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LKS Berbasis RME Menggunakan Cabri 3D untuk Koneksi Matematis Siswa pada Bangun Ruang Bidang Lengkung

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Abstrak

Penelitian ini merupakan penelitian pengembangan yang bertujuan untuk mengembangkan lembar kerja siswa (LKS) berbasis RME dengan Cabri 3D untuk melatih kemampuan koneksi matematis siswa SMP pada materi bangun ruang bidang lengkung yang valid, praktis, dan efektif. Model pengembangan yang digunakan adalah ADDIE. Penelitian ini dilaksanakan di SMP Negeri 10 Palembang pada semester genap tahun ajaran 2020/2021. Penelitian ini dilaksanakan menggunakan aplikasi yakni platform zoom meeting. Penelitian ini terdiri dari dua tahap yaitu evaluasi pendahuluan dan evaluasi formatif. Data panduan dan wawancara berisi komentar dan saran dari validator dan mahasiswa. Data kuesioner untuk melihat kepraktisan LKS yang dikembangkan. Semua data dianalisis dengan menggunakan metode deskriptif kualitatif. dalam analisis ditemukan bahwa LKS yang dibangun dengan kriteria valid berdasarkan hasil validator dan praktikum. Lembar angket dengan rata-rata 85,67% sangat praktis sesuai kriteria. Hasil tes menunjukkan kemampuan koneksi matematis siswa tergolong baik dengan rata-rata 87,88% setelah menggunakan LKS yang dikembangkan. Berdasarkan hasil yang diperoleh LKS yang dikembangkan telah memenuhi kriteria valid, praktisdan efektif.

Kata Kunci: cabri 3D, koneksi matematika, lembar kerja siswa, pengembangan, RME

Student worksheets Based On RME with Cabri 3D to Students' Mathematical Connections on solid with non-flat surface

Abstrak

This research is development research that aims to create student worksheets based on RME with Cabri 3D to train junior high school students' mathematical connections on solid with non-flat surface materials that are valid, practical, and have potential. The development model used is ADDIE. This research was conducted at SMP Negeri 10 Palembang in the even semester of the 2020/2021 academic year. The subjects in this study were students of IX Class. This study consisted of two stages, Preliminary and formative evaluation. Walkthrough and interview data contained comments and suggestions from validators and students. Questionnaire data to see the practicality of the developed Student worksheet. All data were analyzed using descriptive qualitative methods. in the analysis, it was found that the student worksheet was built with valid criteria based on the validator results and practical. The questionnaire sheets with an average of 85.67%, which is very practical according to the criteria. The test showed the students' mathematical connection ability was categorized as good with an average of 87.88% after using the developed student worksheet. Based on the results obtained, the developed student worksheet meets the valid, practical and effective criteria.

***Keywords**: cabri 3D; development; mathematical connection; RME; student worksheets*

INTRODUCTION

The ability to connect mathematics is also one of the most important competencies that students must have in solid mathematical reasoning (NCTM, 2003) The importance of mathematical connection ability is seen in the National Council of Teachers of Mathematics (NCTM, 2000) which states that there are five types of basic mathematical abilities which are standard processes in mathematics education, that is (Problem Solving, Reasoning, Communication, Connections, and Representation). Where one in there is a mathematical connection. The 2013 curriculum has included connections, which are part of the basic abilities that students must have (Kemendikbud, 2018). Mathematical connection ability is very important because with mathematical connection ability it is hoped that students' thinking skills in mathematics will become wider (Sukmaningthias, Susanti, & Nuraeni, 2020). Regarding understanding in the form of a mathematical object. Abstract activities are activities that are needed in learning. According to (Maryono, 2020), the abstract object is also geometry. Where in this case geometry is a skill that exists in the branch of mathematics that is important to be applied (Hoffer, 1992; NCTM, 2003). Therefore, geometry is a very important thing to learn and master in learning mathematics.

However, facts that occur in the field show that there are still many failures faced and accepted by students in connecting the concepts of mathematics itself. As we know, mathematical connection ability is a cognitive ability that makes it easier for students to remember the principles of mathematics through the material presented (Andi, Sukestiyarno, & Junaedi, 2019; Lestari, Rohaeti, & Purwasih, 2018). So, conclusions can be drawn about the ability to connect mathematics is the ability to connect between concepts and principles that make learning meaningful and important to learn. Indonesia's condition in having the ability to connect mathematically is clearly illustrated in international research.

Where Indonesian learning has not directed students in terms of reasoning, communicating, literacy, and problem solving (OECD, 2019) This condition is in line with the results of the Program for International Student Assessment (PISA) study survey conducted by The Organization for Economic Co-operation and Development (OECD, 2019), which stated that Indonesia was ranked 72nd out of 77 countries in the world. We can examine the decision from the survey results that it shows the ability of Indonesian students, especially in mathematics, is classified as low. Besides that, based on interviews and preliminary observations, it can be seen that the mathematical connection skills of SMPN 10 Palembang students are in the low category. This can be a race whip in improving the ability of students in mathematical concepts which are the basis for understanding the students themselves. geometry which is nothing but part of an abstract concept plays a very important role in this problem to form the concept of understanding students in finding common ground for problems that have occurred (Sugrah, 2019)

