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Understanding Mathematical Concepts in the Missouri Mathematics Project Learning Model in terms of Student's Independent Attitude

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Abstract

The learning objectives according to Permendiknas Number 22 emphasize that students could understand problems, design, and solve mathematical models, and interpret the solutions obtained. The objective will be the basis for students to become independent learners. Missouri Mathematics Project learning has a strong chance to achieve this goal.Therefore, this study aims to determine the effect of the Missouri Mathematics Project learning model on understanding mathematical concepts in terms of independent attitudes of fifth grade students. A combination research (Mixed Method) is used in this study by combining of Concurrent Embedded design. The sample in this study amounted to 58 students who were divided into two classes, namely the experimental class with 30 students and the control class with a total of 28 students. The results showed that there was an effect of the Missouri Mathematics Project learning model on understanding mathematical concepts in terms of the independent attitude of grade V students. This was indicated by the average percentage of understanding mathematical concepts by 63.1%. Students' understanding of mathematical concepts with the Missouri Mathematics Project learning model has been classically completed, are 73. The average independent attitude of students using the Missouri Mathematics Project learning model with an average percentage yield of 83.7%. Student independence has a significant effect on students' understanding of mathematical concepts by 10.6%, while the remaining 89.4% is influenced by other factors. It can be concluded that the Missouri Mathematics Project learning model affects the understanding of mathematical concepts in terms of students' independent attitudes.

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INTRODUCTION

One of the learning objectives according to Permendiknas Number 22 is so that students have the ability to understand problems, design and solve mathematical models, and interpret the solutions obtained (Depdiknas, 2006). According to Fajar et al. (2018) they state that teachers as facilitators must have the view that the material taught to students is not only memorized but must understand the concepts given. Learning mathematics in primary schools plays a very important role with various student ability activities, including thinking skills and the ability to solve problems in various problems in life (Ulia et al., 2018).

Learning mathematics in elementary schools is not in line with the development of students' thinking, so students often find it difficult to accept learning. Students become less focused and sometimes confused, therefore a meaningful mathematics learning experience is needed by providing a conceptual understanding of mathematical problem solving (Ulia et al., 2018). The ultimate goal of learning mathematics is so that students can use the concept of learning mathematics at school in their daily life. In addition, it is necessary to develop mathematical abilities in a way that students are expected to have intellectual abilities, skills and virtues or noble morals (Ulia et al., 2018).

Syahroni et al. (2016) stated that the objectives of science learning can be achieved if the students understand the learning process. One of the reasons students are unable to achieve goals in the learning process is because the condition of the teacher still assumes that each student has the same ability to obtain and solve problems (Ovan, 2017). Based on Rahman's (2018) opinion, the personal characteristics of each student determine the success rate of student learning. Learning situations that allow students to be directed to be able to think actively and creatively because every teacher needs active and creative learning conditions to be applied in learning activities in class, but in reality in the field that most students are less trained and accustomed to thinking critically and logical (Julaiha, 2016).

The learning that is applied by the teacher greatly affects students' understanding of the material presented by the teacher. Learning is a style that is equally important for students and for teachers because both cannot be rejected (Akram et al., 2013). According to Winardi, et al. (2018) students in Indonesia have low ability to solve various problems in learning, this ability requires them to have the ability to analyze, give reasons, communicate effectively, and solve and explain problems in various situations. The ability to analyze, give reasons, communicate, solve and explain problems is part of mathematical literacy skills. Effective learning is learning that allows students to learn skills, knowledge, and can make students happy when the learning process takes place. Effective learning will encourage students to learn several useful things, such as facts, skills, value concepts and how to get along with others and ideal and desired learning outcomes (Ovan et al., 2017).

The main cause of student failure in learning is that students find it difficult to understand concepts correctly because they do not understand the abstraction process, still understand the instrument, and can only work on questions but cannot understand concepts. Learning mathematics requires a relational understanding that is needed in learning mathematics because it can explain concepts. The causes of low mathematics learning achievement are lack of understanding of mathematical concepts, lack of basic skills and lack of student motivation (Adiastuty et al., 2012).

Many factors cause students 'low understanding of mathematical concepts, including the lack of focus of students during the learning process, which influences students' lack of understanding of the material presented by the teacher during the learning process at school. Suriyani et al. (2015), Saironi (2017), & Wijaya (2018), they argue that strategies in conveying material must be accompanied by open perceptions. Consideration of student characteristics and characteristics of subject

matter is used as the basis for selecting the learning method to be used. In this case, choosing the right method is the main thing to consider and must be considered, namely the use of methods that instruct students to carry out learning activities in analyzing mathematical problems and providing solutions to these problems (Julaiha, 2016).

By using the appropriate learning model according to the needs of students, it can help them use their time as efficiently as possible, so that students easily understand the material presented. As it is believed that the learning model can increase the effectiveness of learning. This statement is corroborated by previous research from Purnomo et al. (2015), Adiastuty et al. (2012), Ulya et al. (2012), & Ulia & Yunita (2018) they conclude that students who use the learning model are better than students who use the method. expository in learning.

