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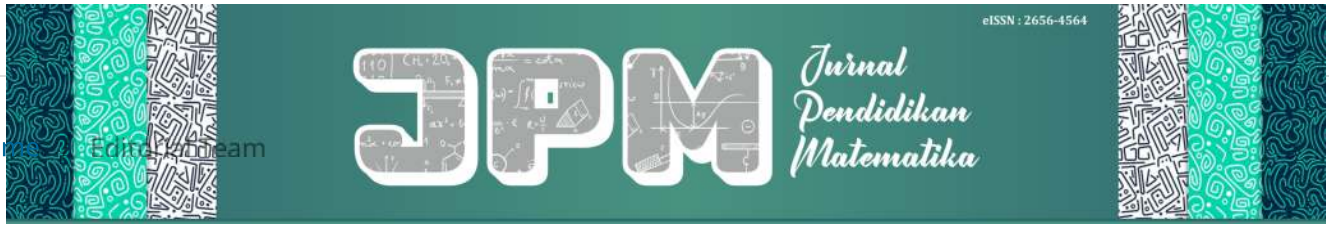

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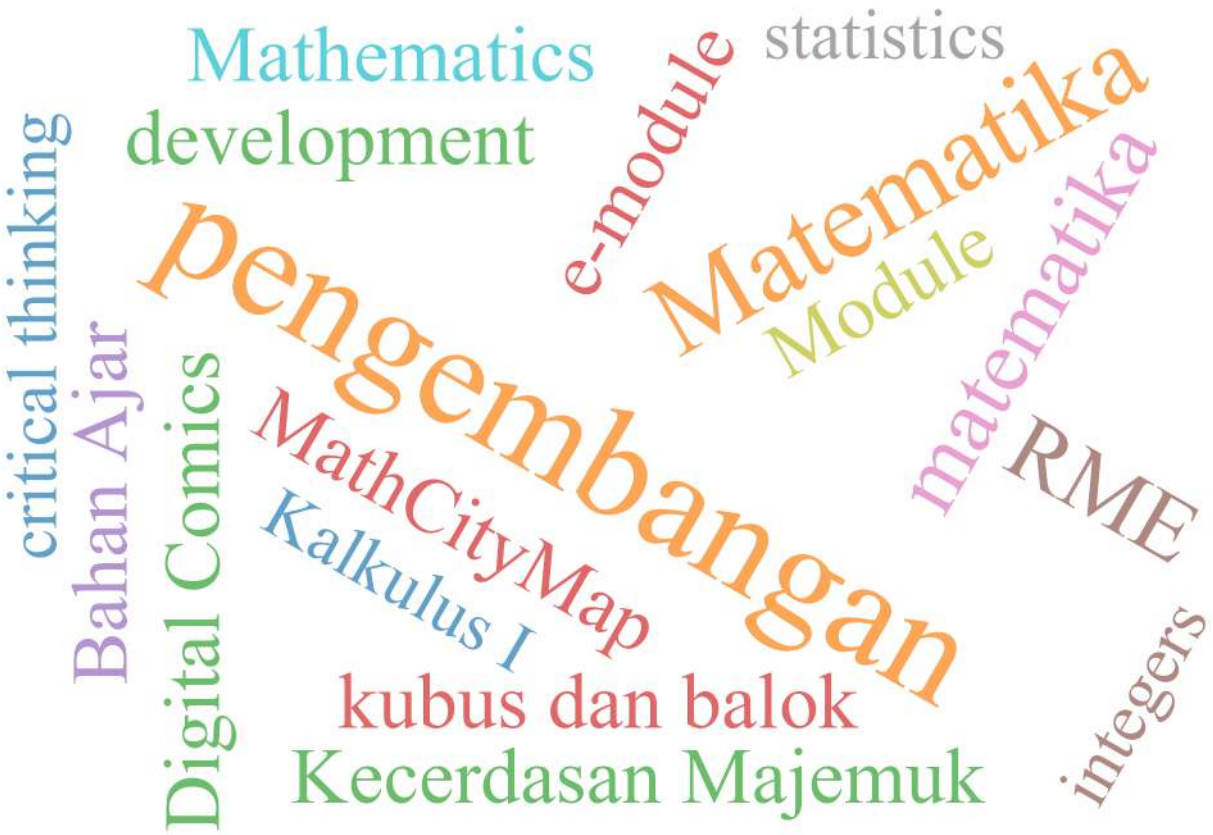
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Vol. 10 No. 2 (2024): Jurnal Pendidikan Matematika (JPM)

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Articles

The Development of Mathematics Learning Methods Through E-Learning Media in SMP Amir Hamzah Medan

Muhammad Arif Hidayat, Sekolah Tinggi Agama Islam Jam'Iyah Mahmudiyah, Indonesia
Marhan Hasibuan, Sekolah Tinggi Agama Islam Jam'Iyah Mahmudiyah, Indonesia
98-105

PDF

DOI : https://doi.org/10.33474/jpm.v10i2.21665

15

Interactive Learnıng Media Development Math Case Based on Scratch Triangle and Parallelogram Grade V Elementary School

Nabilah Az-zahrah, Universitas Mulawarman, Indonesia
Sukriadi, Universitas Mulawarman, Indonesia
Andi Asrafiani Arafah, Universitas Mulawarman, Indonesia
Muhlis, Universitas Mulawarman, Indonesia
Hety Diana Septika, Universitas Mulawarman, Indonesia
Rosita Putri Rahmi, Universitas Mulawarman, Indonesia
106-116

