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# DEVELOPMENT OF LEARNING DEVICES BASED ON ETHNOMATHEMATICS OF THE MEHER TRIBE WOVEN FABRICS (KISAR ISLAND) WITH REALISTIC MATHEMATICS EDUCATION APPROACH ON NUMBER PATTERN MATERIAL

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**Abstract**

This study aimed to develop a learning device based on ethnomathematics of the Meher tribe woven fabrics (Kisar Island) with a Realistic Mathematics Education (RME) approach on number pattern material for 8th-grade students of Public Junior High School 4 Southern Islands. The learning devices developed consisted of Learning Implementation Plans (RPP), Teaching Materials (BA), and Student Worksheets (LKPD). The development model used was the 4-D model, which consisted of four stages, namely define, design, develop, and disseminate but were limited to the development stage. The device was tested for quality (valid, practical and effective). Following the validation results by the five validators, it was found that the devices developed met the validity requirements with an average score of Learning Implementation Plans (RPP) 3.5 (very good), an average score of Teaching Materials (BA) 3.3 (good), the average score of Student Worksheets (LKPD) was 3.4 (good). The average validator's general assessment was 3.3 (good). According to the practicality test of the developed devices, it was found that the developed devices were categorized as practical, with an average positive response of educators of 100% and an average positive response of students of 91.3%. The developed devices also fulfilled the effectiveness requirements by achieving a classical completeness percentage of 79.2%. The results of the study obtained the quality of the devices developed.

*Keywords*: development research, ethnomatematics, rme approach, number patterns

## 1. Introduction

Mathematics is a subject that will always be studied at every level of education, starting from elementary, junior high, and high school to almost all majors in tertiary institutions because mathematics is a prerequisite for studying other exact sciences (Nasution et al., 2017; Ratumanan and Laurens, 2016). It shows that mathematics is a fundamental science because it serves as the basis for the development of other disciplines in the development of science and technology, so mathematics is also called the queen of science.

Learning mathematics is very important, but of course, there are difficulties encountered both from the side of educators and students. According to Wijaya (Lado et al., 2016), mathematics is considered a boring subject for students because it involves many formulas and is considered a complex subject. Mathematics is still considered a complicated subject, and students generally think that mathematics is an objectionable subject.

Furthermore, according to Smith (Safrida et al., 2016), negative things arise in students when learning mathematics in the form of reasons for anxiety, so educators need to realize that every student does not always like mathematics. Many factors cause students to assume that mathematics is challenging and dull. One of which is the readiness of educators in the learning process. According to Darkasyi (Muhsetyo et al., 2016), low mathematics learning outcomes are not only due to complex mathematics but are caused by several factors, namely the students themselves, educators, approaches to learning, and learning environments that are interconnected with one another. According to Laurens (2016), the cause of the low learning outcomes of students is mechanistic learning by not linking mathematics with the realities of life.

Thus, to make mathematics fun and not dull, educators must be more creative by utilizing learning resources that students around them usually find, one of which is through their own

culture, such as crafts, buildings, art and others that students often see. Indonesia, especially Maluku, known as the province of a thousand islands, contains a variety of cultures. These cultures should be used as good learning resources for students studying mathematics. (Utami et al., 2019).

Culture and education are two parts that cannot be separated from human life. In addition, Pradana (Fauzi et al., 2020) also argued that education is not just a means of transferring knowledge but also a means of forming individual character by associating cultural elements. In education. Habits that show the culture of the surrounding community, which are associated with mathematical concepts, are known as ethnomathematics (Laurens, 2016). Ethnomathematics is a study of cultural objects/ content (traditional games, traditional crafts, artefacts, and culturally tangible activities) that can explain a mathematical concept, Prabawati (Feby and Abadi, 2020; Bishop Nielsen, 2009). Furthermore, Andriani et al., (2017) argue that there is a need for a form of learning that is adapted to the culture in which these students are located so that students can experience what they are learning through a culture that is often seen.