One of the possible lessons is student-centered learning, which is different from the traditional way of teachers. (Yudha et al., 2018). Students only passively listen to the description of the material, accept, and simply swallow the knowledge or information received from the teacher.

Based on the results of an interview with a grade V teacher at SD Negeri Ungaran 1, it was found that more students stated that Mathematics was not easy and learning Mathematics was still very boring. When group assignments, some students only rely on their group friends to solve problems or discussion assignments, as a result, when they are given questions independently, many students still do not complete them (Fajar et al., 2018). Murizal (2012) states that understanding mathematical concepts is the basis for meaningful understanding of mathematics.

It is believed that a strong character will form a strong mentality. One of the characters mentioned in the National Education System Law is an independent character (Asmani in Sari, 2019). Independence is defined as the attitude and behavior of not relying on others easily in completing tasks (Ministry of Cultural and Education, 2010). Implementation of independent character education can be integrated into the learning of every subject, one of which is mathematics. Hargis (2000) believes that independent students tend to learn better, can effectively monitor, evaluate and organize learning, save time effectively and score high in science.

Sharon et al. (2011) show that independent learning is a process that can help students organize their thoughts, behavior and feelings so that they can successfully navigate the learning experience. Independence includes three aspects, namely personal attributes, processes, and the learning environment (Song in Sari, 2019). Hidayati et al. (2010) developed six indicators of student independence in learning, namely: (1) independence from one another; (2) self-confidence, (3) strict discipline, (4) responsible, (5) according to their own desires. Initiative acting sexually, and (6) practicing self-control.

Students' lack of independence in learning mathematics may affect them in understanding mathematics-related material. Student learning independence is one of the important elements to support the success of the teaching and learning process (Winardi et al., 2018). The lack of independence of students in learning mathematics can affect their understanding of mathematics-related material. Student independence in learning is one of the important factors that support the success of the learning process (Winardi et al., 2018). This is in accordance with the 2013 curriculum which has been implemented for several years.

In the 2013 curriculum revision, students must be able to be independent and know what they have learned, what they have learned, and what they have to learn. In the 2013 course, we paid special attention to building mentality and governance, deepening and expanding materials, strengthening processes, and adjusting student loads. It is hoped that by implementing the 2013 curriculum, schools can produce competent and independent human resources (Sari, 2019). According to Van der Stel et al. (2014) it is believed that students should be active students with their own learning responsibilities. Students must also be able to plan their learning activities

and implement them methodically and systematically in order to monitor and evaluate student learning itself. The independence of students in learning is also low, so that their academic performance is below the minimum standard (Clark et al., 2011).

Kyndt et al. (2016) show that learning also refers to activities that are organized according to time, space, goals, and support. High-level learning outcomes require students to improve, recognize and understand concepts (Van Der Kleji et al., 2015). Learning independence requires special attention in learning. According to Boeree (2013), independence is not dependence. Independence is also an effect of learning (Birnbaum et al., 2015).

Arista et al. (2018) added, "Independent learning is defined as a form of awareness that comes from an internal desire to receive information, manage it, and connect one information to another. Person". By developing an independent learning attitude, students can diagnose learning difficulties and find appropriate solutions to these difficulties. Of course this will have a positive impact on the concept of student learning itself.

Mukhlis et al. (2018) suggest that independent learning is a person's attitude and behavior for independent learning activities based on his own motivation. This is the result of his own experience and training without relying on others to master it. something. These materials can be used to solve immediate problems.

With an increase in student learning independence, the effect of independent learning on their ability and learning outcomes will be better, and vice versa. Prayekti et al. (2016) also show that someone with an independent attitude should be able to achieve it as much as possible, rather than relying on other people. Therefore, a person's change is the result of daily experiences and independent practice without depending on others. This is in line with Fatihah (2016) who believes that independent learning is a person's ability to carry out learning activities with confidence and responsibility in their own behavior. According to Aini et al. (2012), independent learning is a learning activity carried out by students according to their own wishes and has high self-confidence in completing their homework.

Aliyyah et al. (2017) suggest that independent learning is an active learning activity that is based on knowledge or the ability to determine learning time, learning locations, learning methods and student learning evaluation. self. In other hand, Setyowati (2018) adds that independent learning can allow students to learn actively, find learning methods, carry out the learning process, practice learning effects, independent decision making, homework, and consequences after finishing work. Homework, repeating lessons, remembering lessons, remembering lessons, paying attention to important things, seeking help from friends, and being responsible for doing homework.

Fatihah (2016) emphasizes that learning independence is characterized by the ability to solve problems faced by behavior. With these changes in behavior, the child's thinking ability increases. They can learn independently without the help of others, and not only rely on teachers to learn, because teachers are not the only source of knowledge, and can use learning resources and media. Learning independence can be seen in students' daily learning habits, such as how to plan and carry out learning (Syahputra, 2017).