PDF

DOI : https://doi.org/10.33474/jpm.v10i2.21953

14

An Analysis of Adaptive Reasoning Ability in Middle School Students Mathematics Learning

Dela Amelia Putri, Universitas Singaperbangsa Karawang, Indonesia
Attin Warmi, Universitas Singaperbangsa Karawang, Indonesia
117-125

PDF

DOI : https://doi.org/10.33474/jpm.v10i2.21981

13

The Influence of the Jarimatika Method Using Papet Media on the Multiplication Learning Outcomes of Grade 4 Elementary School Students

Alfina Shofiyana Damayanti, Universitas Islam Nahdlatul Ulama Jepara, Indonesia
Erna Zumrotun, Universitas Islam Nahdlatul Ulama Jepara, Indonesia

Wulan Sutriyani, Universitas Islam Nahdlatul Ulama Jepara, Indonesia
126-135

PDF

DOI : https://doi.org/10.33474/jpm.v10i2.22111

8

Ethnomathematics Exploration of Multiplying and Measuring Activities on The Dome of The Great Mosque of Baitul Hakim Madiun City

Ainun Fisabilillah, Universitas PGRI Madiun, Indonesia
Ika Krisdiana, Universitas PGRI Madiun, Indonesia
Indra Puji Astuti, Universitas PGRI Madiun, Indonesia
136-146

PDF

DOI : https://doi.org/10.33474/jpm.v10i2.22113

7

Development of Problem-Based Learning-Based Modules on Sequence and Series Material for Grade XI at SMA Negeri Semangus

Ririn Saryani, Universitas PGRI Silampari, Indonesia
Nur Fitriyana, Universitas PGRI Silampari, Indonesia
As Elly, Universitas PGRI Silampari, Indonesia
147-159

PDF

DOI : https://doi.org/10.33474/jpm.v10i2.22097

11

The Effect of Using Quizwhizzer Application on Learning Outcomes of Grade VII Junior High School Students on Pythagoras Theorem Material

Hazim Saputra Filia Reza, Universitas Negeri Padang, Indonesia
Intan Maharani, Universitas Negeri Padang, Indonesia
Agitha Amy Meiwari, Universitas Negeri Padang, Indonesia
Reasty Amanda, Universitas Negeri Padang, Indonesia
Fridgo Tasman, Universitas Negeri Padang, Indonesia
160-167

PDF

DOI : https://doi.org/10.33474/jpm.v10i2.22028

61

Development of Mathematics Learning Activities Using Mathcitymap at Sindu Kusuma Edupark to Learn Contextual Problem-Solving

Azkia Martiana Winarning Tyas, Universitas Sanata Dharma, Indonesia
Aurelia Herningtyas Ayu Putri Cahyanti, Universitas Sanata Dharma, Indonesia
Marcellinus Andy Rudhito, Universitas Sanata Dharma, Indonesia
168-184

PDF

DOI : https://doi.org/10.33474/jpm.v10i2.22225

29

Increasing Students' Activity and Understanding of Concepts in Mathematics Learning Using Lesson Study-Based PBL

Puspitaningrum Ayu Rahmadhani, Veteran Bangun Nusantara University, Indonesia
Isna Farahsanti, Veteran Bangun Nusantara University, Indonesia
Edi Ariyanto, Veteran 1 High School Sukoharjo, Indonesia
185-191

PDF

DOI : https://doi.org/10.33474/jpm.v10i2.21867

41

Improving Students' Critical Thinking Skills in Learning Mathematics Using Problem Posing Approach

Pradnya Paramitha Solikhah, Universitas Negeri Surabaya, Indonesia
Abdul Haris Rosyidi, Universitas Negeri Surabaya, Indonesia
Endang Yayuk Sri Widiastuti, SMPN 2 Candi, Indonesia

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DEVELOPMENT OF MATHEMATICS LEARNING ACTIVITIES USING *MATHCITYMAP* AT *SINDU KUSUMA EDUPARK* TO LEARN CONTEXTUAL PROBLEM-SOLVING

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ABSTRACT

Contextual problem-solving abilities are very much needed in processes in the 21st-century era and can be done by providing meaningful experiences. This can also be called Outdoor Learning, namely involving students directly in the learning object. One application that can help learning outside the classroom is *MathCityMap*. This research raises the context of using ethnomathematics-based *MathCityMap* located at Sindu Kusuma Edupark. Sindu Kusuma Edupark is an educational tourist attraction located in Sleman, Yogyakarta. This research aims to develop students' contextual problem-solving abilities in mathematics learning using the *MathCityMap* application at the junior high school level. This research uses a type of development research called Research and Development (R&D). The method in this research refers to the 4D method which consists of 4 stages: definition, design, development, and dissemination. The results of this research are a series of learning activities using the *MathCityMap* application in the context of the Sindu Kusuma Edupark tourist attraction which colleagues have tested. The average assessment result is 80.5% with the feasible category. Based on these results, it was concluded that the *MathCityMap* activity developed by this researcher could be implemented in mathematics learning.