Based on the facts of international research, the difficulties in learning, especially the geometry material studied by (Fuys, Geddes, & Tischler, 1988; Gutierrez, Jaime, & Fortuny, 1991) indicate that there are still many students who have difficulty so that it can be seen and can show the poor skills and abilities of the participants. learners in geometry. The learning process that is seen by not showing the importance of geometry, which is an abstract object in the mathematical concept, makes students experience difficulties, especially in geometric concepts related to the solids with non-flat surface construction material (Kania & Arifin, 2020). It is also rare that the application of tools or media in helping students' understanding, moreover conventional learning is still being applied, this course can make students minimal in the process of constructing the material that has been delivered by educators, it is clear that in this case, the Student worksheet is of course still a formula and emphasis. the mathematical concept does not yet exist (Pitriani, 2017; Maimunah, Izzati, & Dwinata, 2019; Hidayat, Hapizah, Susanti, & Scristia, 2020). Student worksheets are sheets containing the arrangement of tasks that must be done by students by following the instructions and instructions for completing student worksheet steps (Prastowo, 2014). So it is hoped that the student worksheet which contains the assignment sheet is suitable for the

characteristics of students, given the important role of the student worksheet itself in the learning process. by following the context of the curriculum (NCTM, 2000) in geometry contains elements of the use of visualization, spatial reasoning, and modeling. Where one of them is visualization in line and directed with Van Hiele's theory, which is a learning theory that can overcome the difficulties of students

who are experienced in the field of geometry. After seeing, understanding, and drawing conclusions about the conditions that have occurred, alternative solutions are needed. The use of learning models that can make students connect their mathematical concepts, that is learning with a contextual model is none other than Realistic Mathematic Education (RME), which is learning that expresses and emphasizes mathematical concepts that originate in everyday life (Sukmaningthias, 2020). The famous character Hans Freudenthal is someone related to this RME. He has the belief that mathematics must be introduced to students as knowledge that has meaning and meaning for the students. Students may not be passive recipients of mathematics who have become "passive receivers of ready-made mathematics". Instead, mathematics lessons must provide opportunities for students to be "guided" and "rediscover" mathematics by doing it themselves (Zulkardi, 2002)

The use of learning media that addresses abstract objects can certainly improve students' understanding and ability to connect mathematical concepts. Usually, students practice on their own, and their understanding will arise from the discovery of mathematical concepts (Yeni, 2011; Asma, Ikhsan, & Hajidin, 2019). The software that can be presented in this nuance is Cabri 3D. Programs that can make it easier for students to solve problems related to the field of geometry. Rotating in any direction can be confirmed by this software easily. Learning, understanding, and using it yourself can certainly make mathematical concepts born in students. Constructing concepts can also be done by students so that their ability in mathematical connections can emerge (Nasution, 2017; Daud & Santoso, 2019). Like the beauty of mathematics that is said (Cuoco, Goldenberg, & Mark, 1995) states that the beauty of mathematics lies in the relationship between the mathematical connections itself if from that point of view students can make these relationships by themselves. Of course, students will feel the beauty that happens. Without the ability to connect mathematics beyond the connection between topics related to mathematics, the relationship between scientific disciplines and the relationship with everyday life will make students remember many separate mathematical procedures (NCTM, 2003)

Several previous studies have also suggested that the use of instructional media is very useful. Several studies state that the use of student worksheets can improve student learning outcomes (Sukmaningthias, 2020; Masitoh & Prasetyawan, 2019; Celik, BAKI, & ISIK , 2022). Besides the media, the use of approaches in learning can also make learning more meaningful and successful. One approach that can be used is the RME approach. Research reveals that the RME Approach can improve students' mathematical abilities. The RME approach can improve mathematical connection Ability (Sukmaningthias, 2020; Febriyanti, Bagaskorowati, & Makmuri, 2019; Sirait & Azis, 2017; Menanti, Sinaga, & Hasratuddin, 2018). Besides from using learning media and approaches, using applications can help learning be more effective, including the Cabri 3D application. Cabri 3D can improve students' abilities in geometry (Sukmaningthias, Susanti, & Nuraeni, 2020; Ertekin, 2014; Hartatiana, Darhim, & Nurlaelah, 2017; Hollebrands & Okumus, 2017).

Based on the descriptions of several theories and problems that have been described, researchers are interested in developing teaching material in the form of a student worksheet. Where this research is entitled "Student worksheets Based On RME with Cabri 3D to Students' Mathematical Connections on solid with non-flat surface". The purpose of this research is to produce a product in the form of a Student worksheet based on Realistic Mathematic Education (RME) assisted by Cabri 3D to train the mathematical connections of junior high school students on solid with non-flat surface materials that are valid and practical with characteristics. And to produce a product in the form of a Student worksheet based on Realistic Mathematic Education (RME) with Cabri 3D assistance to train the mathematical connections of junior high school students on solid with non-flat surface materials that have potential effects. The benefits of this research are the creation of new knowledge in mathematics as a reference for students, alternative mathematics learning tools that are useful for teachers, and a reference that can be considered for future researchers with different alternative materials and media.

