

DEVELOPMENT OF STUDENT WORKSHEET ON PROBABILITY WITH REALISTIC MATHEMATICS EDUCATION APPROACH USING PANDEMIC CONTEXT**Dava Imadul Bilad**Program Studi Pendidikan Matematika, Fakultas Matematika dan Ilmu Pengetahuan Alam
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Universitas Negeri Surabaya, rooselynaekawati@unesa.ac.id**Abstrak**

Kondisi pendidikan pada masa pandemi mengalami beberapa perubahan yang membuat siswa sulit memahami materi yang diajarkan dan membuat mereka lebih pasif dalam kegiatan pembelajaran. Oleh karena itu, penelitian ini bertujuan untuk mengembangkan LKS materi peluang dengan pendekatan matematika realistik dengan pandemi konteks. Tujuan pengembangan LKS ini juga untuk membantu siswa mempelajari materi dengan baik dan meningkatkan aktivitas siswa dalam pembelajaran jarak jauh. LKS ini juga diharapkan dapat menjadikan kegiatan pembelajaran lebih bermakna bagi siswa karena membuat siswa menemukan konsep sendiri sehingga siswa dapat lebih memahami materi dengan baik. Dalam rangka pencapaian tujuan LKS yang diharapkan, penelitian ini didasarkan pada 4 aspek, yaitu: validitas, kepraktisan, keefektifan, dan kelayakan. Penelitian ini dikembangkan dengan mengikuti prinsip ADDIE (Analisis, Desain, Pengembangan, Implementasi, dan Evaluasi) dan subjek penelitian ini adalah siswa kelas VIII. LKS ini divalidasi oleh 2 orang ahli dan disupervisi kepraktisan oleh 1 orang ahli. Hasil pengembangan LKS memiliki nilai validitas sebesar 83,78% dan tergolong sedikit revisi. Kemudian untuk uji kepraktisan mendapatkan nilai 85% dan dikategorikan praktis. Kemudian untuk hasil belajar, pada pre test sebagian besar siswa belum mampu mengerjakan soal yang diberikan dan pada post test semua siswa dapat mengerjakan soal yang diberikan dengan baik sehingga keberhasilan LKS sangat tinggi untuk dibuat. siswa memahami konsep tersebut. Dari angket kepuasan siswa dalam pembelajaran, nilai rata-rata 4,8 dapat dibulatkan menjadi 5 yang artinya siswa sangat puas dengan kegiatan pembelajaran yang telah dilakukan. Sehingga hasil dari penelitian ini adalah keberhasilan pengembangan media pembelajaran pada materi probabilitas yang cocok diberikan kepada siswa di masa pandemi ini karena dapat meningkatkan pemahaman siswa terhadap materi dan membuat siswa lebih aktif dalam mengikuti kegiatan pembelajaran.

Kata Kunci: Lembar kerja siswa; Pendidikan Matematika Realistis (RME); ADDIE (Analisis, Desain, Pengembangan, Implementasi, Dan Evaluasi); Kemungkinan.

Abstract

The condition of education during the pandemic experienced several changes that made it difficult for students to understand the material being taught and made them more passive in learning activities. Therefore, this study aim at developing student worksheet on probability material with realistic mathematics education approach with pandemic context to help students learn the material well and increase student activity in distance learning and make learning activities more meaningful for students because it makes students find their own concepts so that students can better understand the material well. This study based on 4 aspects, namely: validity, practicality, effectiveness, and feasibility. This research was developed following the ADDIE principle (Analysis, Design, Development, Implementation, and Evaluation) and the subject for this study was 8th grade students. Then this student worksheet was validated by 2 experts and supervised for practicality by 1 expert. The results of developing student worksheets have a validity value of 83.78% and considered as few revisions. Then for the practicality test, it gets a score of 85% and categorized as practical. Then for the learning results, in the pre-test most students have not been able to work on the questions given and in the post-test all students can work on the questions given well so that the success of student worksheets is very high to make students understand the concept. The student satisfaction questionnaire in learning, the average value of 4.8 can be rounded up to 5, which means that students are very satisfied with the learning activities that have been carried out. So, the result of this research is the success of developing learning media on the material of probability that is suitable to be given to students during this pandemic because it can

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improve student's understanding of material and make students more active in participating in learning activities.

Keywords: Student Worksheet; Realistic Mathematics Education (RME); ADDIE (Analysis, Design, Development, Implementation, And Evaluation); Probability.