Keywords: *Development, Learning Activities, Ethnomathematics, MathCityMap.*

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INTRODUCTION

Mathematics is one of the parts important in knowledge learning (Yuniarti, Sulasmini, Rahmadhani, Rohaeti, & Fitriani, 2018). This matter is supported by Wiliawanto (2019) who stated that if reviewed from classification in fields knowledge, mathematics is classified as knowledge exact that is a science based on accurate measurements. Therefore, deep learning mathematics needs more understanding, not just memorizing. Using problem contextualization is one possible way to become an alternative to help students understand material mathematics. Mustamine Anggo (2011) stated that through the use of problem contextual students are trained to think more complexly because involves formal and informal knowledge as well as reasoning mathematics.

Participants must have students as part of the basic competencies for 21st century mathematics learning, namely problem-solving abilities (Dirmansyah, 2023). Problem-*solving abilities* are the participant's ability students to collect data, process information, and use complex logic and creativity to find effective solutions or strategies to solve the problems they face (Attri, 2018). Branca (1980) confirms that the ability *to problem*-solve is important owned by students' reason 1) *problem-solving* is an ability fundamental in learning mathematics, 2) *problem-solving* consists of methods, procedures, and strategies that are part of the curriculum learning mathematics, 3) *problem-solving* is the core and essence from learning mathematics.

Contextual problems are mathematical problems related to context, in this case, the context taken is something real, that can be seen/observed, and is close to the participants' lives. education (Rizki, 2018). Contextual problems are selected for participants Students can relate the knowledge they have gained to events in the real world so that participants Students can better understand and apply the knowledge they have learned (Alfiyah, 2018). Apart from that, learning mathematics by raising contextual problems also aims to prepare participants educated in facing real-world challenges and developing participants' creativity educate and hone *problem solving skills*. This is in line with Elita, et al (2019) who stated that participants Students can apply mathematics learning to their lives Students can solve a problem with the knowledge that the participants already have educated. One effort that teachers can make to apply contextual problem-based mathematics learning is to use learning outside the classroom or *outdoor learning* (Setiyorini, 2018). By involving participants students directly in mathematics activities in outdoor environments, it is hoped that students can better understand appropriate contextual problems so that they can improve their ability to solve contextual problems Zulqarnain, M (2022).

Rofiudin and Anisa (2016) said that utilizing method learning *outdoor learning* will maximize the learning process because can utilize the environment as a medium for learning and provide an experience where participants will study utilizing the environment as a learning medium so that no bored inside class. The same thing was also conveyed by Yesi Lintang Setyani and Amidi (2022), the process of teaching and learning in an *outdoor way learning* that can make participants students develop more through exploration because the participants students are directly involved in the objects they encounter, for example measuring and calculating the area in a park or open space. *Outdoor learning* activities can be done anywhere, such as around schools, in museums, or even at tourist attractions. This learning is also called ethnomathematics. According to d'Ambrosio (1985), Ethnomathematics is a research model that studies mathematical elements in a society's traditions, which consist of history and philosophy to explore certain mathematical concepts in that group and implement them in the mathematics learning process. In other words, Ethnomathematics is a science that studies the relationship between mathematics and the culture, traditions, and way of thinking of a particular society or ethnic group.

In this research, the researcher wants to link the elements of ethnomathematics in one of the tourist attractions in Yogyakarta, namely Sindu Kusuma Edupark, with the *MathCityMap application*. Sindu Kusuma Edupark is a tourist and educational destination located in Sinduadi, Mlati, Sleman, Yogyakarta. There are several rides such as *Cakramanggilingan, Candiborobudur Miniature, Mabur Chair, Omah Batik and Tempoe Doloe Toys, Montor Mabur*, and many more. Researchers chose this place because this recreation area is not just a playground but also has an educational theme. This is also in line with Prima Cristi Crismono (2017) who said that one of the learning methods that can be used is *outdoor Learning* aimed at making participants Students can carry out the learning process outside and are more able to

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use real media around the environment as contextual learning. This can be seen in several rides or attractions that use educational concepts. Learning objectives can be achieved by involving participants to educate directly. This is in line with the statement of Siti Komariyah and Fatmala Nur Laili (2018), which states that in order for learning objectives to be achieved, teachers can help the students to understand concepts by maximizing thinking abilities.

In this research too, researchers focused more on abilities of students to solve contextual mathematical problems using the RME *(Realistic)* approach *to Mathematics Education)* especially on geometry, distance, and systems of linear equations in two variables. This was done because several journals had been found by researchers and saw in real situations the participants' abilities students in solving mathematical problems were still relatively low. So it is hoped that using the *MathCityMap* application can help the students to improve their solving abilities problem the students with approach contextual and realistic. According to (Ismaya et al., 2018), *MathCityMap* is an Android/*IOS-based application* that utilizes GPS. *MathCityMap* will direct students to locations where there are mathematical problems that students must work on in the *Math Trail system.* By using the *MathCityMap application,* it is hoped that the students will be more interested in learning mathematics which is created using concepts from the Sindu Kusuma Edupark playground. The use of *MathCityMap* also uses the *Realistic Mathematics Education* (RME) method.

The aim of this research is to develop mathematics learning activities that can improve students' *problem-solving abilities* using *MathCityMap media* in the context of the Sindu Kusuma Edupark playground and evaluate the results of peer validation of the media that has been developed.