In addition to culture-based learning, in the ongoing teaching and learning process, most educators in mathematics still use conventional learning systems with teacher-centred learning. According to (Hidayati, 2021), a concept built by itself will be more embedded in the child's memory than a concept presented in a lesson. Such learning is often called Realistic Mathematics Education (RME). The RME approach is an approach to learning that provides opportunities for students to play an active role in the process of learning activities by building understanding and finding mathematical concepts from informal knowledge through real problems both physically and mentally to create a fun and meaningful learning atmosphere, Hadi (Chisara et al., 2019), Laurens et al., 2017; Palinussa, 2013; Tanjung, 2020). With the RME approach, students are happy with the classroom learning atmosphere, which makes class effective, trains students' reasoning, and can improve learning outcomes in mathematics, Mulbar and Rosyadah (Kartiwa, 2016).

When making initial observations by researchers at one of the junior high schools (SMP) on Kisar Island, namely Public Junior High School 4 Southern Island, which is geographically located in the Meher tribal community, The researcher interviewed the mathematics teacher to find out the learning process and the mathematical abilities of the participants. Students who had studied number pattern material. Based on the results of the interviews, information was obtained that students still had difficulty understanding the concept of number pattern material, so it had an impact on learning outcomes that were not maximized where 65% of students had not reached the minimum completeness criteria (KKM) set by the school. By associating the number pattern material with problems in everyday life, students can find it easier to find the concept of the number pattern material.

Number pattern material is taught in the eighth grade of junior high school in odd semesters. In everyday life, students often unknowingly encounter things related to number patterns and object configurations, so students should be able to associate the number patterns and object configuration material with the environment in which they are located. By associating the number pattern material with problems in everyday life, students can find it easier to find the concept of the number pattern material.

In addition to student learning outcomes, the results of brief discussions between researchers and mathematics educators at Public Junior High Schools in southern islands show that the learning devices used by educators in the learning process still used existing learning devices. They could have been an innovation by educators in creating/designing learning devices based on the actual needs and conditions of the students he teaches. In line, educators in Indonesia generally use conventional teaching materials or ready-to-use teaching materials purchased from book publishers without any independent planning, preparation and arrangement of teaching materials to be used in the learning process so that they only present learning material as it is. Moreover, only a few provide contextual problems, Zuriah (Aisyah et al., 2018).

Thus, the learning devices used need to be more contextual, uninteresting, and monotonous and not follow the needs of students. The risk is that students will need help understanding what the educator is teaching. Learning devices must be made by paying attention to the school curriculum. However, the important thing that also needs to be considered is that these learning devices are adapted to the needs of students so that later learning takes place well and is conducive.

Technological developments that impacted the culture on Kisar Island and migrants from other areas after the division of Southwest Maluku district, which was initially the district capital on Kisar Island, had an impact on the cultural life of the generation at that time. Therefore, the cultures on Kisar Island began to erode, such as traditional games, dances, dressing, food and others. This problem needs special attention to preserve cultural values on the island of Kisar.

One effort that can be used to overcome this is to integrate culture into learning Andriani et al., (2017). Initially, the average school on Kisar Island had integrated culture into learning but only in local content subjects. Hence, developing a culture-based learning design in mathematics on Kisar Island was necessary.

Based on the description above, the formulation of the problem in this study is how is the quality of learning devices (valid, practical, effective) based on ethnomathematics of the Meher tribe woven fabrics of (Kisar island) with the Realistic Mathematics Education (RME) approach on number pattern material at Public Junior High School 4 Southern Island according to the 2013 curriculum?

## 2. Method

This research is research development or Research & Development (R&D). In this research, an ethnomathematics-based learning device was developed with a Realistic Mathematics Education (RME) approach, which included teaching materials (BA), lesson plans (RPP), and student worksheets (LKPD) on number pattern material in 8th-grade Public Junior High School 4 Southern Islands.

The learning devices development model used in this study is to modify the 4-D model from Thiagarajan (Hobri and Suharto, 2014), which consists of four stages: define, design, develop, and disseminate. This research is limited to the development stage.