INTRODUCTION

According to WHO (2020), the corona virus disease 2019 (COVID-19) is infectious disease caused by the newly discovered corona virus. The emergence of COVID-19 has had many impacts on human life around the world because according to the Indonesian Ministry of Health (2020), Corona virus (CoV) is a large family of viruses that are transmitted between animals and humans. That way, the most appropriate preventive way to reduce the spread of COVID-19 is to reduce direct human-to-human contact. But that have many impact on several aspects of life, one of which is in the field of education. The world of education during the pandemic is required to adapt to new living conditions caused by distance restrictions. According to Sari et al (2020), the form of the learning process that occurred during the pandemic was in the form of changes from learning activities in the classroom to moving to each home using the internet network or educational media.. Learning using the internet or it can also be called online learning has been introduced in the world of education in Indonesia since 2014 through Permendikbud No. 109 of 2013 Article 2. However, according to Surahman et al (2020), there are many challenges faced during online learning, especially infrastructure problems and teacher readiness so that online learning is less attractive until the emergence of the COVID-19 pandemic. This kind of learning system makes student's activeness in learning decrease and the level of student's understanding also decreases due to lack of concentration in learning. So that, innovation is needed that makes students more active in learning and easy to understand the material on this condition.

The word mathematics in the minds of students is a material that is very difficult to understand, then also the teacher is scary, and the assumption that mathematics is not important in their lives. From that, it can be seen if a child has already thought about the concept if mathematics is a difficult and creepy subject in such a way that it makes students feel inferior to learning mathematics which makes it more difficult for them to understand the material. Although there are many scary assumptions about mathematics, according to Tanujaya (2017) mathematics is an important material to be mastered by students from elementary school to college level. Therefore, it is necessary to change the way students perceive mathematics so that they can start to like mathematics and getting comfortable with mathematics. Common math learning activities in Indonesia according to Sanjaya (2008) is teaching places the teacher as the "main actor" providing information, so in "instruction" the teacher acts more as a facilitator, managing various resources and facilities for

students to learn where the application is mostly done by teachers with explain formulas directly which makes students dizzy to memorize a lot of formulas. In addition, during this pandemic, students are taking shorter lessons than before and distance learning is more confusing for students to understand math material. During this pandemic, teachers are also less able to carry out full supervision of students as before about whether students are really taking lessons well because of the distance. Then students need the right way to make them understand mathematics well without having trouble memorizing many formulae especially during a pandemic like this, because this is a challenge for students who also have the task of understanding the whole lesson more independently. Then the right way to do it is build student's way of thinking to find existing mathematical concepts for themselves because this will make students remember the material better than memorizing. It is also added to apply mathematics material directly in daily life near students so that they are more aware of the importance of using mathematics so that it can make students increase their desire to learn more mathematics. One of mathematical materials that are often found in daily life but still often make students confuse is the probability material. The probability material is one of the chapters of mathematics that is started to be taught to students in junior high school. Then the confusion that can occur on probability material because of many examples of applying probabilities in daily life and student's understanding on probability material is still not strong. Thus, creative ideas are needed to change student's difficulties in understanding probability material, especially during a pandemic like this. Based on the Decree of the Minister of Education and Culture of the Republic of Indonesia Number 719/P/2020 concerning Guidelines for Curriculum Implementation in Education Units in Special Conditions, learning activities during the pandemic have a shorter time than learning activities before the pandemic came and carried out remotely for efforts to reduce the spread Covid-19. This makes it difficult for students to understand the material and be passive in learning activities, there is a need for learning innovation that make students more active in learning and increase their understanding of concepts. One of the learning innovations that can make students active is the creation of a learning process by linking the material with the experiences of students' daily lives which is called the Realistic Mathematics Education (RME) approach. According to Supinah and Agus (2009:70), Realistic Mathematics Education (RME) is an approach to mathematics education developed in the Netherlands by Hans Freudental. The real world is used as a starting point for the development of mathematical ideas and concepts in

learning using Realistic Mathematics Education (RME) and in this study, the Realistic Mathematics Education (RME) was developed in the form of a student worksheet and the context chosen was the pandemic context that was in accordance with current conditions. It is hoped that Realistic Mathematics Education (RME)-based student worksheet on probability material about finding the probability of an event with pandemic context can be a breakthrough that increases student activity in learning and helps improve their understanding of probability materials. Therefore, this study with the research subject is 8th grade students aim to develop student worksheet on probability material with realistic mathematics education approach with pandemic context to help students learn the material well and increase student activity in distance learning and make learning activities more meaningful for students because it makes students find their own concepts so that students can better understand the material well. The activities given on the student worksheets are also activities carried out by students during this pandemic so that students are not burdened and make students understand that mathematics is also needed in everyday life.