METHODE

This study uses development research, that is Development Research with the type of development studies. This study aims to produce student worksheet based on Realistic Mathematics Education with Cabri 3D assistance to train junior high school students' mathematical connections on

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solid with non-flat surface materials that are valid, practical, and have potential effects. The subjects in this study were students of class IX SMP Negeri 10 Palembang. Which consists of 3 people one-to-one, 6 small groups where each group consists of 2 people, and 20 people in the field test, where each group consists of 5 people. This research was conducted using an application that is the zoom meeting platform. This research procedure consists of two stages, that is preliminary and formative evaluation. Preliminary consists of analysis and design and formative evaluation consist of self-evaluation, expert review, one-to-one, small group, and field test (Tessmer, 1998).

This preliminary stage consists of two stages of research, that is analysis and design. In this analisys stage, the researcher will make several preparations, that as determining the place where the research will be carried out and conducting the analysis, that is Student Analysis, Curriculum Analysis in junior high schools, and Material Analysis by compiling research instruments. Furthermore, at this stage, the researchers developed teaching materials in the form of student worksheet based on Realistic Mathematics Education to train junior high school students' mathematical connections on solid with non-flat surface materials with the assistance of 3D Cabri in their manufacture. The design stage includes the design and preparation of student worksheet instruments by following the basic competencies that will be achieved by students. Then go to the formative evaluation stage. In this first stage, a self-evaluation was carried out to determine the strengths and weaknesses of the initial prototype design. The results of the revision in this stage are prototype I. Then the expert review stage where the draft of the prototype has been evaluated by Self Evaluation to produce prototype I will then be validated by several experts, that is two lecturers in mathematics education at Sriwijaya University and one mathematics teacher at SMP Negeri 10 Palembang. In this stage, the content, construct, and language will be validated against the suitability of the student worksheet. In the one-to-one stage, prototype I is used as a one-to-one stage testing tool. The one-to-one stage will be tested on three grade IX students of SMP Negeri 10 Palembang for the 2020/2021 school year. In this stage, students will also be asked about their suggestions, comments, and responses to student worksheets (prototype I). Furthermore, the revision results at the expert review stage and one-to-one are valid student worksheet. This valid student worksheet is prototype II. Continue to the next stage is the small group. After

The revision at the expert review stage and one-to-one (prototype II). The prototype II trial was carried out at the small group stage consisting of three groups with each group consisting of two class IX students of SMP Negeri 10 Palembang for the 2020/2021 school year. Students are asked to work on and complete questions, comment on or provide responses to student worksheet (prototype II). So in this stage, it will produce a valid and practical student worksheet. And the last stage of the formative evaluation stage is the field test stage. The field test stage is carried out after validating the self-evaluation and expert review stages and testing at the one-to-one and small group stages to obtain a valid and practical student worksheet based on the revised results at the validation and trial stages. Realistic Mathematics Education-based student worksheet with 3D Cabri Assistance to Train Junior High School Students' Mathematical Connections on the solid with non-flat surface Material was tested at the field test stage. The trial at this stage was carried out with 20 students of class IX of SMP Negeri 10 Palembang for the 2020/2021 academic year, which were divided into 4 groups and each group consisting of 5 students. The data collected from this study is a walkthrough, interviews, and questionnaires. In the walkthrough stage, the data collection process is used to see the validity of the Student worksheet developed by obtaining validation data from experts and students. At the interview stage, the data collection process was used to find out problems in the student worksheet that had been developed and to obtain comments and suggestions from students which were used to see the validity of the student worksheet that had been developed. At the questionnaire stage, the data collection process was used to determine the practicality of the student worksheet that had been designed by giving a questionnaire to students in the form of a Google Form which contained question items.

The data that has been collected will be analyzed by researchers. In the walkthrough stage, the data obtained from the validation results will then be analyzed descriptively and qualitatively by the researcher. At the interview stage, the data analysis was obtained from the one-to-one and small group stages, and then the researcher will be analyzed descriptively qualitatively to support the validity of the student worksheet. Furthermore, at the questionnaire stage, the data collection process was used to

determine the practicality of the student worksheet that had been designed by giving a questionnaire to students in the form of a Google Form which contained question items

Data Analysis Techniques

1. Walkthrough Data Analysis

At this stage, we will detail the suggestions and comments that have been given by the expert review and one to one. Where the expert review consisted of two mathematics education lecturers and a class IX mathematics teacher at SMP Negeri 10 Palembang. The results of these suggestions and comments are used as material for improvement on prototype II to produce the validity of prototype II.

2. Interview Analysis

At this stage the analysis of interview data obtained from the one to one and small group stages which have been tested on students as well as comments and responses regarding questions posed by students will be analyzed as part of the support to support the validity and practicality of the data. The interview data was in the form of asynchronous online interviews, which were conducted when the researcher and the participants were not on the network at the same time by using the Google Form.

3. Questionnaire Data Analysis

Questionnaire results data that has been obtained from filling out the Google form carried out by students will then be analyzed using a Likert scale.

Table 1. Likert Scale Attitude Determination Format

Attitude Question	**Scoring**	
	Positive	**Negative**
Response Very Agree	5	1
Response Agree	4	2
Response Doubtful	3	3
response disagree	2	4
response strongly disagree	1	5

Source : (Azwar, 2015)

The steps used when analyzing the questionnaire data are:

a. . Counting the total scores obtained for each indicator, then the researcher determines the criteria for the total scores in the following way: Maximum score: 5 × 6 (number of respondents) = 30, Minimum score: 1 × 6 (number of respondents) = 6, Category criteria: 5, Range of values: $\frac{30-6}{5} = 4{,}8 \approx 5$.Then further, the total score will be interpreted using the criteria as in table 3.2 below.