The development of student independence allows students to do everything according to their abilities without depending on others. Students with high learning independence will try to solve all the practice questions or homework given by the teacher with their respective abilities. If students experience difficulties, they will ask questions or discuss with friends, teachers or other parties who are better able to overcome these difficulties (Fatihah, 2016).

Mulyono et al. (2018) suggest that the interaction between learning and the independent learning model has an impact on student mathematics learning outcomes after mastering students' initial abilities. The mathematics learning outcomes of students with

the independent learning model were higher than students who used the facilitator model.

The Missouri Mathematics Project learning model is a program designed to assist teachers in the effective use of exercises so that students achieve extraordinary improvements. Missouri Mathematics Project learning model is a learning model that involves students actively involved in learning. Students must participate actively in learning because of the position of the teacher as a facilitator who accompanies and assists students in the learning process (Sari et al., 2014). The Missouri Mathematics Project model has been proven to be effective in helping students improve math scores (Kyle in Ansori 2015).

The Missouri Mathematics Project learning model is a model that interacts between teachers and students in the classroom which includes five steps, namely review, development, controlled training, seatwork, and assignments (Krismanto in Winardi, 2018). At the stage of reviewing the past material (daily review), teachers and students review what has been covered in the previous lesson, several things that need to be reviewed in this activity, namely perceptions, motivation, and learning objectives. At the development stage, it is carried out with demonstrations and the use of appropriate concrete objects for elementary school students in accordance with Piaget's theory of cognitive development stages.

For the controlled training stage, there is cooperative learning, which means that students discuss in groups related to subject matter or math problems. Students who are embarrassed to ask the teacherif there are difficulties in understanding the material being studied, this group discussion is very helpful for them, because students tend to be open to their peers. At the seatwork stage, students work on practice questions aimed at strengthening their understanding of concepts and applying their knowledge through practice solving problems related to math problems in everyday life. And the last is the homework assignment stage, where the teacher assigns assignments to students so that students also study at home.

The Missouri Mathematics Project is a learning model designed to assist teachers in using exercises effectively, so that teachers can significantly improve their academic achievement or students can gain outstanding achievement in learning. That is way the Missouri Mathematics Project learning model can be used to foster the character of students 'independence in solving problems or problems as an effort to improve students' mathematical literacy skills.

In a previous study from Sari et al. (2014) and Julaiha (2016), they state that the results of the study show that there are significant differences in students' ability to solve problems and can improve learning outcomes between students who take the Missouri Mathematics Project learning model and students who take conventional learning models.

This research is in line with the results of research conducted by Jannah et al. (2019). They concluded that students' understanding of mathematical concepts using learning models was more effective than using conventional learning models. Likewise research according to Setyaningrum et al. (2018), revealed that the results of the study showed an increase in students' conceptual understanding. From the results obtained, it can be concluded that student understanding and cooperation of class X SMA Kesatrian 1 Semarang increased through the Discovery Learning model on exponential inequality.

Based on the discussion proposed, the purpose of this study was to determine the effect of the Missouri Mathematics Project learning model on understanding mathematical concepts and independent attitudes of fifth grade students of SD Negeri Ungaran 01.

METHOD

This study uses a combination research (Mixed Method). The combination research model used in this study is a combination of the Concurrent Embedded design (Sugiono, 2016). The Concurrent Embedded design combination research method is a combination method that

combines two quantitative research and qualitative research together but with different weights. The primary data in this study uses quantitative research and secondary data in this study uses qualitative research.The subjects in this study were all students of class V SDN Ungaran 1 with a total of 58 students, consisting of 30 students of VB class as an experimental class and class VC 28 students as an control class.

The steps in this study using the concurrent embedded design method in obtaining quantitative data, the first by giving pretest questions, then the teacher conveys learning material virtually, then given project work independently, namely by making a framework of cubes and blocks, then given questions posttest and when students work on the posttest questions, a questionnaire is provided which is addressed to the parents of the students. As for the analysis of qualitative data gathered form students who meet the criteria include 2 students with high scores, 2 studens with moderate scores and 2 students with low scores given interview questions based on predetermined indicators of student independence. The indicators of the understanding mathematical concepts in this study include: Restate a concept, classify objects a according to certain properties (according to the concept), present concepts in various forms of mathematical representation, and apply concepts or problem solving algorithms. Indicators of student's independent attitudes in this study include independence from other, have self confindence, behave in a disciplined manner, have a sense of responsibility, and behave on their own initiative.

The indicators of concept understanding are measure using pretest and posttest questions, and independent attitudes are measure using questionnaires and interviews.

RESULTS AND DISCUSSION

The magnitude of the effect of using the Missouri Mathematics Project learning model can be known more clearly and accurately because it compares conditions before and after being given treatment. To measure the average increase in understanding mathematical concepts, the test scores were tested using the one way ANOVA test.

Based on the results of the analysis of the fifth grade students 'mathematical concept understanding test which consists of 5 indicators used to measure the average understanding of the concept, the results of students' understanding of mathematical concepts are provided in Table 1.