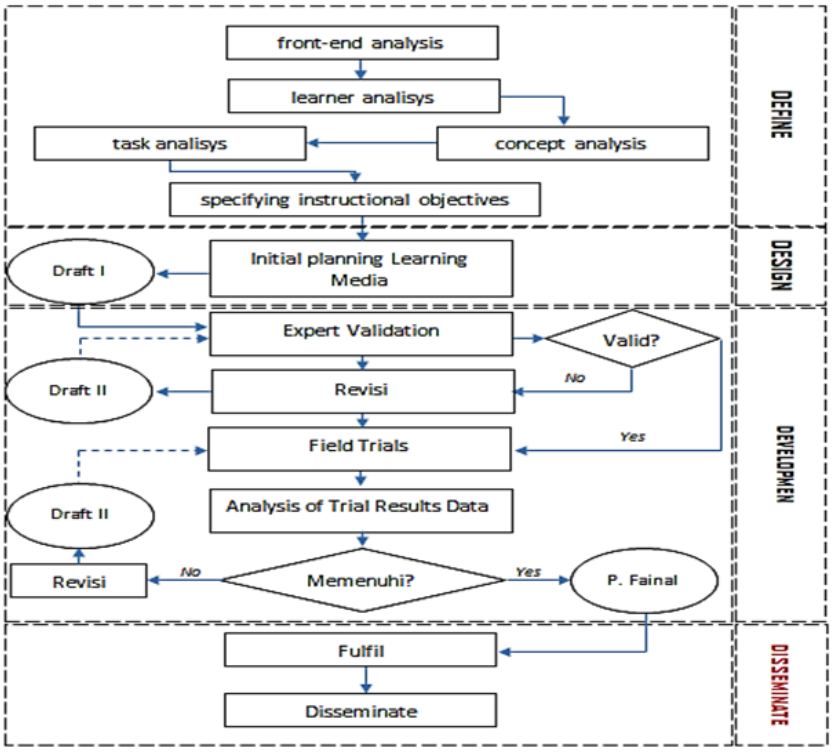



**Figure 1.** Learning Devices Development Scheme

Activities at the three stages are described as follows. (1) The define stage aimed to determine and define the requirements for the preparation and development of learning devices by analyzing the objectives and limitations of learning materials focused on analyzing the situation faced by educators, the characteristics of students, the concepts taught and ending with the formulation of learning indicators. Activities carried out were (a) initial-end analysis, (b) student analysis, (c) concept analysis, (d) task analysis, and (e) specification of learning objectives; (2) The design stage aimed to design learning devices, including RPP, BA, and LKPD. The activities were media selection, format selection, and initial design; and (3) The

development stage aimed to produce a final draft. The activities carried out were expert validation, readability tests, and learning device trials. A validator carries out validation considered an expert (expert judgment) in mathematics. The readability test aimed to obtain input from educators and students regarding language that is read, understood and can be implemented in the field. Meanwhile, the trial aimed to determine the implementation of learning based on the activities of educators and students. Data was collected using validation sheets, observation sheets, questionnaires, and learning achievement tests. The analysis was carried out in a quantitative descriptive manner. It was based on the criteria (1) The validator provided an assessment of learning devices (RPP, BS, and LKPD) with an average score of ≥ 2.50; (2) Educator Activities and Student Activities are said to be implemented if the percentage is ≥ 70%; (3) Educators gave positive responses in the form of agree (S) and strongly agree (SS) responses if the percentage of the questionnaire results is ≥ 70%; (4) Students give positive responses in the form of agree (S) and strongly agree (SS) responses if the percentage of the questionnaire results is ≥ 70%; and (5) Learning is said to be effective if at least 75% of students obtain test results that reach the Minimum Completeness Criteria (KKM), which is more than or equal to 64.

## 3. Result and Discussion

Based on the researcher's discussions with several informants, namely W.L (Customary Figures) and M.S, N.D and OS (Weavers), information was obtained that woven cloth is a substitute for leaves and bark as body wrapping. Apart from being used as body wrapping, woven cloth is also made with different motifs so that if someone wears the woven cloth, that motif can distinguish a person based on strata or position according to custom on Kisar Island. The woven motif on Kisar Island, which in the Meher language is called Wonokadi, consists of 4 (four) motifs, among others:

### a. Wonokadi Wekwekur (Specificity)

Wekwekur, or in Indonesian, which means toe touch/on the heel, describes the wibot or chastity of a woman on the island of Kisar. The Wekwekur motif is divided into 3 (three) namely the Wekwekur Woyalimermekem motif, where those who may use this motif are Merehe, Romalunu, Meya'a and Mauko'o, then the Wekwekur Oromermekem motif, where those who may use this motif are Romana and Dadiarupun as well as the Wekwekur motif Mer'ina. The Wekwekur Woyalimermekem and Oromermekem woven fabrics in traditional wedding processions are given to daughters from their mothers, while the Wekwekur Mer'ina motifs are given to granddaughters from their grandmother. The following is a picture of the Wekwekur woven motif.