Table 2. Criteria Total Score on Each Indicator

Attitude Question	**Total Score**
Response Very Agree	26-30
Response Agree	21-25
Response Doubtful	16-20
response disagree	11-15
response strongly disagree	6-10

(Modification from (Djaali & Mulyono, 2008))

b. After determining the criteria for each indicator, then calculate the percentage for each indicator on the questionnaire sheet with the formula:

$$Np = \frac{Total\ score\ obtained}{The\ ideal\ score} \times 100\% \quad \ldots\ldots (1)$$

c. After getting the percentage of each indicator, then calculate the average of the values on the questionnaire sheet with the following formula:

$$Np = \frac{Total\ score\ obtained}{The\ ideal\ score} \times 100\% \quad \ldots\ldots (2)$$

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Next, determine the practicality of the teaching materials that have been developed. Score categories are presented in Table 3

Table 3. practicality criteria

Criteria	Description
$84 \leq Na \leq 100$	Very Practical
$68 \leq Na < 84$	Practical
$52 \leq Na < 68$	less practical
$36 \leq Na < 52$	impractical
$20 \leq Na < 36$	very impractical

(Modification From Sugiyono, 2013: 135)

4. Test Data Analysis

Analysis of the test data was carried out to see the ability of students' mathematical connections in material on curved side shapes, namely cones in Cabri 3D Assisted Realistic Mathematics Education Based Worksheets. The researcher got the results of the mathematical connection test after analyzing the participants' answers. Analysis of mathematical connection test data is analyzed as follows:

a. Convert the question scores into grades

The score that has been obtained will be converted into a value with a range of 0 – 100 using the following rules.

$$Np = \frac{Total\ score\ obtained}{The\ ideal\ score} \times 100\% \quad \ldots\ldots (3)$$

b. Determine the category of students' mathematical connection abilityAfter the value for each student is obtained, then determine the category of mathematical connections for each student

Table 4. connection ability Category

Value	Description
86-100	Very Practical
71-85	Practical
56-70	less practical
41-55	impractical
0-39	very impractical

RESULT AND DISCUSSION

In this study, it aims to see the validity, practicality, and potential effects of student worksheet based on Realistic Mathematic Education (RME) supported by Cabri3D which has been developed, so that the stages in this study use preliminary stages which include analysis and design and formative evaluation only includes the self-evaluation stage. , expert reviews, one-to-one, small groups, and get to the field test. The research implementation procedure was carried out in two stages, that is preliminary which includes analysis and design as well as formative evaluation including self-evaluation, expert review, one-to-one, small group, and field tests. At the preliminary stage, where the analysis of students, curriculum, and material is carried out. in the initial analysis the researcher conducted an analysis of students, curriculum and material, the researcher will conduct research in class IX.3 SMP Negeri 10 Palembang, Class IX.3 consists of 33 students, consisting of 16 boys and 17 girls. Compulsory math subject matter in the midst of the Covid-19 pandemic is taught once a week with a maximum of one meeting in each meeting. In learning, students are usually given Student Worksheets which contain formulas which do not yet emphasize mathematical concepts and rarely use a media or visual aids to help the process of understanding students. Based on the results of Istitho'ah's research (2017) states that contextual-based mathematics learning media assisted by 3D cabri can be used as an alternative learning media by the teacher and continues. The curriculum used at SMP Negeri 10 Palembang is the 2013 curriculum. Based on the applicable curriculum, the solid with non-flat surface of cone material is studied in class IX in the even semester. Furthermore, the design of the student worksheet that will be developed is carried out, that is student worksheet based on RME assisted by Cabri 3D shown in Figure

1. The researcher also prepares learning tools that will be used in learning such as lesson plans and test questions to train students' mathematical connections