Table 1. The Average Test of Concept Understanding

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3807.562	1	3807.562	40.686	.000
Within Groups	5240.714	56	93.584		
Total	9048.276	57			

The results of the data in Table 1 show that there is a difference in the average increase in students' understanding of mathematical concepts. It can be concluded that the understanding of students 'mathematical concepts on the achievement of indicators is more than 60%, which means that the average understanding of students' mathematical concepts using the Missouri Mathematics Project learning model is better than using conventional learning models.

Based on the analysis of students 'mathematical concept understanding tests, which can be seen from the results of the students' posttest scores, it can be seen that the calculation results are presented in Table 2.

Table 2. Final Test

Test value = 70 (Concept Understanding)					
T	Df	sig (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
1.709	29	.098	3.00000	.5896	6.5895

The results shown in Table 2 indicate that the average posttest results of students' classical understanding of mathematical concepts have reached the Completed Minimum Criteria (KKM), with an average completeness of 73 of the KKM score of 70.

Based on the questionnaire analysis to determine the average increase in independent attitudes with 5 indicators, 10 statements and with a maximum score of 4 on each statement. The results of the questionnaire calculations are displayed in Table 3.

Table 3. The Test of Average Independent Attitude

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	110.476	1	110.476	5.398	0.24
Within Groups	1146.149	56	20.467		
Total	1256.625	57			

Based on the results in Table 3, it shows that there is an average increase in students' independent attitudes.It can be concluded that the independent attitude of students on the achievement of indicators is more than 80%, which is 83.7%, which means that the average independent attitude using the Missouri Mathematics Project learning model is better than using conventional learning models.

Based on research conducted by Sari (2019), it is revealed that the effect of independent learning outcomes on student accounting learning outcomes through independent learning shows that the independent variable learning has a significant and positive effect.

The research results proposed by Herlianti et al. (2015) shows that there is a strong relationship between learning behavior and metacognitive abilities by using science learning strategies independently with the "one day one diary for science" program.

Nurmala et al. (2019) in their research concluded that there is an influence of cognitive style on student learning outcomes on Biodiversity material. There is an influence of learning independence on student learning outcomes on Biodiversity material, and there is an interaction between cognitive style and learning independence on student learning outcomes in Biodiversity material.

Based on the analysis of the effect of student independence on students' understanding of mathematical concepts, the data obtained were tested using tests of linier regression. The results of the calculation of the linear regression test are displayed in Table 4.

Table 4. Simple Linear Regression Test

Model MMP	Unstandardized Coefficient		Standardized Coefficient	T	Sig.
	B	Std. Error	Beta		
1 (constant)	20.311	28.973		.701	.489
Independent Attitude	.628	.345	.326	1.822	.079

Based on the results presented in Table 4, it shows that the results of student independence have a significant effect on students' understanding of mathematical concepts.

The magnitude of the influence of the independent attitude of students in the Missouri Mathematics project learning model is 10.6%, while 89.6% is influenced by other factors, due to experiencing limitations in learning. Thus, there is 10.6% influence of independent attitudes in the Missouri Mathematics Project learning model on understanding mathematical concepts for fifth grade students of SD Negeri Ungaran 01. The results of the calculation of the percentage effect of students' independent attitudes are listed in Table 5.

Table 5. Determination Test

R Square	Adjusted R Square	Std. Error of the Estimate
.106	.074	9.25055

Based on Table 5, it shows that there is 10.6% influence of independent attitudes in the Missouri Mathematics Project learning model on understanding the mathematical concepts of fifth grade students of SD Negeri Ungaran 01.

Overall students' understanding of mathematical concepts has increased from the pretest and posttest results. Increased understanding of students' mathematical concepts can also be seen per-indicator, in this study the understanding of concepts taken consists of 4 indicators, namely (1) restating a concept, (2) Classifying objects according to certain properties (according to the concept), (3) Presenting the concept in various forms of mathematical representation, and (4) Applying the concept or algorithm to problem solving.

The effect of the Missouri Mathematics Project learning model turns out to increase students' understanding of mathematical concepts, it can be seen from the posttest results that have increased from the pretest. During learning even though it is online, students follow it seriously. They are enthusiastic in making charts on cubes and blocks. Likewise with research according to Sholikhan (2017), he states that there is an effect of self-regulated learning on concept understanding, and there is an interaction effect between guided inquiry learning strategies and learning to understand concepts using the Guided Inquiry strategy. As for the selection of 3 criteria students who have high, medium and low scores are selected based on the results of the post test scores. The result of post test scores in is presented Figure 1.

In the Figure 1, it is stated that students with high scores, because the questions answered correctly meet the requirements on the indicators, 20 questions answered incorrectly totaling 2 numbers, 6 questions answered correctly with the indicator restating a concept, 4 questions answered correctly are indicators of classifying objects. -object, 3 questions answered correctly are indicators of presenting concepts in the form of mathematical representations, and 5 questions answered correctly are indicators of applying concepts to problems.