**Figure 2**. Wekwekur Motive

This Wekwekur motif is used at certain moments, namely traditional titles (*Kohonnohonol'a*) and Reception (*Harapeina'a*). The procedure for using the wekwekur motif woven cloth is that the end of the woven cloth is above the heel or below the ankle for young girls (not married), while the end of the cloth is under the calf for those who are married. The unique feature of the original woven wekwekur is that the upper and lower ends of the cloth are black, which symbolizes the birth and death of a person in the dark.

### b. Wonokadi Rimanu (Princess of Heaven)

The word Rimanu is a fragment of the word "ri", which means human and "manu", which means chicken, so the word Rimanu means chicken man because it has a particular character, namely being able to fly (has wings). Meanwhile, from a traditional perspective, Rimanu means "Princess of Heaven". The following is a picture of the Rimanu woven motif.

**Figure 3**. Rimanu Motive

In the picture above, three people marked with a blue line (Riwokelu wokiaka) are guards/guards, then a spear point marked with a white line (Weleh) and also a caricature/ornament marked with a red line (Kanadi) which is a symbol of supernatural powers /strength. From the meaning of each caricature that has been explained, the caricature/ornament indicates that three bodyguards with supernatural powers guard the Princess of Heaven (Rimanu), who is joyfully praising the giver of life. The unique feature of this motif is the princess of heaven (Rimanu), whose feet seem to want to lift (float). This has the meaning that humans on earth only.

**c. Wonokadi Kuda, Lawoo (horse, crocodile)**

This motif shows chivalry/warlords, so those entitled to use this woven motif are leaders on the battlefield. Here is a picture of Wonokadi Horse, Lawoo.

**Figure 4**. Kud'a Motive, Lawoo

From the picture above, the caricature marked with a blue line depicts a crocodile (Lawoo), while the caricature marked with a yellow line depicts a man riding a horse (kud'a) while dancing.

**d. *Wonokadi Tei, Tokko, I'in* Apothecary/healer)**

This motif is unique because it is symbolized by animals such as lizards, geckos and fish and is an image of a special person. The following is a picture of wonokadi Tei, Tokko, I'in.

**Figure 4**. Tei Motive, Tokko, I'in

The primary reason why this woven cloth contains disgusting animals is that lizards and geckos can live in any space and situation and can eat mosquito larvae. These special people describe as apothecaries (healers).

Since the semenajung melayu tahun 1574, the entry of exodus/ethnicities on Kisar Island has also impacted woven fabric motifs on Kisar Island so that they experience collaboration with outside cultures. However, the woven fabrics known on Kisar Island generally only have four motifs, as described in the previous section.

Here is a picture of the equipment used for weaving.

**Figure 5**. Weaving Equipment

The equipment used in the weaving process in Figure 5 above has names and benefits, as stated by Kuahaty (2013), which is explained in Table 1 below.

**Table 1.** Weaving devices

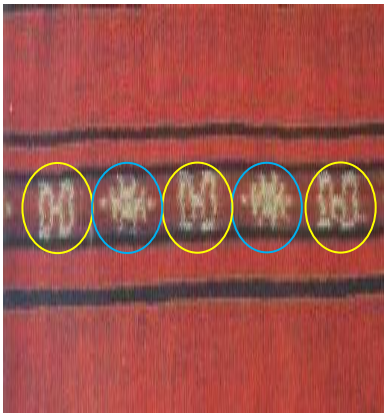
| No | Devices name | Devices function |
|---|---|---|
| 1. | Nasla | Separate the seeds with cotton |
| 2. | Wuhur | Produce cotton |
| 3. | Ahwiur | Place cotton to be spun |
| 4. | Pokhrau | Spun cotton into yarn |
| 5. | Di'ikwaku | Rotate Pokhrau |
| 6. | Uluwali | Thread to be spooled |
| 7. | Dodomor | Thread spool |
| 8. | Aunahoro | A place to install and form threads according to motifs |
| 9. | Pepehe | Count according to motive |
| 10. | Yoonau | Upper and lower thread adjustment anchors |

| No | Devices name | Devices function |
|---|---|---|
| 11. | Kikiknau | To set yoonau |
| 12. | Wili'i | Hit/tighten the thread |
| 13. | Hawono | Tie the ends of the fabric |
| 14. | Oroh and akam | Upper and lower holders of threads for weaving |

The material used for the manufacture of woven cloth consists of 2 (two) parts, namely (1) Yarn: the thread used for weaving is spun using the essential ingredients of cotton plants which in the Meher language is called (Ahuwaku) assisted by using spinning devices made from wood, bia, and woven koli leaves, (2) dyes; which is used as a thread dye to form the motif of each woven cloth, namely by using the roots and leaves of the plant, namely karum leaves (produces a black color), turmeric (produces a yellow color), Nenu roots and Kusambi skin (produces a red color), leaves Lapatu Nut (produces a green color).