METHOD

This research is *R&D research (Research and Development)* which uses the 4D method. W. Ririn., etc (2020) said that in the 4D method (*Four D* Model) consists of several stages, namely definition, design, development, and deployment. In the first stage, namely the definition stage, researchers collected information from the internet about *Sindu Kusuma Edupark* and made direct visits to the location. Then the researchers presented it using the *MathCityMap application*. The second stage is design, the researcher designs activities using *MathCityMap* and teaching materials presented in *Canva* by adapting to the school level towards the intended target, namely for participants. junior high school student. The third stage is *development*, namely researchers validate individuals who study mathematics. The purpose of this validation is that *the MathCityMap* created by researchers is proven to be valid for use inside learning. The researcher only reached the third stage because the researcher's focus was on creating the *MathCityMap application* but not on its implementation and evaluation. Apart from that, it does not carry out direct implementation to participants' students due to limited time from researchers.

In product development, peer assessments are carried out based on 8 aspects of assessment from an expert, namely, suitability of the activity being developed with the competency indicators to be achieved, commands (language) in the activity, the time needed to complete the activity, applications used to support the implementation of the activity. , whether the instructions or assistance provided are able to help the students when facing difficulties, clarity of signs given, development of learning activities, and enjoyment in learning activities.

Assessment is carried out using *peer teaching activities*. Validators carry out assessments in *the Learning Management System* (LMS) with assessment information 1 to 5 where 1 means

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very poor, 2 means poor, 3 means average, 4 means good, and 5 means very good. It is hoped that the assessment of this product will provide criticism or suggestions that the author can use as material for reflection to improve the final product.

Assessment analysis is obtained by processing data assisted by the *Microsoft Excel application* to find the average value using *a tool* called *average*.

RESULTS

This research is aimed at developing ethnomathematics-based mathematics learning activities with the help of the *MathCityMap application* at Sindu Kusuma Edupark. The learning will be structured to improve students' abilities in solving specific problems contextually. By using the 4D method, the author obtained analysis results in the form of:

1. **Definition Stage**

   MathCityMap analysis

   MathCityMap is an application that can be used for learning mathematics by utilizing the surrounding environment for the learning process. Educators can provide contextual questions by utilizing several points. In working on questions, participants Students must download the *MathCityMap application* first. Then, in the process of solving problems, direct measurements can be carried out so that the students can experience things directly. In solving participant problems Go to the appropriate location as shown on *MathCityMap*

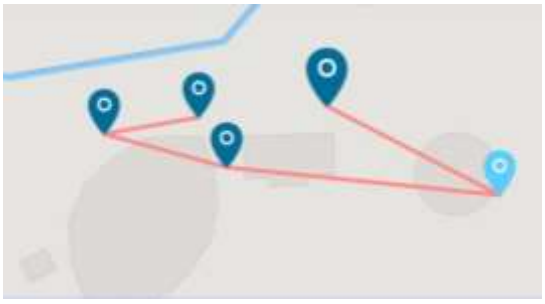
   Analysis of Sindu Kusuma Edupark

   Sindu Kusuma Edupark (SKE) is an educational tourist park in Yogyakarta. At this location, each place has an educational element. Researchers visited directly to find out the places and facilities that could be used to carry out this research process. There are 17 rides at SKE and visitors do not need to pay to be able to enjoy all the rides. Payment can be made according to the rides that visitors want to enjoy. However, before paying for each ride, you must first pay the entrance ticket outside. Researchers choose vehicles not haphazardly because they always think about the appropriate problem context for participants to solve middle school level education.

2. **Design Stage**

   2.1. Location Determination

   In this research, researchers developed the *MathCityMap application* as a learning activity. The selected location object is SKE. This activity was created by the researcher for the students at the junior high school (SMP) level. In this activity, there were 5 locations chosen as stopping points for participants. The students carried out activities, namely, the ticket purchase counter, the Manggilingan Cakra Ferris Wheel, the fish therapy pool, lights in the back garden area, and photo spots in the SKE back garden area. The selected location is adjusted and arranged in such a way that students travel in one direction, but students can also start from any location.



Picture 1. Initial view *of MathCityMap*

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2.2. Material Determination

Researchers determine interesting locations and connect each location to contextual problems. The 1st location is a place to buy tickets and is used for SPLDV material. The 2nd location is the iconic place of SKE, namely the large Ferris wheel with the name Cakra Manggilingan. The author uses this location to create problems regarding distance, speed, and time. The 3rd location is a fish therapy pond so it can be used for questions related to plane geometry, namely ceramic tiles. The activity in the 4th location is the lights in the back garden. *The lights* at this location look interesting and contextual problems can be created based on spatial geometry, specifically the area of the tube cover. The final location is a photo spot in the back-garden area which discusses geometry.

In the first illustration, there is an initial display for carrying out *MathCityMap activities* that have been developed by researchers. When students want to join in this activity, they need to download the *MathCityMap application* first and enter the code 2520520. With this code, students will be directed to the activity that has been prepared. The questions that have been prepared in the application are designed to improve problem solving abilities. Through the five points in *MathCityMap*, it is hoped that it can improve students' contextual problem-solving abilities.

No	Material	Competency Indicators
1	SPLDV	Resolving SPLDV problems related to contextual problems.
2	Distance, Speed, Time	Solve problems related to speed, distance, and time.
3	Plane Geometry	Solve problems related to plane geometry.
4	Space Geometry	Solving problems related to building space.
5	Plane Geometry	Solve plane geometry problems related to contextual problems.