SOAL

Mata Pelajaran : Matematika
Kelas : V (lima)
Waktu : 60 menit

Kerjakan soal-soal dibawah ini dengan benar!

1. Diketahui Volume kubus = 27 cm^3. Panjang sisi Kubus tersebut adalah .....
   a. 1 cm c. 3 cm
   b. 2 cm d. 4 cm
2. Sebuah dadu berbentuk kubus memiliki panjang sisi 2 cm. Volume dadu adalah .....
   a. $7cm^3$ c. 9 cm^3
   b. 8 cm^3 d. 10 cm^3
3. Ibu memiliki 2 buah kotak berbentuk kubus dengan panjang sisinya 3 cm. Total jumlah Volume seluruh kotak ibu adalah .....
   a. 50 cm^3 c. 56 cm^3
   b. 54 cm^3 d. 60 cm^3
4. Adhi memiliki kotak berbentuk balok, jumlah titik sudut yang ada pada kotak adalah .....
   a. 8 c. 10
   b. 9 d. 11
5. 
   Tentukan volume balok pada kubus satuan diatas!
   a. 58 cm c. 62 cm
   b. 60 cm d. 64 cm
6. Jika luas permukaan kubus adalah 24 cm^2, maka panjang sisi kubus adalah .....
   a. 1 cm c. 3 cm
   b. 2 cm d. 4 cm
7. Panjang sebuah rusuk adalah 6 cm. Luas alas kubus tersebut adalah .....
   a. 216 cm^2 c. 222 cm^2
   b. 220 cm^2 d. 321 cm^2
8. Luas alas dari kubus yang memiliki panjang rusuk 10 cm adalah .....
   a. 400 cm^2 c. 600 cm^2
   b. 500 cm^2 d. 700 cm^2
9. Diketahui 3 kubus yang panjang rusuknya sama memiliki total volume 372 cm^3. Maka volume 1 kubus adalah .....
   a. 120 cm^3 c. 123 cm^3
   b. 121 cm^3 d. 124 cm^3
10. Jumlah rusuk pada bangun ruang balok adalah.....
    a. 12 c. 8
    b. 13 d. 10
11. Sebuah bak mandi berbentuk balok dengan luas alas balok p x l, maka sisi bagian atas balok berbentuk.....
    a. Persegi c. Persegi panjang
    b. Lingkaran d. Segitiga
12. Fania memiliki sebuah lemari berbentuk balok dengan panjang 1 meter, lebar 50 cm, dan tinggi 2 meter. Maka volume lemari adalah .....
    a. 1.000.000 cm^3 c. 3.000.000 cm^3
    b. 2.000.000 cm^3 d. 4.000.000 cm^3
13. Di ketahui panjang Balok = 2x lebar balok. Jika tinggi balok adalah 5 cm dan Volume nya 90 cm^3. Maka panjang balok tersebut adalah .....
    a. 8 cm c. 10 cm
    b. 6 cm d. 5 cm
14. Vita memiliki kolam ikan berbentuk balok, dengan panjang 60 cm, lebar 40 cm. Jika volume kolam adalah 72 liter. Maka tinggi kolam adalah .....
    a. 20 cm c. 40 cm
    b. 30 cm d. 50 cm
15. Diketahui setiap sisi sebuah kardus memiliki ukuran sisi 40 cm. Berbentuk apakah kardus tersebut.....
    a. Persegi c. persegi panjang
    b. Balok d. kubus
16. Bu Mala memasukan air kedalam bak mandi berbentuk kubus yang memiliki volume 6000 cm^3. Jika ibu mengisi bak mandi sebanyak ½ dari volume bak mandi. Sisa air yang di perlukan ibu untuk memenuhi bak mandi adalah .....
    a. 1 liter c. 3 liter
    b. 2 liter d. 4 liter
17. Luas alas kubus = 6xsxs. Hal ini menunjukkan bahwa sisi kubus berbentuk .....
    a. Segitiga c. persegi
    b. Persegi panjang d. jajar genjang
18. Sebuah kubus memiliki Luas alas 0,6 liter. Panjang sisi kubus tersebut adalah
    a. 30 cm c. 40 cm
    b. 60 cm d. 50 cm
19. Jika luas alas sebuah kubus = ½ dari volume balok yang berjumlah 1200cm^3. Maka panjang sisi kubus adalah .....
    a. 6 cm c. 9 cm
    b. 7 cm d. 10 cm
20. Ema memiliki kaleng berbentuk balok dengan volume 20 cm^3. Sara memiliki kaleng berbentuk kubus .....
    Jika panjang sisi kaleng Sara adalah ¼ dari panjang sisi kaleng Ema. Maka volume kaleng Sara adalah .....
    a. 110 cm^3 c. 120 cm^3
    b. 115 cm^3 d. 125 cm

Figure 1. Highest Post Test Score

SOAL

Mata Pelajaran : Matematika
Kelas : V (lima)
Waktu : 60 menit

Kerjakan soal-soal dibawah ini dengan benar!