Based on the Meher ethnic woven cloth motifs, several forms can be explored to explain the concept of number pattern material, as shown in table 2 below.

**Table 2.** Conformity of the motif location with the number pattern material

| Motif | Compatibility with number patterns |
|---|---|
|  |  <br>➢ Kanadti = yellow circle<br>The Kanadti ornament will always appear in an **odd** order (1, 3, 5, 7, 9, dst)<br>➢ Raraopol = Blue<br>The Raraopol ornament will always appear in **even** order (2, 4, 6, 8, 10, dst)<br>Kanadti Pattern (A) = ***2n-1***<br>Raraopol Pattern (B) = ***2n*** |
|  |  <br>Color Order<br>The general form of the location of the green color for the n-th row |
|  | The general form of the location of the yellow color for the n-th row<br>The general form of the location of the yellow color for the n-th row<br>The general form of the location of the black color for the n-th row |

| | Motif | |
|---|---|---|
| | A | B |
| Urutan Bilangan | 1 | 2 |
| | 3 | 4 |
| | 5 | . |
| | . | . |
| | . | . |
| | . | . |
| | dst | dst |

| Pola | 1 | 2 | 3 | . . . | n |
|---|---|---|---|---|---|
| Baris ke- | 1 | 5 | 9 | . . . | n |
| Persamaan | (4x1)-3 | (4x2)-3 | (4x3)-3 | . . . | (4xn)-1 atau **4n-3** |

| Pola | 1 | 2 | 3 | . . . | n |
|---|---|---|---|---|---|
| Baris ke- | 2 | 6 | 10 | . . . | n |
| Persamaan | (4x1)-2 | (4x2)-2 | (4x3)-2 | . . . | (4xn)-2 atau **4n-2** |

| Pola | 1 | 2 | 3 | . . . | n |
|---|---|---|---|---|---|
| Baris ke- | 3 | 7 | 11 | . . . | n |
| Persamaan | (4x1)-1 | (4x2)-1 | (4x3)-1 | . . . | (4xn)-1 atau **4n-1** |

| Pola | 1 | 2 | 3 | . . . | N |
|---|---|---|---|---|---|
| Baris ke- | 4 | 8 | 12 | . . . | N |
| Persamaan | (4x1) | (4x2) | (4x3) | . . . | (4xn) atau ***4n*** |

From this information, a learning device based on ethnomathematics of the meher woven fabric with the RME approach has been developed, which includes RPP, BA, and LKPD for four meetings (draft I). The draft I was then validated by five validators, including 3 lecturers and 2 junior high school educators. The validation results are presented in table 3 below.

**Table 3.** Validator's General Assessment of Learning Devices

| No | Devices revised | Validators | | | | | Xv |
|---|---|---|---|---|---|---|---|
| | | *L.M* | *C.A* | *H.T* | *H.M* | *A.S* | |
| 1 | RPP | 3 | 3 | 3 | 3 | 4 | 3,2 |
| 2 | BA | 3 | 3 | 3 | 3 | 3 | 3 |
| 3 | LKPD | 4 | 4 | 3 | 3 | 4 | 3,6 |
| **Score average (Rs)** | | | | | | | **3,3** |

Based on the validator's general assessment results, as shown in Table 3 above, an average score (Rs) of 3.3 is obtained. It shows that the learning devices developed are in a good classification so that the learning devices can be used with slight revisions based on the suggestions of the five validators.

Then, a readability test was carried out by the educator (A.S) and three students (S.Z, M.K, and L.D) to ensure the clarity of the language used in the preparation of learning devices so that these learning devices can facilitate students in learning. The opinion of Nerita et al., (2018) The results of the readability test showed that there were no words, sentences, or terms that were not understood, so based on this and revisions based on the validation results of each validator (draft II), they would then be used for testing learning devices in the learning process in class (field trials). In the testing phase of the devices, data obtained included observation data on the implementation of learning based on the activities of educators and students and questionnaire responses of educators and students. The following is the observational data on the implementation of learning based on educator activities in table 4 below.