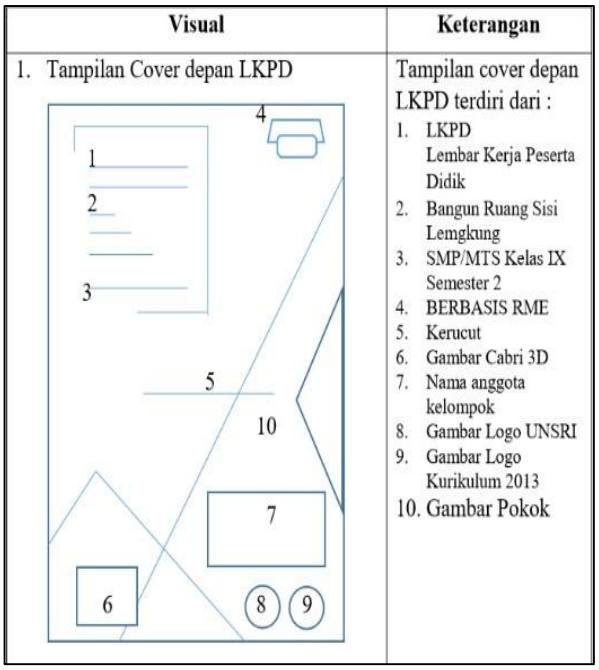

Figure 1. Student Worksheet design

In the formative evaluation stage, the first stage is self-evaluation, in which the researcher will conduct his research on the prototype that has been designed to determine the advantages and disadvantages of the initial prototype design. The results that will be obtained in the formative evaluation stage are called prototype I. Furthermore, the prototype I will be studied further by experts. This stage is carried out to see the validity of the student worksheet that has been developed, that is in terms of content, construct and language. The characteristics seen in terms of content include material, problems, and learning objectives in the 2013 curriculum by looking at the suitability of the contents to the Student worksheet. Characteristics seen in terms of constructs are to see the relationship between the learning model of the Realistic Mathematics Education (RME) approach assisted by Cabri 3D to train students' mathematical connections. While the characteristics seen in terms of language are to see the use of appropriate language used following the General Guidelines for Spelling in Indonesian. The validation results in the form of comments and suggestions from experts can be seen in Table 1.

In the formative evaluation stage, the first stage is self-evaluation, in which the researcher will conduct his research on the prototype that has been designed to determine the advantages and disadvantages of the initial prototype design. The results that will be obtained in the formative evaluation stage are called prototype I. Furthermore, the prototype I will be studied further by experts. This stage is carried out to see the validity of the student worksheet that has been developed, that is in terms of content, construct and language. The characteristics seen in terms of content include material, problems, and learning objectives in the 2013 curriculum by looking at the suitability of the contents to the Student worksheet. Characteristics seen in terms of constructs are to see the relationship between the learning model of the Realistic Mathematics Education (RME) approach assisted by Cabri 3D to train students' mathematical connections. While the characteristics seen in terms of language are to see the use of appropriate language used following the General Guidelines for Spelling in Indonesian.

In line with the validation that has been carried out at the expert review stage, then a trial will be carried out at the one-to-one stage. This trial aims to see the clarity of the language of the student worksheet (prototype I) and the difficulties experienced by students in solving the problems presented in the student worksheet (prototype I). Comments and suggestions from students regarding the student worksheet (prototype I) as well as the difficulties experienced in solving the problems presented in the

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student worksheet (prototype I) will then be used. to improve the student worksheet (prototype I) being developed so that it will produce a valid student worksheet, that is prototype II. The results of validation at the expert review and one-to-one stages can be seen in Table 2. After the repairs were made, the student worksheet (prototype II) was obtained which met the valid criteria. (prototype 2). At the small group stage, there are three groups with each group consisting of two students. Students who become testers are class IX of SMP Negeri 10 Palembang for the 2020/2021 school year. In the small group trial, interview and questionnaire data were obtained. Interview data is shown in table 3, which is the results of the revision decisions made by researchers based on comments or suggestions from the three groups of students at the small group stage.

Table 5. Comments and Suggestions and Small Group Stage Revisions

No	Comments and Suggestions	Revision
1	If possible, the Cabri 3D application software is used on the cellphone	Not accepted, because for now the cabri 3d application software can be used on laptops
2	The student worksheet should have gone straight to the questions because if there were many activities or problems presented in the previous student worksheet, it would confuse	Not accepted, because if the student worksheet is made directly into the questions that you want to work on without any stages or processes, how can a conclusion be reached? So that students will not understand and understand the conclusions that students get.

Table 2 shows the results of comments and suggestions as well as revision decisions at the Small Group stage. After finishing using the student worksheet based on Realistic Mathematics Education assisted by Cabri 3D that has been made. Furthermore, students are given a questionnaire sheet in the form of a Google Form where the questionnaire sheet contains both positive and negative questions. The questionnaire sheet must be filled in by students according to their respective responses regarding the Realistic Mathematics Education-based student worksheet that has been used. The results of the questionnaire sheet at the Small Group stage are shown in table 4. In addition, there are also suggestions and comments that students give to student worksheet based on Realistic Mathematics Education with Cabri 3D Assistance. Based on the small group stage, the percentage results obtained from the questionnaire sheet at the small group stage, that is obtaining an average result, that is (85.67%) which is categorized as very practical according to the criteria of (Sugiyono, 2013) which states that $84 \leq Na \leq 100$ falls into the very practical category. The criteria for a Student worksheet are considered practical based on the criteria proposed (Pawestri & Sukoco, 2017) which aspects of practicality are met if a development product is determined from the ease of development and the product's results and is also easy to use by teachers and students. This is also in line with the practical criteria put forward (Akker, 1999)where the practical aspect is fulfilled if the student worksheets developed are easy to use, like, and attractive

with at least visible from different percentages. In the results that have been obtained, there are still several indicators that of course have not reached the optimal value, that is (100%). As in the activity indicators presented by the RME-based student worksheet with Cabri 3D assistance, students were active in learning (77%) agreed.

The activity indicators presented by the RME-based student worksheet assisted by Cabri 3D made students active in learning (77%, agreed), this happened because some students were answering doubts on the questionnaire sheets provided. In this case, when students use student worksheet together with their different abilities, it can make students experience confusion so that the reasoning process is left behind with their friends who continue to solve further problems so that those whose reasoning process takes a long time will result in them being inactive in learning. Furthermore, for the percentage of student worksheet based on RME assisted by Cabri 3D which is presented to help students understand the material being studied (80%, agree), this arises because all students answer agree, it can be seen when students work on student worksheet enthusiastically working on problem activities so they can conclude.

