), 193-202.

Widodo, S. A., & Riyanto, H. (2017). Pengembangan bahan ajar matematika realistik berbasis etnomatematika pada materi pokok sistem persamaan linear dua variabel. *Jurnal Riset Pendidikan Matematika, 4*(2), 183-188.