METHODE

The research method used is the ADDIE method with stages consisting of Analysis, Design, Development, Implementation, and Evaluation with the research steps can be seen from the following scheme:

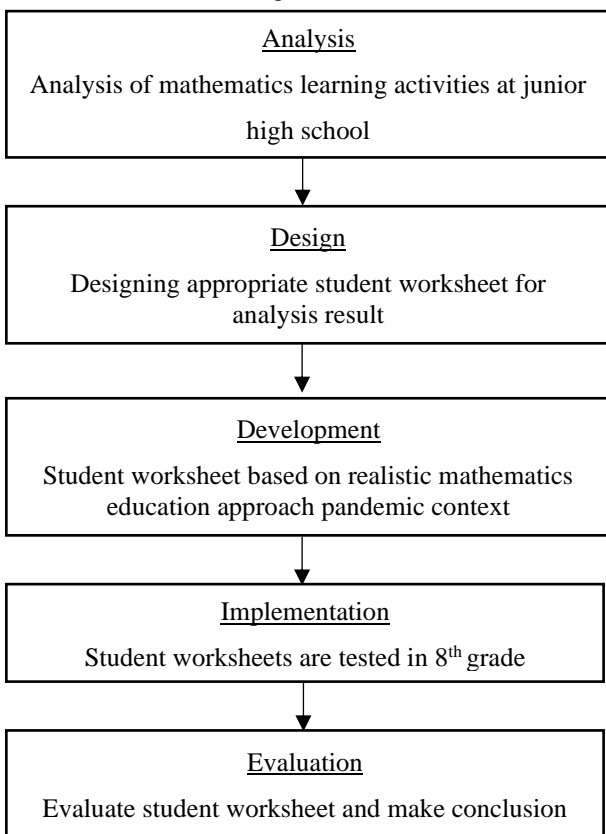


Figure 2. Research Scheme

The media developed is a student worksheet based on Realistic Mathematics Education (RME) approach with pandemic context that the research begins with analyzing the learning conditions experienced by the subject. Then after analyzing the learning conditions experienced by the subject, a suitable learning design can be made to be given to students according to the needs of students which is adjusted to the results of the analysis that has been made previously. After carrying out the stages of designing learning media, the next stage is the development of learning media based on designs that have been made previously. After the media has been developed with various previous consultations, it's time to practice or implement media on the subject to check the feasibility of using this media. The last step is to evaluate the feasibility of this student worksheet with several additional instruments in the form of a student worksheet validation sheet by an expert student worksheet validator, pre-test and post-test questions, student learning success questionnaires, and observational assessments. learning by teachers who also supervise research data collection activities. The data were obtained from one class of 8th grade which have implemented a hybrid learning system with the learning carried out there are face-to-face learning and distance learning through webinar, and for this study the researcher implemented this student worksheet in the learning webinar. This development seeks to manufacture products that are used to overcome the problem of student's activity learning during a pandemic and lack of understanding of students in understanding the material. In the analysis stage, the activities carried out were observing mathematics learning activities at 8th grade during the pandemic to see how the learning process took place. Then create a learning design that is suitable for use in overcoming existing problems, and in this case the problem that occurs is the student's mathematics learning activity and lack of understanding of students in understanding the material. After that, the stages of developing student worksheets that are in accordance with the designs that have been made previously and validation of the feasibility of student worksheets is carried out. The next stage is the application of student worksheets to students. But before that, students were given a pre- test to measure students' abilities before the material is given. Then in the final stage, students are given a post-test and a questionnaire to see student learning outcomes and student opinions about the student worksheets that have been given, coupled with the assessment of teachers who participate in learning activities. After the implementation stage is to evaluate the student worksheets that have been made by paying attention to the results of the validation

from expert, the results of observing the successful practice of Realistic Mathematics Education (RME)-based learning activities, the range of differences in the pre-test and post-test results, the results of the student response questionnaire about learning activities.

The methods of data collection used were validation sheet which has been consulted and revised by experts before being tested and to see how successful the student worksheets were, observation sheet, pre-test and post-test sheet, and student questionnaires. Worksheet validation was carried out by Mathematics lecturer who are experts in the Realistic Mathematics Education (RME) field and junior high school mathematics teacher who are experienced in teaching junior high school children. Aspects of the criteria covered in the validation assessment include format feasibility, language feasibility, content feasibility and didactic feasibility. Then the formula to calculate the validation results is as follows:

$$Value = \frac{Empirical\ Total\ Score}{Maximum\ Total\ Score} \times 100\%$$

Then after calculating with the above formula, the results can be concluded by dividing the validation results criteria according to Akbar (2013) as shown in Table 1 below:

Table 1. The validation criteria of learning model

No	Percentage (%)	Category
1.	85.01-100	Very valid
2.	70.01-85.00	Valid
3.	50.01-70.00	Less valid
4.	1.00-50.00	Invalid

To assess the success of the Realistic Mathematics Education (RME)-based learning activity practice, it is carried out by mathematics teacher who are also present in the learning activities to conduct assessment observations. The formula to calculate the results of observing the successful practice of Realistic Mathematics Education (RME)-based learning activities is as follows:

$$Suksesful\ practice\ (Sp) =$$

$$\frac{Scores\ obtained\ by\ mathematics\ teacher}{Total\ scores} \times 100\%$$

After calculating with the above formula, the results can be concluded by dividing the practicality category of learning model according to Sukardi (2004) as shown in Table 2 below:

Table 2. The practicality category of learning model

No	Score	Category
1.	$Sp > 95\%$	Very Practical
2.	$80\% < Sp \leq 95\%$	Practical
3.	$65\% < Sp \leq 80\%$	Sufficiently Practical
4.	$50\% < Sp \leq 65\%$	Less Practical
5.	$Sp \leq 50\%$	Unpractical

Then to assess the success of students receiving the material with the help of student worksheets, this is done by assessing the results of pre-test and post-test results. After calculating the value of the students' answers, the answers according to Widodo, Rachmadiarti, and Hidayati (2017) can be categorized shown in Table 3 below:

Table 3. The criteria of process skill

No	Score	Category
1.	85.01-100	Excellent (A)
2.	70.01-85	Good (B)
3.	55-70	Sufficiently Good (C)
4.	< 55	Poor (D)

After assessing the results of the students' post-test and pre-test answers and categorizing them according to Table 3, it's time to compare the students' abilities before and after giving the student worksheets. The next measurement of the success of this student worksheet is determined by the results of the questionnaire given to 8th grade junior high school students as the subject of research. According to Miles & Huberman (in Sugiyono; 2008:337) the questionnaire measurement scale using Likerts Summated Rating (LSR) using 5 answer categories for each answer respondents use interval 1 up to 5 with answer choices as follows:

1. Strongly agree (Score 5)
2. Agree (Score 4)
3. Undecided (Score 3)
4. Disagree (Score 2)
5. Strongly disagree (Score 1).

Then for the calculation formula according to Sugiyono (2008:337) as follows:

$$Score = \frac{Total\ respondents \times (The\ highest\ score - 1)}{The\ highest\ score}$$

$$The\ Lowest\ score = Total\ respondents \times The\ lowest\ score, \text{ and}$$

$$The\ highest\ score = Total\ respondents \times The\ highest\ score.$$

After doing the calculations, the assessment criteria can be determined.

RESULTS AND DISCUSSIONS

The result of this media development is the student worksheet based on Realistic Mathematics Education (RME) approach with pandemic context. This student worksheet aims to help solve math problems experienced by students in the form of difficulties understanding the material and increasing their activeness in learning, and this student worksheet can help them find concepts independently so that their understanding can be stronger than only memorizing. Then the mathematical application used is about the current pandemic conditions so that students can better understand the importance of

mathematics in every condition that can make them more motivated to understand mathematics. This student worksheet was tested using several additional instruments in the form of validation sheets, pre-test and post-test questions, learning observation sheets, and student questionnaires where these instruments were made accompanied by consultation and revision with experts. This developed student worksheet will be tested with the subject of one of the classes in junior high school which has carried out hybrid learning activities with face-to-face learning and webinar, and the learning activity used to test the success of this student worksheet is a webinar. Webinar learning activities were chosen compared to face-to-face meetings because these learning activities made students more confused in understanding the material and the lack of student activity compared to face-to-face learning activities. This student worksheet was also created and analyzed using the method ADDIE (Analysis, Design, Development, Implementation, Evaluation) which is further explained as follows:

Analysis Stage

The analysis of mathematics learning conducted at observation learning activities by participating in 8th grade learning on junior high school, either face-to-face meeting or webinar learning because learning activities at junior high school using a hybrid learning system. Because there are two learning activities then the analysis is divided into two, which are the analysis of mathematics learning activities during face-to-face meetings and during webinar. Webinar learning activities are carried out with all students doing webinar learning from home. The results of student analysis when learning mathematics through webinar are that students are not very active in learning because learning activities are more towards one-way learning, the teacher explains the material and when the teacher throws questions the students just stay silent without answering. Meanwhile when face-to-face learning activities are divided into 2, there are some students who attend class and others do webinars from home. Students who take lessons from home are less able to understand learning well because teachers communicate more often with students who are present at school. Although teachers communicate more often with students who attend school, they are still often silent or embarrassed to express their opinions because they are used to doing one-way learning from the teacher. It can be seen from the two learning activities carried out, the learning that has been carried out still makes students not active in learning and still makes students confused in learning mathematics. So from the observed mathematics learning activities, it can be concluded that the results of the analysis are that learning activities have not made students active in learning, it also means that students do not like and have the motivation to

learn mathematics during the current pandemic. Then students are also still confused about receiving learning which results in their lack of understanding of the material that that has been given.