The percentage of the RME-based student worksheet statement assisted by Cabri 3D guides students to new knowledge (90%, strongly agrees), arises because when students use and work on student worksheets, of course, new knowledge that students have not got they can see in student worksheet that has been presented that is, the process of using the Cabri 3D application can make it easier to draw and calculate the area and volume of solid with a non-flat surface, one of which is the cone. In the RME-based student worksheet statement assisted by Cabri 3D, it is easy for students to understand (87%, strongly agree), students understand easily the student worksheet that has been presented because the detailed student worksheet process steps are presented in the student worksheet so that students can work on the student worksheet by working on the problem process first, then the process stage concludes. The percentage of the RME-based student worksheet presentation indicator assisted by Cabri 3D makes students interested in seeing and learning it (80%, agree), seen when students become enthusiastic/happy to see the problems presented in the student worksheet so that they are interested in studying it. The RME- based student worksheet design statement assisted by Cabri 3D is more attractive to students than the usual student worksheet designs (97%, strongly agree), this can be seen when students use student worksheets where students are very excited to see the designs presented by the color design student worksheet, the arrangement of the pictures and the problems presented in the student worksheet make students see them become interested. So that this statement is calculated almost 100%.

Table 6. Small Group Questionnaire Data Results

No	Category	Percentage	Statement
1	The RME-based student worksheet with the assistance of Cabri 3D is presentedto help students understand the material being studied.	80 %	Agree
2	RME-based student worksheet assisted by Cabri 3D guides students to newknowledge	90 %	Strongly Agree
3	student worksheet based RME assisted Cabri 3D is easy to understand	87 %	Strongly Agree
4	The presentation of the RME-based student worksheet with the assistance of Cabri 3D makes students interested in seeing and studying it.	80 %	Agree
5	The RME-based Cabri 3D-based student worksheet design is more attractiveto students than the usual student worksheet designs.	97%	Strongly Agree
6	The tasks contained in the RME-based student worksheet with the assistance of Cabri 3D are interesting for students to learn more about solid with non flat surface.	100 %	Strongly Agree
7	Problems in the student worksheet related to the daily environment of students and the use of Cabri 3D software media made students interested in doing it.	80 %	Agree
8	RME-based student worksheet with the assistance of Cabri 3D makes students confident when working on questions.	80 %	Agree
9	RME-based student worksheet with the assistance of Cabri 3D helps students discuss with other friends.	87 %	Strongly Agree
10.	The activities presented by the RME-based student worksheet using Cabri 3D made students active in learning.	77 %	Agree
	Average :	**85,67 %**	**Very Practical**

The percentage of the problem statement contained in the student worksheet that is related to the daily life environment of students and using Cabri 3D makes students feel like doing it (80%, agree),

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this can be seen in the student worksheet that is presented by students who can understand the problem because of the problems presented related to or related to the environment of students' daily lives so that students become more interested in doing it. But of course one of the students answered doubtfully. The RME-based student worksheet statement assisted by Cabri 3D makes students confident when working on questions (80%, agree), when students use student worksheet they believe that they can solve problems together with a group of friends so that problems that may be difficult will be resolved easily. The percentage of the RME-based student worksheet statement assisted by Cabri 3D helps students discuss with other friends (87%, strongly agree), it can be seen that when students use the student worksheet that has been presented, some students with low and moderate cognitive abilities can, of course, ask questions to students with abilities high cognitive so that the process of understanding the problems that have been presented by student worksheet can be overcome together with the group. This is what makes students who are usually silent, of course, will talk with other friends to discuss so that they get a mutual agreement in the process of concluding the problems that have been presented by the student worksheet. However, there is a percentage of indicators (100%, strongly agree), that is in the student worksheet indicator statement based on RME assisted by Cabri 3D it is interesting for students to learn more about solid with a non-flat surface, this happens because when students are given student worksheet based on RME assisted by Cabri 3D students become enthusiastic, and interested when using it, so the percentage results obtained (100%) strongly agree. The results were obtained from the calculation of a questionnaire in which all the students ticked strongly agree. The results are same with (Sukmaningthias, 2020) that the use of interesting student worksheet and classified as very good criteria can increase students' interest in learning. After the small group stage, the next stage is to make revisions to the things that have been commented on by students. So, for these two stages, the Student worksheet that the researcher has created is categorized as valid and practical.