1. Diketahui Volume kubus = 27 cm^3. Panjang sisi Kubus tersebut adalah .....
   a. 1 cm c. 3 cm
   b. 2 cm d. 4 cm
2. Sebuah dadu berbentuk kubus memiliki panjang sisi 2 cm. Volume dadu adalah .....
   a. 7cm^3 c. 9 cm^3
   b. 8 cm^3 d. 10 cm^3
3. Ibu memiliki 2 buah kotak berbentuk kubus dengan panjang sisinya 3 cm. Total jumlah Volume seluruh kotak ibu adalah .....
   a. 50 cm^3 c. 56 cm^3
   b. 54 cm^3 d. 60 cm^3
4. Adhi memiliki kotak berbentuk balok, jumlah titik sudut yang ada pada kotak adalah .....
   a. 8 c. 10
   b. 9 d. 11

5. Tentukan volume balok pada kubus satuan diatas!
   a. 58 cm c. 62 cm
   b. 60 cm d. 64 cm
6. Jika luas permukaan kubus adalah 24 cm^2, maka panjang sisi kubus adalah .....
   a. 1 cm c. 3 cm
   b. 2 cm d. 4 cm
7. Panjang sebuah rusuk adalah 6 cm. Luas alas kubus tersebut adalah .....
   a. 216 cm^2 c. 222 cm^2
   b. 220 cm^2 d. 321 cm^2
8. Luas alas dari kubus yang memiliki panjang rusuk 10 cm adalah .....
   a. 400 cm^2 c. 600 cm^2
   b. 500 cm^2 d. 700 cm^2
9. Diketahui 3 kubus yang panjang rusuknya sama memiliki total volume 372 cm^3. Maka volume 1 kubus adalah .....
   a. 120 cm^3 c. 123 cm^3
   b. 121 cm^3 d. 124 cm^3
10. Jumlah rusuk pada bangun ruang balok adalah.....
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11. Sebuah bak mandi berbentuk balok dengan luas alas balok p x l, maka sisi bagian atas balok berbentuk.....
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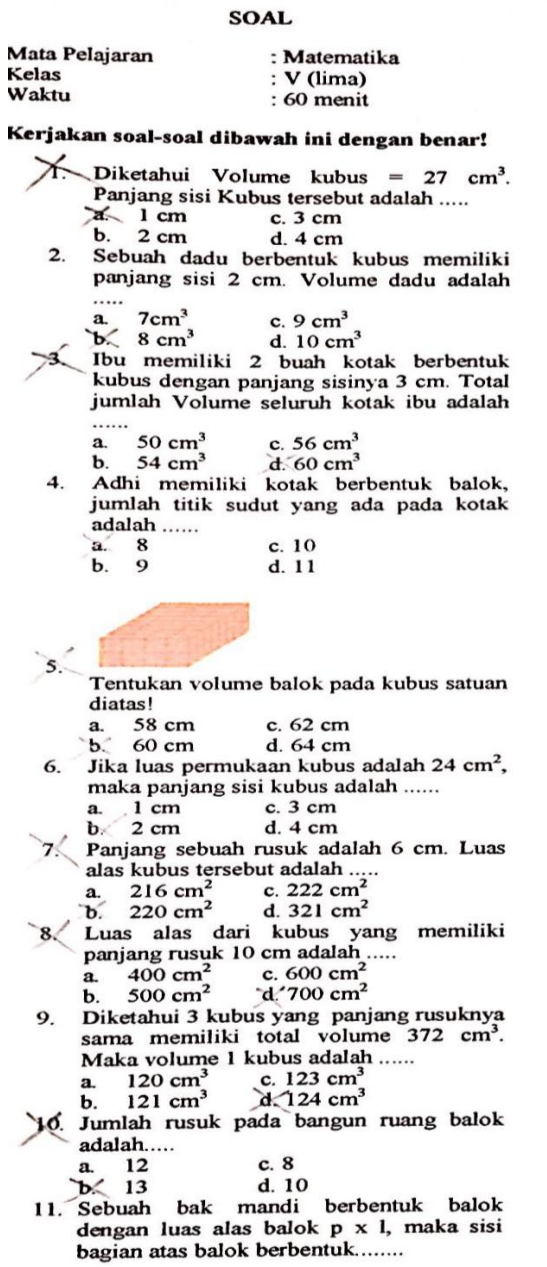
    b. Lingkaran d. Segitiga
12. Fania memiliki sebuah lemari berbentuk balok dengan panjang 1 meter, lebar 50 cm, dan tinggi 2 meter. Maka volume lemari adalah .....
    a. 1.000.000 cm^3 c. 3.000.000 cm^3
    b. 2.000.000 cm^3 d. 4.000.000 cm^3
13. Di ketahui panjang Balok = 2x lebar balok. Jika tinggi balok adalah 5 cm dan Volume nya 90 cm^3. Maka panjang balok tersebut adalah .....
    a. 8 cm c. 10 cm
    b. 6 cm d. 5 cm
14. Vita memiliki kolam ikan berbentuk balok, dengan panjang 60 cm, lebar 40 cm. Jika volume kolam adalah 72 liter. Maka tinggi kolam adalah .....
    a. 20 cm c. 40 cm
    b. 30 cm d. 50 cm
15. Diketahui setiap sisi sebuah kardus memiliki ukuran sisi 40 cm. Berbentuk apakah kardus tersebut.....
    a. Persegi c. persegi panjang
    b. Balok d. kubus
16. Bu Mala memasukan air kedalam bak mandi berbentuk kubus yang memiliki volume 6000 cm^3. Jika ibu mengisi bak mandi sebanyak ½ dari volume bak mandi. Sisa air yang di perlukan ibu untuk memenuhi bak mandi adalah .....
    a. 1 liter c. 3 liter
    b. 2 liter d. 4 liter
17. Luas alas kubus = 6xsxs. Hal ini menunjukkan bahwa sisi kubus berbentuk .....
    a. Segitiga c. persegi
    b. Persegi panjang d. jajar genjang
18. Sebuah kubus memiliki Luas alas 0,6 liter. Panjang sisi kubus tersebut adalah
    a. 30 cm c. 40 cm
    b. 60 cm d. 50 cm
19. Jika luas alas sebuah kubus = ½ dari volume balok yang berjumlah 1200cm^3. Maka panjang sisi kubus adalah .....
    a. 6 cm c. 9 cm
    b. 7 cm d. 10 cm
20. Ema memiliki kaleng berbentuk balok dengan volume 20 cm^3. Sara memiliki kaleng berbentuk kubus .....
    Jika panjang sisi kaleng Sara adalah ¼ dari panjang sisi kaleng Ema. Maka volume kaleng Sara adalah .....
    a. 110 cm^3 c. 120 cm^3
    b. 115 cm^3 d. 125 cm