Design Stage

From the results of the analysis of the learning conditions in the classroom, it can be concluded that the student needs activities that make them active in learning. Besides that, it is also necessary to make students like learning mathematics because it cannot be denied that many students do not like mathematics. As well as the application of learning that can build student’s concepts so that student’s subject matter is better understood and remembered. The stages of designing this worksheet are illustrated by a chart like the following:

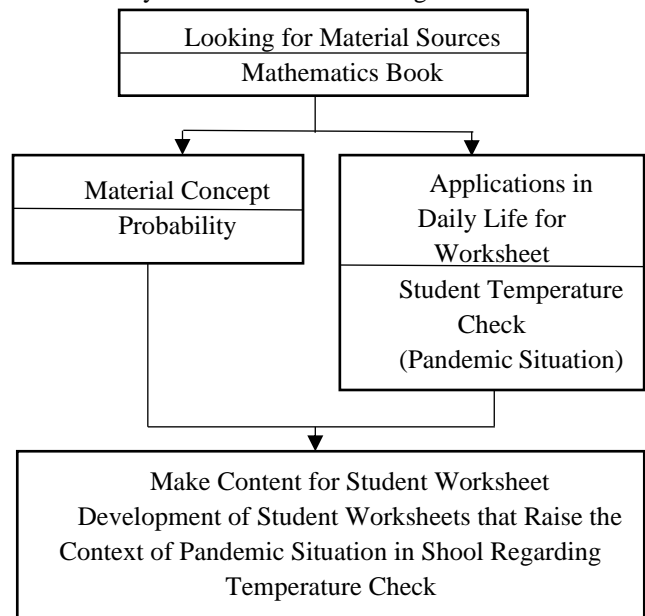


Figure 2. Worksheet Designing Scheme

The idea chosen by the author is to design a Realistic Mathematics Education (RME)-based student worksheet with a pandemic context that is in accordance with the current conditions experienced by students. Due to the Realistic Mathematics Education (RME)-based student worksheets, the contents of the student worksheets contain activities that can lead student’s thinking to find concepts. The activities given on the student worksheets are sequential by forming student’s concepts in stages. The activity steps are made following the steps of a realistic model according to Gravemeijer (1994) consisting of situation, model of, model for, and formal notation which are carried out sequentially. The activity steps on the student worksheets can be seen in the following Iceberg model:

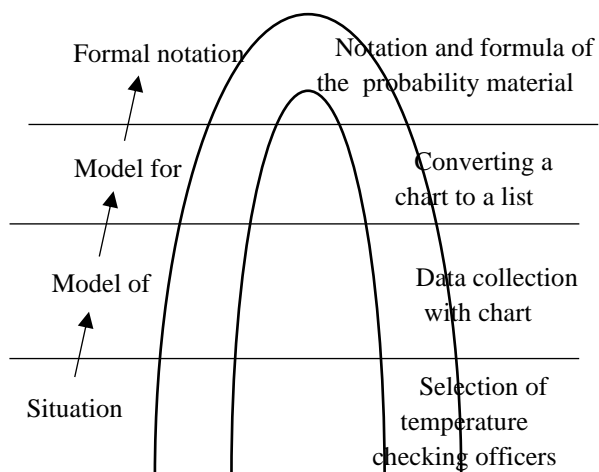


Figure 3. Iceberg Model

In the situation section, students are given problems in the context of a pandemic where the problem is about how to select temperature checking officers. Then at the model of stage, students begin to make diagrams as a means of recording the answers needed. Then after that, it was only the model of stage where students made a list to relate the existing data to the concept. And then at the formal notation stage, the concept of probability material is found.

The design of this student worksheet is based on the 2013 Indonesian State Education Curriculum, namely Basic Competencies 3.11 and 4.11 (Kemendikbud, 2013). The development of this student worksheet made for one meeting consisting of two sub-materials, namely the sample room and the expected chance of occurrence with indicators of competency achievement as shown in Table 4 below:

Table 4. The Material of Probability on the Indonesia's Curriculum of 2013

Basic Competencies	Indicator
3.11. Explain the empirical and theoretical probability of an event from an experiment	3.11.1 Identifying the sample space members of an event
	3.11.2 Determining the number of members of the sample space of an event
	3.11.3 Identify expected events
	3.11.4 Determining the number of expected events
4.11. Solve problems related to the	4.11.1 Presenting contextual

empirical and theoretical probabilities of a company occurrence of an experiment	problems related to empirical and theoretical probabilities of an occurrence of an experiment. 4.11.2 Resolving contextual problems related to empirical and theoretical probabilities of an occurrence of an experiment
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Then for the learning outcomes instrument, it includes basic competencies as well as on student worksheets. The type of question chosen is a description question whose form refers to the minimum competency assessment, which is directly related to the application of social life.

Development Stage

From the design stage, student worksheet based on Realistic Mathematics Education (RME) are formed on probability material on pandemic context that can make students more active on learning and more understand the concept. According to Depdiknas (2008), making student worksheets based on the rules given by the Indonesian Ministry of National Education where the device made must be meet the following components:

1. title;
2. learning instructions;
3. competencies that must be achieved;
4. subject matter;
5. supporting information;
6. work tasks and steps; and
7. assessment.