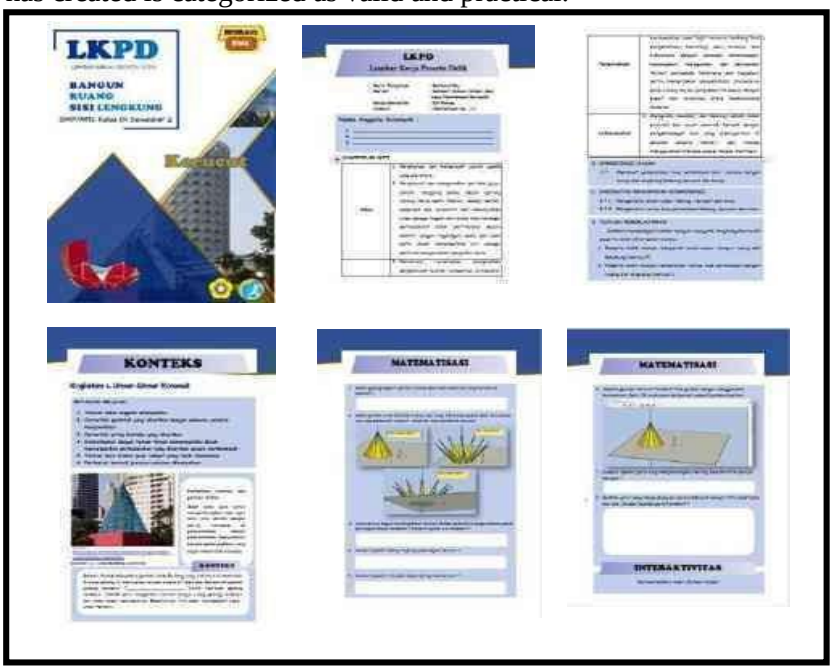

Figure 2. Student Worksheet

The results of the research are strengthened according to (Khatimah, 2018) which shows that the use of Cabri 3D in learning effectively trains connection skills can be seen from the results of student response analysis which shows a positive response with the percentage of student responses for each aspect above 80%. These results are in line with the use of interesting student worksheets in learning which is proven to be able to make students as a whole trained in their mathematical connection skills (Sukmaningthias, Susanti, & Nuraeni, 2020). And in line with the opinion of (Fitri, yuanita, & maimunah, 2020) which states that contextual mathematics learning is proven to be able to improve mathematical connection skills. The last stage of the formative evaluation stage is the field test stage. The field test stage is carried out after validating the self-evaluation and expert review stages and testing

at the one-to-one and small group stages to obtain a valid and practical student worksheet based on the revised results at the validation and trial stages. The following is one of the meetings in the student worksheet.

At this meeting, the material taught was about definition material and cone nets. Learning activities use student worksheet based on Realistic Mathematic Education with Cabri 3D assistance. At this stage of the activity, students are formed into 4 study groups and each group consists of 5 students. Based on this meeting, students work on the student worksheet that has been presented in the form of contextual problems to find out the definition and cone nets in the solid as in Figure 2 student worksheet is designed following the steps of the Realistic Mathematic Education approach assisted by Cabri 3D, that is realistic problems (context), understand the problem (mathematics), explain the problem (interactivity), solveand compare the results of the discussion (linkages) and conclude (construction results). student worksheet has also been created by designing it according to emerging indicators of mathematical connection capabilities. At this stage of the meeting, through scheduled pre-learning (asynchronous) learning activities, students are started by being given the first Cabri 3D-assisted learning tutorial video to understand the material provided, and students are also asked to download the Cabri 3D application. Furthermore, after watching the 3D Cabri-assisted learning video, students were asked to note important things that had not been understood. After that, the researcher asked students to try to operate the Cabri 3D application individually by viewing the tutorial video of learning the use of Cabri 3D that had been given. Then students will be asked to work on questions and problems contained in student worksheet in scheduled learning activities (synchronous). During the activity, researchers observed related students regarding the students' lack of understanding of student worksheet based on RME assisted by Cabri 3D. It begins with a lack of understanding of some of the questions and problems presented in the student worksheet and students who do not understand how to use the Cabri 3D application. The researcher will act as a teacher, guiding students in understanding the problem (mathematics), that is in the form of realistic problems (context), explaining problems (interactivity), completing and comparing the results of discussions (linkages), and concluding (construction results). From this first meeting, students wrote down what they knew and asked about the problems presented in the student worksheet. The following is a snippet from the interview.

Student 1: It is known that there is a picture of the Cone Building in Australia. Student 2: Well, the next one asked about the shape of the solid

Student 3: Because the shape of the building is like a cone

Student 4: So, the shape of the building is conical.

Student 5: So yes, so the building was conical and now I started filling in the questions to understand the cone from the steps that are already in the student worksheet. The following is a snippet from the interview.

Student 1: It is known that there is a picture of the Cone Building in Australia. Student 2: Well, the next one asked about the shape of the solid

Student 3: Because the shape of the building is like a cone Student 4: So, the shape of the building is conical.

Student 5: So yes, so the building was conical and now I started filling in the questions for understand about the cone from the steps that are already in the student worksheet

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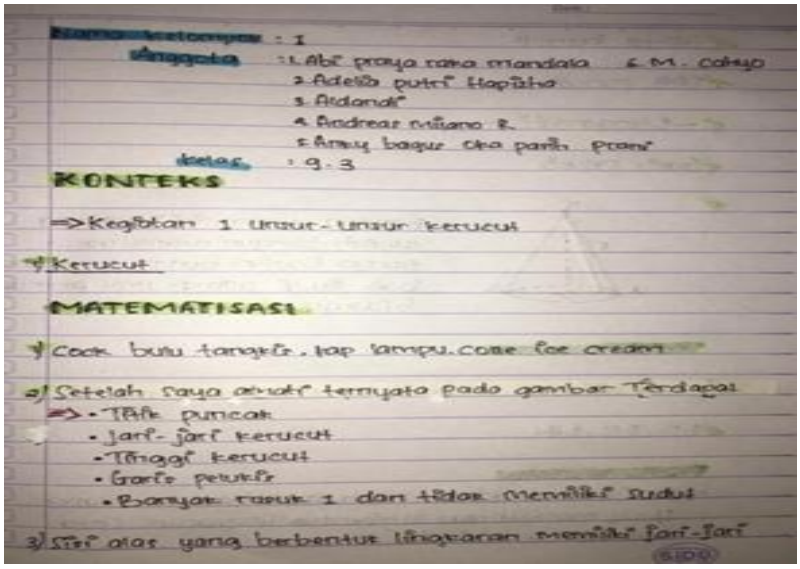