3. Development Stage

Below are five activities that have been created by researchers using the *MathCityMap application* at Sindu Kusuma Edupark.

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Picture 2. Activity 1

In activity 1, students must go to the ticket counter location. The problem taken by the researcher is related to the System of Linear Equations in Two Variables (SPLDV) with more than one answer. The problems presented are also contextual problems related to the activities that will be carried out at Sindu Kusuma Edupark. Each activity is also given an image that corresponds to the location so that students can easily find the location point.

Picture 3. Activity 2

Activity 2 is at the Cakra Manggilingan location which is the main icon of Sindu Kusuma Edupark. In carrying out this activity, students are expected to use a *stopwatch*. In this activity, the height of the Ferris wheel is known. Students are asked to find the speed of the Manggilingan Chakra. However, to be able to solve it, you have to find the distance traveled by using the circumference of the circle and the time taken to arrive at the original place. Students can do activity 2 by riding a ride so they can see the beauty of the area around Sindu Kusuma Edupark. While waiting for the Ferris wheel to finish turning one round, students can enjoy the beauty around SKE by taking photos.

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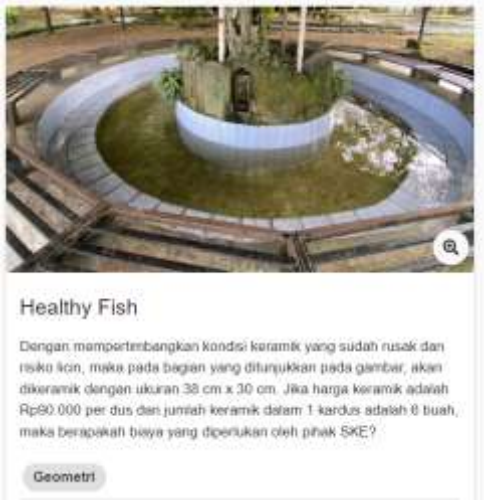

Picture 4 . Activity 3

The third activity is related to tiling the floor. This activity is found in fish ponds, specifically fish therapy ponds. Students can carry out activities using measuring tools, namely measuring tape. The problems presented are contextual problems and students are not given detailed instructions. The instructions given are only a trigger so that students can think critically and discover problem solutions. Completion problem This can done by looking for wide ceramic with an outer diameter pool reduced with wide ceramic with an inner diameter.

Picture 5. Activity 4

The next activity is activity 4. Students are asked to walk to the backyard and observe a cone-shaped object. The problems given are contextual problems. Researchers present problems related to spatial geometry, namely conical shapes. Participants ' expectations Students can solve it using the cone blanket formula.

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Penjaga

Pada halaman belakang, terdapat spot foto dengan ikon guci. Guci tersebut terbuat dari tanah liat. Apabila orang menyentuhnya riskan untuk jatuh. Oleh sebab itu, disekeliling ikon guci tersebut dibuat pagar membentuk persegi panjang seperti pada gambar. Akan tetapi, karena pagar besi tersebut sudah mulai berkarat maka akan diganti dengan yang baru.
Setiap 3,375 m pada sisi panjangnya akan diberikan tiang vertikal sepanjang 1 m. Begitu juga pada setiap 2,13 m pada sisi lebarnya akan diberikan tiang vertikal sepanjang 1 m.
Jika setiap 1 m besi akan dikenakan harga Rp30.000 berapakah biaya yang dibutuhkan untuk memasang pagar?

Picture 6. Activity 5

In the last activity, there were problems related to geometry material. The problem is about building a fence in the backyard of Sindu Kusuma Edupark. In the park, there is a Gucci surrounded by red grass. To avoid being stepped on by visitors, the researchers created contextual problems by combining existing problems around them. This ability can see students' ability to think critically as well as look for a solution in a way mathematical to solve the

problem. The following is a display of teaching materials for carrying out Sindu Kusuma Edupark activities.

Picture 7. Initial display of teaching materials.

In the initial display, the cover, learning objectives, and instructions for using teaching materials are presented. This activity aims to improve students' ability to solve problems problem contextually using *MathCityMap media* in the context of the SKE playground. *Outdoor Learning* is used by researchers to support activities in the

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MathCityMap application. In the teaching materials display, instructions for using the teaching materials are also presented to the participants Students are asked to form groups of 3-4 people. Then solve the problem, and finally, hold a joint discussion by discussing the answers from several groups regarding the activities that have been completed by the participants.

Picture 8. Activity flow.

The activities presented by the researcher are written at the beginning. This learning provides activities called did you know, let's go on an adventure, let's discuss, and let's reflect. In the 'did you know' activities, interesting facts about SKE are presented that participants can read and educate.

Picture 9. Let's go on an adventure.

In the let's go on an adventure activity, more detailed instructions for use are presented, namely you are asked to download *MathCityMap* and write the code to enter the activity. Then to solve the problem, participants Students are asked to write down the steps from the participants' answers students so that they can be discussed in the let's discuss activity.