This student worksheet is based on Realistic Mathematics Education (RME), so it is necessary to make it based on the Realistic Mathematics Education (RME) principle. According to Freudenthal in Gravemeijer (1994), "Mathematics is a human activity" and the principle of the Realistic Mathematics Education (RME) are guided reinvention, didactical phenomenology, and self-developed model. It can be concluded that it is students who will find their own mathematical concepts with the activities they do with the guidance of the teacher. It makes development of this student worksheet needs to show activities in accordance with Realistic Mathematics Education (RME)-based learning. The first thing that needs to be done is to provide context for the problems that students need to solve. This is in the Realistic Mathematics Education (RME) steps according to Gravemeijer (1994) including

the situation stage, which by giving the context of this problem can lead students to find the concept. The context given to students is the selection of temperature checking officers where this activity becomes the routine of students during the pandemic, the context on the student worksheets can be seen in Figure 4 below:



Figure 4. Context of Problems on Student Worksheets

The next Realistic Mathematics Education (RME) step according to Gravemeijer (1994) is “model of” stage, which from the given situation allows students to model what information they get. This is done to make students understand the problems that have been given. On the student worksheet, this stage is made in the form of activity 1 which can be seen in Figure 5 below:



Figure 5. “Model Of” Stage

The third Realistic Mathematics Education (RME) stage according to Gravemeijer (1994) is “model for” stage, which at this stage collects data from “model of stage” so that it can be linked to the concept. In this student worksheet, “model for” stage is made in activity 2 which is shown in Figure 6 below:

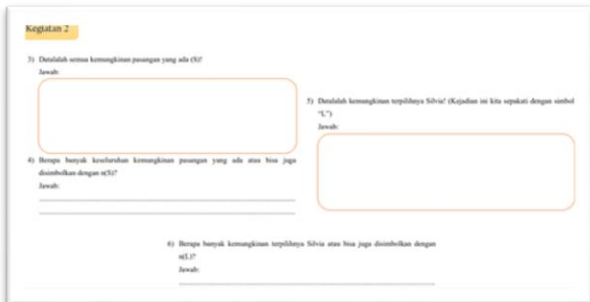


Figure 6. “Model For” Stage

The fourth RME stage according to Gravemeijer (1994) is the formal notation stage in which students find mathematical concepts from the problems that have been

given. In this student worksheet, the formal notation stages are made in activity 3 which is shown in Figure 7 below:

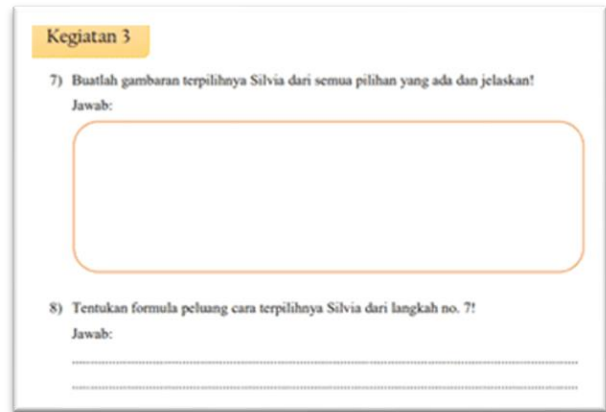


Figure 7. Formal Notation Stage

After the concept is found, students are expected to be able to answer the main questions of the problems that have been given. In this student worksheet, this is shown in the activity 4 which is shown in Figure 8 below:

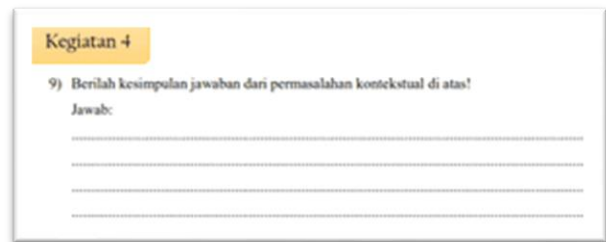


Figure 8. Main Question

After developing student worksheets, the next stage is validation from expert. There are 2 experts here who validate, the first is a mathematics lecturer the second is a mathematics teacher. The results of the validation can be seen in Table 5 below:

Table 5. Validation Results

Validator	Scores Achieved at Each Aspect				Validation Criteria for Each Aspect			
	1	2	3	4	1	2	3	4
Validator 1	16	29	22	13	80.00%	82.86%	88.00%	86.67%
Validator 2	18	29	20	12	90.00%	82.86%	80.00%	80.00%
Average for each aspect					85.00%	82.86%	84.00%	83.33%

Information: Aspect 1: Format Feasibility; Aspect 2: Language Feasibility; Aspect 3: Content Feasibility; and Aspect 4: Didactic Feasibility.

From the table above, the average value of two validators for the format feasibility test is 85.00% and included in valid category. It is based on the fact that the making of this student worksheet has been adapted to the rules given by the Indonesian Ministry of National Education. For the average value of language feasibility get 82.86% and included in valid category. According to Islamiyah (2015), a good student worksheet needs to adjust to the level of student development, readability, and motivational ability.