Figure 3. Student Answer about understand the problem

Figure 3 shows the results of student work. In the picture it can be seen that students have made a solution by understanding and explaining the problem. in the process of solving it students already understand the problem by writing down examples of conical objects, then writing down the characteristics of the cone in shape. Based on the interview expertt above, it can be concluded from the meeting on the activity that one of the indicators of mathematical connection ability has emerged.

The connection ability is seen in the good category 87.88. And understanding the linkages/relationships between one idea and another is 93.95%. Meanwhile, the lowest percentage of occurrences is the indicator using the relationship between ideas in mathematics to solve math application problems. The description of the mathematical connection ability of students based on the results of the mathematical connection test and the results of the interview is as follows.

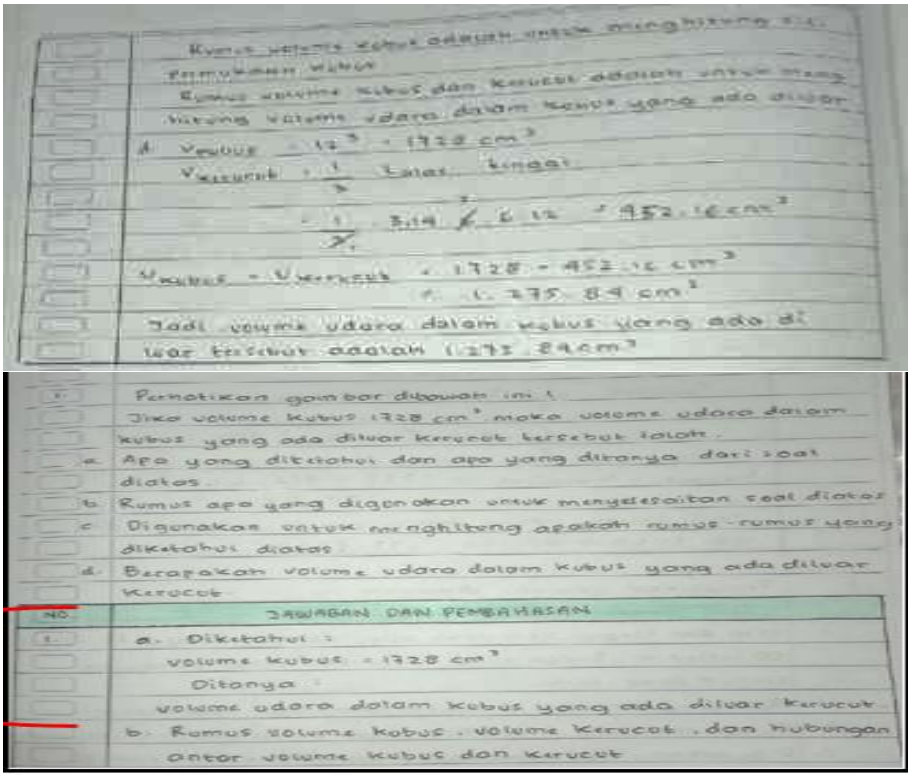

Figure 4. Participant occupation (FPA) answers to question number 1

The answer of the student in figure 4 is the answer to the connection question for question number 1. Where the three indicators of mathematical connection ability can already be seen. Judging from the emergence of indicators of knowing the relationship between each idea that exists in mathematics, it can be seen from the answers students write down known and asked questions along with writing down the formulas used to solve problems where this is related to the mathematical concepts that underlie the results. answers from students. Students have also come up with indicators of understanding the relationship/relationship between one idea and another by writing down the sequence of steps to solve the problem correctly and correctly. From the results of the mathematical connection test questions and interviews, the researcher concluded and argued that FPA students were able to rewrite what was known and asked about the questions and write down what formulas were used to solve questions where this was related to concepts. Then students have written the sequence of steps to solve the problem correctly. So the researchers stated that FPA was in the good category for its mathematical connection abilities.

CONCLUSION

Based on the research that has been done, it can be concluded that student worksheet based on Realistic Mathematics Education (RME) assisted by Cabri3D to train the mathematical connections of junior high school students on solid with non-flat surface material has been categorized as valid. The validity of the student worksheet is seen from the validation results and the results at the one-to-one trial stage which is based on the content, construct, and language aspects. The practicality of student worksheet based on Realistic Mathematics Education (RME) assisted by Cabri 3D to train mathematical connections can be seen from the results of the small group stage, namely, all students can use student worksheet well. The potential effect is seen in the results of a mathematical connection ability test, the highest percentage of indicator occurrences, that is, the second indicator, Understanding the linkages/relationships between one idea and another, amounting to 93.95%. Meanwhile, the lowest percentage of occurrences is an indicator using linkages between ideas.

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