Figure 2. Medium Post Test Score

In the Figure 2, stated that students with moderate scores, because the questions answered correctly meet the requirements on all indicators, from 20 there are 8 questions that are answered incorrectly. The indicator restates a concept in question numbers 2, 5, 9, 16 and 19. Indicators for classifying objects include questions 4, 10, and 20. On indicators for presenting concept in the form of mathematical representations in question number 8. And the indicators of applying the concept to problems are in question numbers 12, 14 and 18.



SOAL

Mata Pelajaran : Matematika
Kelas : V (lima)
Waktu : 60 menit

Kerjakan soal-soal dibawah ini dengan benar!

1. Diketahui Volume kubus = 27 cm^3. Panjang sisi Kubus tersebut adalah .....
   a. 1 cm c. 3 cm
   b. 2 cm d. 4 cm
2. Sebuah dadu berbentuk kubus memiliki panjang sisi 2 cm. Volume dadu adalah .....
   a. 7cm^3 c. 9 cm^3
   b. 8 cm^3 d. 10 cm^3
3. Ibu memiliki 2 buah kotak berbentuk kubus dengan panjang sisinya 3 cm. Total jumlah Volume seluruh kotak ibu adalah .....
   a. 50 cm^3 c. 56 cm^3
   b. 54 cm^3 d. 60 cm^3
4. Adhi memiliki kotak berbentuk balok, jumlah titik sudut yang ada pada kotak adalah .....
   a. 8 c. 10
   b. 9 d. 11