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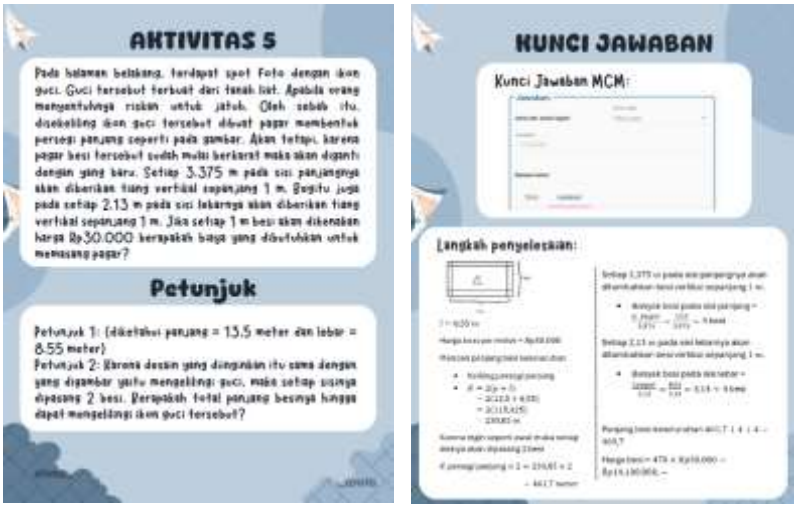
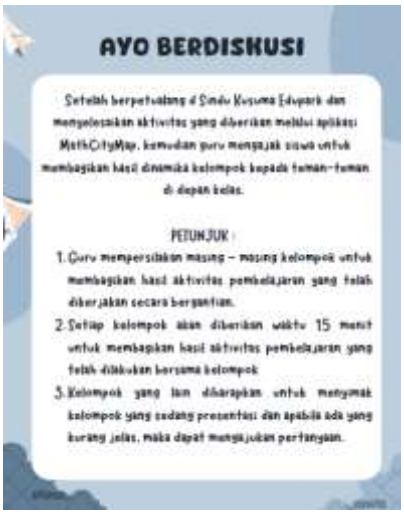


Picture 10. Let's go on an adventure activity display.

Let's go on an adventure is an activity that must be done by the students. This activity consists of 5 activities. Then in the teaching materials, the teacher is presented with instructions for completing the activity, answer keys, and completion steps. This is to make it easier for teachers to give directions to the students. Instructions, answer keys, and problem solutions are also available in the activities on *MathCityMap.*



Picture 11. Let's discuss

Discussion activities are carried out at the end of the lesson after the students complete all activities. A total of 5 groups were asked to make presentations by discussing the solutions to the questions that had been completed. Each group only discusses 1 question, then other groups can pay attention, ask questions, or respond to the answers from the group that is presenting. Finally, the teacher can confirm the correct answer.

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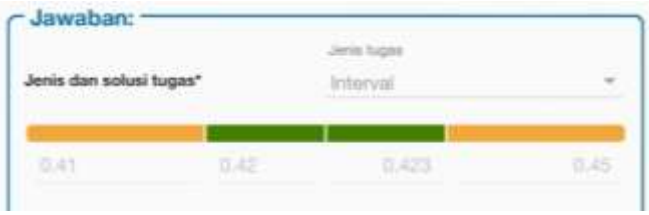
Picture 12. Come on, reflect.

Before ending the settlement, the students can reflect by scanning barcodes. This was done to find out the students' feelings while studying and provide evaluations to prepare for the next lesson.

The developed *MathCityMap uses answers in interval form.* Students need direct measurements in the field and there is one activity with multiple choice answers. Researchers use interval answers because measurements taken by each student will not always produce the same numbers, intervals are used to present more accurate answers. When researchers carry out direct measurements at Sindu Kusuma Edupark, the correct answers from students will be seen through the intervals marked in green.

Picture 13. Examples of answers in the form of choices



Picture 14. Example answers in the form of intervals

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For each activity given, it is not certain that students will be able to do it, so the researcher provides several instructions to make it easier for students to find solutions. The author only provides *clues* so the students do not rely on clues and try to solve contextual problems. The instructions given are also made in stages.

Picture 15. Example instructions

The activities developed also include tools to assist in solving problems. In each given activity, the same measuring instrument is not always used. The researcher wrote down the measuring tools needed such as measuring tape, ruler, *stopwatch*, and calculator. Calculators are permitted to be used by the students can complete assignments more quickly and make it easier to calculate answers.

Picture 16. Examples of measuring instruments

To achieve the research objective, namely teaching students contextual problem-solving skills, the researcher conducted an assessment using an assessment rubric with the following indicators.

No	Assignment Location	Score
1	Ticket Purchase Counter	100
2	Chakra Ferris Wheel M calling	100
3	Fish therapy pool	100
4	Lights in the back-garden area	100
5	Photo spot in the back-garden area	100
	Total Score	500

Information:

- When working on questions at each location, if the answer obtained is correct, you will get a score of 100

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- When working on questions at each location, if you answer incorrectly as much more than once, then subtract as much as -15 for each error.

4. Deployment Stage

research development product using *MathCityMap* has been tested by 8 colleagues. Then an assessment was carried out by the writing team with a range of 1 - 5. The assessment was carried out using 9 aspects as follows.