Therefore, this student worksheet is made by complying with language rules that apply in Indonesia and are interactive so that students can be motivated to learn mathematics, especially on the topic of probability. The average content feasibility is 84.00% and included in valid category. According to BSNP (2014), good student worksheets in accordance with basic competencies, accurate, and up-to date. In line with this, this student worksheet has been made in accordance with the 2013 Indonesian state education curriculum. For didactic feasibility, the average score is 83.33% and included in valid category in which there are Realistic Mathematics Education (RME) principles to help students find concepts independently with teacher guidance. From some things that have been mentioned above, the average validation result is 83.78% of the total interpretation. According to the validity criteria of Akbar (2013), this percentage is included in the valid category with a slight revision, which is between 70.01%-85.00%.

Implementation Stage

The implementation of the (Realistic Mathematics Education) RME-based student worksheet practice test was carried out through 8th grade junior high school learning activities. Learning activities are carried out online in the form of webinar, the activities of which can be seen in Figure 9 below:

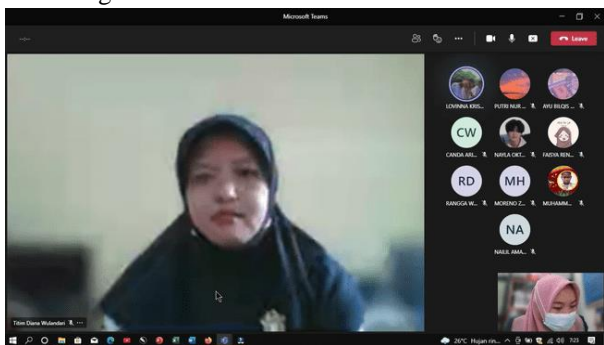


Figure 9. Implementation of The Application of Student Worksheet

The learning activity begins by giving a pre-test on the probability material to measure the student’s initial abilities. According to the assessment of Widodo, Rachmadiarti, and Hidayati (2017), the results of the pre-test of the subject group are 0% included in excellent category, 12.5% included in good category, 37.5% included in sufficiently good category and 50% included in poor category. So it can be concluded that almost all students do not understand this probability material. After giving the pre-test, the next activity is to carry out Realistic Mathematics Education (RME)-based learning accompanied by a practice test of the student worksheets that have been developed. In learning activities, students are divided into several study groups where each team

works together to find mathematical concepts from the problems given in the student worksheets. Students actively ask the teacher when they find difficulties in working on student worksheets. The stages of working on the student worksheets begin with students reading the problems given. After that, students are asked to do activity 1 in order to make them understand what the core problems are. According to Gravemeijer (1994), this stage is the model of stage and the results of student answers in activity 1 can be seen in Figure 10 below:

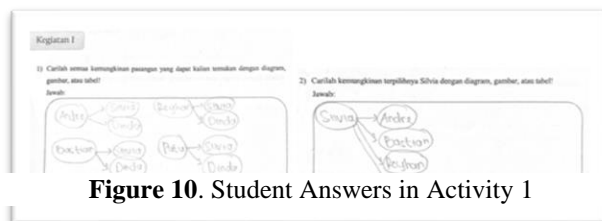


Figure 10. Student Answers in Activity 1

After understanding what is known in the problem, students are asked to do activity 2 which aims to listed what has been obtained in activity 1. According to Gravemeijer (1994), this stage is the model for stage and the results of student answers in activity 2 can be seen in Figure 11 below:

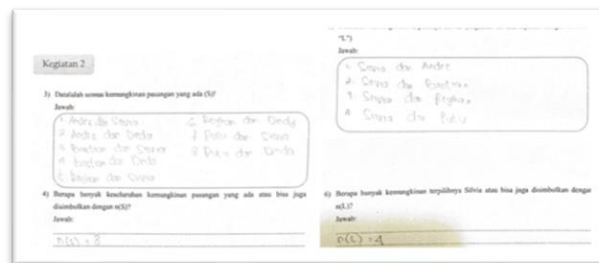


Figure 11. Student Answers in Activity 2

Furthermore, in activity 3 the students were asked to relate what they got to mathematical concepts. According to Gravemeijer (1994), this stage is the formal notation stage and the results of student answers in activity 3 can be seen in Figure 12 below:

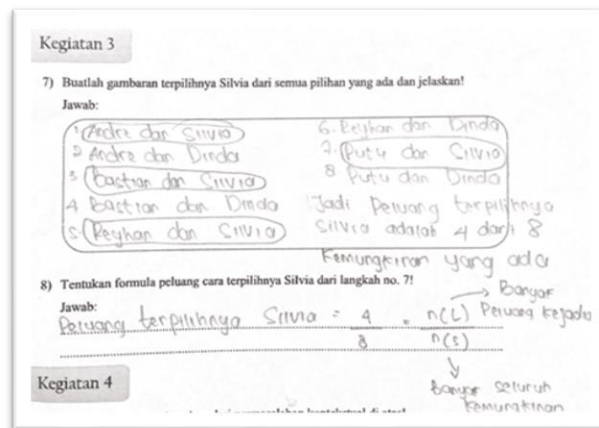


Figure 12. Student Answers in Activity 3

From working on the first 3 activities on student worksheets, students can find mathematical concepts about probability using Realistic Mathematics Education (RME). After the concept is found, students are asked to do activity 4 to answer the main questions on the problems given at the beginning. The results of student answers for activity 4 can be seen in Figure 13 below:

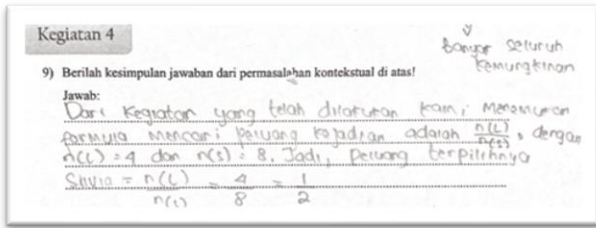


Figure 13. Student Answers in Activity 4

The practice of this learning activity is assessed for feasibility by a math teacher who is an expert in learning mathematics for junior high school students. After calculating the results, the successful practice (Sp) gets a score of 85% and According to Sukardi (2004) included in the category of practical. At the end of the learning activities, students are given post-test questions related to the material along with a questionnaire about the satisfaction of the learning activities that have been carried out. According to Widodo, Rachmadiarti, and Hidayati (2017) for post-test results are 87.5% included in excellent category, 12.5% included in good category, 0% included in sufficiently good category and 0% included in poor category. From this it can be concluded if all students have understood the material after the learning activities are carried out and student worksheets are given. This is in accordance with the pretest results at the beginning of learning where most students do not understand the material and the post-test results state that all students have understood the material well. This shows the success of student worksheets to lead students to find concepts independently with teacher guidance. Then for the learning satisfaction questionnaire that has been given to students, the results are calculated using the questionnaire calculation formula according to Sugiyono (2008) to get the final result of 4.8 which can be rounded up to 5. Then based on the categorization of the Likert's Summated Rating (LSR), student satisfaction in the category of very satisfied with the learning activities that have been carried out.

Research on the application of RME-based student worksheet learning has also been carried out by Monif and Suparman (2018). This study focuses on teaching flat shapes at the junior high school level. This student worksheet is designed to improve students' understanding of meaningful mathematics learning for students. Then, research on the development of ADDIE-

based learning media has also been carried out by Setiyani, Dian, Ferry, and Sandi (2020). This research is specifically designed to create learning media that can increase knowledge, creative thinking, and student activity in learning the material.

Evaluation Stage

Evaluation in this research activity occurs at the stage of developing student worksheets. Evaluation is carried out by the validator to provide suggestions and comments regarding the developed student worksheets. These suggestions and comments can be seen in Table 6 below:

Table 6. Suggestions and Comments by Validators

No.	Suggestions and Comments
1.	Show the application of the concept of Realistic Mathematics Education (RME)
2.	Correct some words that do not meet the rules of Indonesian grammar
3.	Fix some math concept mistakes

In addition, the evaluation stage is also carried out at the implementation stage where during the learning activities there is internet signal interference which also affects the disruption of material delivery. Where during a pandemic like today technology is an important factor in delivering material remotely, this is in accordance with Nadiyah & Faaizah (2015) that the application of technology is an important factor for students because it can improve their learning outcomes. Then because during the pandemic the time for learning activities was shorter than before, this made students not accustomed to doing learning in a short time so that on the questionnaire they gave suggestions to give longer time for learning activities. But even so, the learning objectives have been achieved with the given time. Then in the learning activities, the mathematics teacher who supervises the learning activities provides suggestions for choosing words that are easily understood by students so that students can quickly catch and understand what has been conveyed.

CONCLUSION

This Realistic Mathematics Education (RME)-based student worksheet on probability material was developed during the Covid-19 pandemic which aims to improve the quality of student education, especially in the field of mathematics. This student worksheet has aim to increase student's enthusiasm for learning mathematics, then increase student's understanding of mathematical concepts, and increase student activity in learning. The design and development of student worksheets is made through research from various related sources and experts in their fields. Then for the feasibility test, validation is carried out by experts in their fields and provides the results of this

student worksheet have a validity value of 83.78% and considered as few revisions. After being repaired, this student worksheet was implemented in 8th grade junior high school students, starting with giving pre-test questions, then learning activities were carried out by giving student worksheets that had been made, and at the final stage giving post-test questions and questionnaires. From the results of the pre-test and post-test, it was found that the student's abilities increased in the probability material after learning with this Realistic Mathematics Education (RME)-based student worksheet. Then from the questionnaire that has been given to students, it is found that students are very satisfied with the learning activities that have been carried out and the student worksheets they have done. Then for the assessment of the feasibility of the practice that has been carried out by the mathematics teacher who has also supervised the learning activities that have been carried out, that this learning gets a score of 85% and categorized as practical. Therefore, the results of this student worksheet can be used by teachers as an alternative teaching in probability material.

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