5. Tentukan volume balok pada kubus satuan diatas!
   a. 58 cm c. 62 cm
   b. 60 cm d. 64 cm
6. Jika luas permukaan kubus adalah 24 cm^2, maka panjang sisi kubus adalah .....
   a. 1 cm c. 3 cm
   b. 2 cm d. 4 cm
7. Panjang sebuah rusuk adalah 6 cm. Luas alas kubus tersebut adalah .....
   a. 216 cm^2 c. 222 cm^2
   b. 220 cm^2 d. 321 cm^2
8. Luas alas dari kubus yang memiliki panjang rusuk 10 cm adalah .....
   a. 400 cm^2 c. 600 cm^2
   b. 500 cm^2 d. 700 cm^2
9. Diketahui 3 kubus yang panjang rusuknya sama memiliki total volume 372 cm^3. Maka volume 1 kubus adalah .....
   a. 120 cm^3 c. 123 cm^3
   b. 121 cm^3 d. 124 cm^3
10. Jumlah rusuk pada bangun ruang balok adalah.....
    a. 12 c. 8
    b. 13 d. 10
11. Sebuah bak mandi berbentuk balok dengan luas alas balok p x l, maka sisi bagian atas balok berbentuk.....
    a. Persegi c. Persegi panjang
    b. Lingkaran d. Segitiga
12. Fania memiliki sebuah lemari berbentuk balok dengan panjang 1 meter, lebar 50 cm, dan tinggi 2 meter. Maka volume lemari adalah .....
    a. 1.000.000 cm^3 c. 3.000.000 cm^3
    b. 2.000.000 cm^3 d. 4.000.000 cm^3
13. Di ketahui panjang Balok = 2x lebar balok. Jika tinggi balok adalah 5 cm dan Volume nya 90 cm^3. Maka panjang balok tersebut adalah .....
    a. 8 cm c. 10 cm
    b. 6 cm d. 5 cm
14. Vita memiliki kolam ikan berbentuk balok, dengan panjang 60 cm, lebar 40 cm. Jika volume kolam adalah 72 liter. Maka tinggi kolam adalah .....
    a. 20 cm c. 40 cm
    b. 30 cm d. 50 cm
15. Diketahui setiap sisi sebuah kardus memiliki ukuran sisi 40 cm. Berbentuk apakah kardus tersebut.....
    a. Persegi c. persegi panjang
    b. Balok d. kubus
16. Bu Mala memasukan air kedalam bak mandi berbentuk kubus yang memiliki volume 6000 cm^3. Jika ibu mengisi bak mandi sebanyak ½ dari volume bak mandi. Sisa air yang di perlukan ibu untuk memenuhi bak mandi adalah .....
    a. 1 liter c. 3 liter
    b. 2 liter d. 4 liter
17. Luas alas kubus = 6xsxs. Hal ini menunjukkan bahwa sisi kubus berbentuk .....
    a. Segitiga c. persegi
    b. Persegi panjang d. jajar genjang
18. Sebuah kubus memiliki Luas alas 0,6 liter. Panjang sisi kubus tersebut adalah
    a. 30 cm c. 40 cm
    b. 60 cm d. 50 cm
19. Jika luas alas sebuah kubus = ½ dari volume balok yang berjumlah 1200cm^3. Maka panjang sisi kubus adalah .....
    a. 6 cm c. 9 cm
    b. 7 cm d. 10 cm
20. Ema memiliki kaleng berbentuk balok dengan volume 20 cm^3. Sara memiliki kaleng berbentuk kubus .....
    Jika panjang sisi kaleng Sara adalah ¼ dari panjang sisi kaleng Ema. Maka volume kaleng Sara adalah .....
    a. 110 cm^3 c. 120 cm^3
    b. 115 cm^3 d. 125 cm

Figure 3. Lowest Post Test Score

In the Figure 3, it is stated that students with low scores, 20 questions were answered incorrectly on number 1, 3, 5, 7, 8, 10, 13, 15, 17, 19, and 20, for questions no. 2, and 9 are questions that answered correctly with indicators restating a concept, for questions number 4 and 11 which were answered correctly were indicators of classifying objects, for question number 6 which was answered correctly was an indicator of presenting concepts in the form of

mathematical representations, and for question numbers 12, 14 , and 18 are indicators of applying the concept to problems. Although the questions answered were not all correct, but the questions answered correctly already represented of all indicators of understanding the mathematical concepts that had been determined by the researcher. It can be concluded from the answers provided by the students that they can still work on the questions given independently even with limitations in delivering material due to the pandemic and learning is done online. In many cases, by not under direct supervision by the teacher the students do still meet obstacles in answering all the questions. The good things is that some questions correctly answered by the students and already represent all the indicators of understanding the concept that have been determined.

As for the results of the research, according to Eriana et al. (2019), they stated that manipulative teaching aids using the jigsaw technique in the learning process can increase students' understanding of mathematical concepts. Likewise, according to Syarifuddin (2018) it is found that the scientific approach is effective in using science learning through conceptual understanding. Sularso et al. (2017) in their research informed that the results of students' understanding of guided inquiry learning are better than the understanding of freely modified inquiry concepts. Syarifuddin (2018) stated that the scientific approach effectively used in science learning.

Based on some of the research discussed, it can be concluded that students' conceptual understanding can be better if it is balanced with a learning model or learning approach according to student needs and in accordance with the material presented. Efforts in applying a scientific approach to the learning process are often referred to as a hallmark of the 2013 curriculum (Syahroni, 2016). Zahara et al. (2018) concluded that an effective scientific approach can be used to improve students' understanding of concepts and scientific attitudes.

Asfar (2019) stated that a positive student response was 3.45, which means that the integration of the Auditory Intellectually Repetition (AIR) learning model and the effective Guided Discovery model learning can improve students' understanding of mathematical concepts.

Previous research conducted by Dodik (2017) shows that there was an influence of the interaction between learning models and learning independence on student mathematics learning outcomes, after controlling for students' initial abilities. In the independent attitude variable, students showed an increase from pretest to posttest. The independent attitude of students can also be seen in each indicator. There are 5 indicators of independent attitude in this study, namely: 1) independence of others, 2) having self-confidence, 3) behaving in discipline, 4) having a sense of responsibility, and 5) behaving based on one's own initiative

CONCLUSION

The Missouri Mathematics Project learning model has an positive effect on the understanding of mathematical concepts in terms of the independent attitudes of fifth grade students of SD Negeri Ungaran 01. The model provides training program for students to understand the concepts and to solve the questions or assignments given by the teachers independently.

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