No	Aspects in observation	Average value
1	Suitability of learning activities with competency indicators to be achieved	72.50%
2	Commands (language) in activities	82.50%
3	The time required to complete the activity	80%
4	Applications used to support the implementation of activities	82.50%
5	The instructions or assistance provided can help the students when facing difficulties	77.50%
6	Clarity of signs provided	80%
7	Development of learning activities	80%
8	Enjoyment in learning activities	85%
9	Overall assessment	85%
	Total Average - Avg	80.56%

According to Asyhari and Silvia (2016), the appropriateness of learning media can be categorized as follows:

$\leq 20\%$ = Very Inadequate
$21\% < X \leq 40\%$ = Not Eligible
$41\% < X \leq 60\%$ = Quite Decent
$61\% \leq X < 80\%$ = Worth it
$X \geq 81\%$ = Very Decent

Each aspect that has been assessed is then processed using the following formula:

$$Nilai = \frac{Skor\ tiap\ aspek}{Skor\ maksimum}$$

Based on assessments carried out by fellow researchers, the final score was 80.5%. This indicates that the learning activity is in the appropriate category and is ready to be tested on the students.

Based on the results of this assessment, we also received comments which we have summarized in the following table.

No	Observed aspects	Comment

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1	Suitability of learning activities with competency indicators to be achieved	5 validators gave good marks and 3 validators gave average marks. Here, several validators felt that the activities being developed were not really in line with competency indicators. This can be an input for researchers to be able to convey questions more clearly and improve the quality of activities developed by paying more attention to relevant competency indicators.
2	Commands (language) in activities	1 validator gave a very good score and 7 validators gave a good score. Overall, validators felt that the use of language in this learning activity was easy to understand so the activity was also easy to understand. This can also be seen when researchers communicate with validators when conducting trials in class.
3	The time required to complete the activity	1 validator gave a very good score, 6 validators gave a good score, and 1 validator gave an average score. Overall, validators felt that the estimated time was considered sufficient to carry out all the activities prepared by the researcher.
4	Applications used to support the implementation of activities	1 validator gave a good score and 7 validators gave a good score. Here the validator feels that the tool or application used (*MathCityMap application*) supports use in learning activities.
5	The instructions or assistance provided can help the students when facing difficulties	1 validator gave a very good score, 6 validators gave a good score, and 1 validator gave a poor score. Overall, validators feel that the instructions or assistance provided can help participants educate when facing difficulties. However, 1 validator felt that the instructions provided were insufficient. The validator provided suggestions for researchers to pay more attention to students' difficulties and help students overcome them.
6	Clarity of signs provided	1 validator gave a very good score, 6 validators gave a good score, and 1 validator gave an average score. Overall, validators felt that the signs provided were clear. It's just that several sentences in the

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		questions need to be corrected so that the meaning of the questions can be understood more easily.
7	Development of learning activities	3 validators gave very good marks, 2 validators gave good marks, and 3 validators gave average marks. Overall, validators felt that the learning activities developed were innovative and challenging.
8	Enjoyment in learning activities	2 validators gave very good marks and 6 validators gave good marks. Overall, validators felt that the learning developed was enjoyable and satisfying because through this learning, the students were invited to explore directly.
9	Overall validation	2 validators gave very good marks, and 6 validators gave good marks. Overall, validators felt that the learning activities developed were good. It's just that each activity needs to be detailed in more detail to make it easier for the students to understand each activity.
	Total Average - Avg	80,56%

DISCUSSION

Learning media is needed today. Moreover, technology is increasingly sophisticated. One of the learning technology media that can be used for learning activities in schools is *MathCityMap (MCM)*. The author developed the *MathCityMap learning media* to teach contextual problem solving. This application provides an opportunity for students to learn outside the classroom by taking advantage of existing conditions. Similar studies were conducted by Ismaya, et al. (2018) who utilized the MCM application to determine mathematical reasoning abilities. Not only that, other research was also conducted by Maheswari et al. (2023), namely developing MCM in ethnomathematics-based problem-solving abilities at Fort Vredebrug. The author wants to do research too, but in a different place, namely at SKE.

The author uses the *Sindu Kusuma Edupark (SKE) location* as a place to study. Developing media with MCM can provide a sense of enjoyment because learning is done outside the classroom so it doesn't get boring like in the classroom. This is indicated by the assessment results from the validator, namely 85%. The application of *outdoor learning* also provides meaningful learning because students practice directly. Not only that, the problems given also use contextual problems. Based on this explanation, it is better to know that studying mathematics provides many benefits that exist in everyday life.

MCM development is also equipped with LKPD. The goal is that when students work on questions, students can write the answers on the LKPD that is already available. The LKPD has also been tested and assessed by validators. Then the results were obtained that the media developed was suitable for distribution to students.

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CONCLUSIONS AND SUGGESTIONS

This research is aimed at utilizing the *MathCityMap application* in developing learning activities that are expected to improve students' contextual problem-solving abilities at the junior high school level. In this activity, the researcher designed 5 stopping points (5 questions) which were used to train students' contextual problem-solving skills. After going through a peer assessment consisting of 8 people by paying attention to 9 existing aspects, the researcher received an average assessment of 80.5% and the learning activity was in the appropriate category. Based on these results, it can be concluded that the activities that have been developed are suitable for testing with students.

Due to limited time in the research process, this research only reached the development and validation stage, we as authors provide suggestions so that the research can be continued at the next stage, namely implementation.

REFERENCES

Alfiyah, A., & Sulistyaningrum, H. (2018). Penerapan Model Pembelajaran Problem Solving Dengan Pendekatan Kontekstual Untuk Meningkatkan Kemampuan Pemecahan Masalah Matematika. *Jurnal Penelitian Pendidikan Matematika*, *2*(2), 112-122.

Attri, R. (2018). *Accelerating complex problem-solving skills: problem-centered training design methods.* Singapore: Speed To Profciency Research: S2PRo

Asyhari, A., & Silvia, H. (2016). Pengembangan media pembelajaran berupa buletin dalam bentuk buku saku untuk pembelajran IPA terpadu. *Jurnal ilmiah pendidikan fisika Al-Biruni*, *5*(1), 1-13. https://ejournal.radenintan.ac.id/index.php/al-biruni/article/view/100

Branca, N.A. (1980). Problem Solving as Goal, Process and Basic Skills. in S Krulik and R.E. Reys (Eds). Problem Solving in School Mathematics. Washington DC: NCTM.

Cahyadi, Rahmat Arofah Hari. (2019). Pengembangan Bahan Ajar Berbasis ADDIE Model. *Halaqa: Islamic Education Journal (vol 3)*. https://halaqa.umsida.ac.id/index.php/halaqa/article/view/1563

Cahyani, Z. K., Cahyono, A.N., & Waluya, B.(2024). *Systematic Literature Review:* Penggunaan Aplikasi *Math City Map* terhadap Kemampuan Berpikir Kritis. PRISMA, *Prosiding Seminar Nasional Matematika* (Vol. 7, 739-743). https://proceeding.unnes.ac.id/prisma/article/view/3025

Catrining, L., & Widana, I. W. (2018). Pengaruh Pendekatan Pembelajaran *Realistic Mathematics Education* (RME) terhadap Minat dan Hasil Belajar Matematika. *Emasains* (Volume VII No. 2). https://ojs.mahadewa.ac.id/index.php/emasains/article/view/108

D'Ambrosio, U. (1985). Ethnomathematics and its place in the history and pedagogy of mathematics. For the Learning of Mathematics, 5(1), 44-48.

Elita, G. S., Habibi, M., Putra, A., & Ulandari, N. (2019). Pengaruh pembelajaran problem based learning dengan pendekatan metakognisi terhadap kemampuan pemecahan masalah matematis. *Mosharafa: Jurnal Pendidikan Matematika*, *8*(3), 447-458. https://journal.institutpendidikan.ac.id/index.php/mosharafa/article/view/580

Ismaya, B. F., Cahyono, A. N., & Mariani, S. (2018). Kemampuan penalaran matematika dengan math trail project berbantuan MathCityMap. In *Seminar Nasional Pendidikan Matematika Ahmad Dahlan, Yogyakarta*.

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Ispita, Perninda, Hevi., Lestari, Reza (2022). Pembelajaran Matematika Berbasis Etnomatematika Kemampuan Berpikir kritis Siswa Ditingkatkan dengan Aplikasi Math City Map. *Prosiding Simposium Nasional Multidisiplin* (Vol 4, E ISSn 2714-5603). https://jurnal.umt.ac.id/index.php/senamu/article/view/7673.

Komariyah, S., &Laili, A. F. N. (2018). Pengaruh kemampuan berpikir kritis terhadap hasil belajar matematika. *JP3M (Jurnal Penelitian Pendidikan dan Pengajaran Matematika)*, *4*(2), 53-58. https://jurnal.unsil.ac.id/index.php/jp3m/article/view/523

Mrizkidirmansyah, & Febriandi, R. (2023). *Meningkatkan Kemampuan Problem Solving Matematika Siswa Sd Melalui Implementasi Model Problem Based Learning*. Jurnal Elementaria Edukasia, 6(4), 2135–2144. https://doi.org/10.31949/jee.v6i4.7591

Rizki, M. (2018). Profil Pemecahan Masalah Kontekstual Matematika oleh Siswa Kelompok Dasar. *Dinamika Penelitian: Media Komunikasi Penelitian Sosial Keagamaan*, *18*(2), 271-286. https://doi.org/10.21274/dinamika.2018.18.2.271-286

Rofiudin, Achmad , Anisa Fatwa Sari (2016). Pengaruh Outdoor Learning Pelajaran Matematika Bab Geometri Terhadap Hasil Belajar Siswa, Prosiding Semnasdik 2016 Prodi Pend. Matematika FKIP Universitas Madura.

Sarwoedi, Marinka, D. O., Febriani, P., Wirne.I. N. (2018). Efektifitas Etnomatematika dalam Meningkatkan Kemampuan Pemahaman Matematika Siswa. *Jurnal Pendidikan Matematik Raflesia* (Vol. 03 No 02).https://ejournal.unib.ac.id/jpmr/article/view/7521

Setiyorini, N. D. (2018). Pembelajaran kontekstual ipa melalui outdoor learning di sd alam ar-ridho semarang. *Al-Mudarris: Journal Of Education*, *1*(1), 30-38.

Zulqarnain, M., & Fatmahanik, U. (2022). Identifikasi Kemampuan Pemecahan Masalah Kontekstual Ditinjau dari Gaya Belajar Siswa. *Jurnal Tadris IPA Indonesia*, *2*(3), 293-304

Setyani, Y. L., & Amidi, A. (2022, February). Telaah Model PBL-RME Bernuansa Etnomatematika pada Outdoor Learning terhadap Kemampuan Pemecahan Masalah Matematis Peserta Didik. *PRISMA, Prosiding Seminar Nasional Matematika* (Vol. 5, pp. 520-536). https://journal.unnes.ac.id/sju/prisma/article/view/54702

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