**Table 4.** Results of Observation Analysis of Educator Activities

| NO. | Activities | Implementation | | | |
|---|---|---|---|---|---|
| | | Meeting 1 | Meeting 2 | Meeting 3 | Meeting 4 |
| **I.** | **Introduction** | | | | |
| 1 | Open the lesson with greetings | 1 | 1 | 1 | 1 |
| 2 | Ask one of the students to lead the prayer | 1 | 1 | 1 | 1 |
| 3 | Convey learning objectives and learning outcomes to be achieved by students | 1 | 1 | 1 | 1 |
| 4 | Convey outlines of the material scope and activities to be carried out to work on LKPD with group discussions | 1 | 1 | 1 | 1 |
| **II.** | **Core activities** | | | | |
| 1 | Provide contextual problems and students are asked to understand the problem | 1 | 1 | 1 | 1 |
| 2 | Students are asked to explain contextual problems | 0 | 0 | 1 | 1 |
| 3 | Students are directed to solve contextual problems in LKPD | 1 | 1 | 1 | 1 |
| 4 | Students are asked to compare and discuss work results individually, in groups, and between groups | 1 | 1 | 1 | 1 |
| 5 | Facilitate students to draw conclusions | 0 | 1 | 1 | 1 |
| **III.** | **Closing** | | | | |
| 1 | Give awards to students in the form of praise for the learning process that has taken place | 1 | 1 | 1 | 1 |
| 2 | Educators give homework | 1 | 1 | 1 | 1 |
| 3 | Inform the material to be studied at the next meeting | 1 | 1 | 1 | 1 |
| **Average Ag (%)** | | **83,3** | **91,7** | **100** | **100** |

Based on the results of observations as shown in table 4 above, the implementation of educator activities based on educator activities reached ≥70%. Then, the average teacher learning implementation for four meetings reaches 91.3%> 70%. It can also be seen that the implementation of educator activities has increased at each meeting so that educator activities in the learning process can be said to be effective.

Two observers observed student activities. The first observer (S.D) observed each group at meetings 1 and 3, while the second observer (Y.L) observed each group at meetings 2 and 4. The results of the analysis are listed in Table 5 below.

**Table 5.** Results of Observation Analysis of Student Activities in Groups

| Meetings | Implementation (%) | | | | | | | | | | Ask |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Group 1 | | Group 2 | | Group 3 | | Group 4 | | Group 5 | | |
| | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | |
| **I** | 86,7 | 13,3 | 90 | 10 | 93,3 | 6,7 | 90 | 10 | 91,7 | 8,3 | ***90,3*** |
| **II** | 90 | 10,0 | 86,7 | 13,3 | 93,3 | 6,7 | 93,3 | 6,7 | 91,7 | 8,3 | ***91*** |
| **III** | 93,3 | 6,7 | 93,3 | 6,7 | 93,3 | 6,7 | 93,3 | 6,7 | 91,7 | 8,3 | ***93*** |
| **IV** | 90 | 10,0 | 93,3 | 6,7 | 93,3 | 6,7 | 90 | 10 | 87,5 | 12,5 | ***90,8*** |
| **Average Ask (%)** | | | | | | | | | | | **91,3** |

The observational data above shows that the percentage of student activity implementation reached >70%. Then, the overall average implementation also reached 91.3%> 70%. Therefore, the learning process based on student activity can be effective. The results of filling out the educator's response questionnaire to the learning devices used after being analyzed obtained results as shown in table 6 below.

**Table 6.** Results of Educator Response Questionnaire Analysis of Learning Devices

| Learning Media | SS | S | TS | STS |
|---|---|---|---|---|
| **1. Teaching materials (BA)** | | | | |
| a. The appearance of the cover and contents of BA is attractive and easy to understand | 1 | 0 | 0 | 0 |
| b. BA made according to indicators | 1 | 0 | 0 | 0 |
| c. BA helps students discover material concepts | 1 | 0 | 0 | 0 |
| d. BA makes students learn independently | 1 | 0 | 0 | 0 |
| e. BA makes students curious | 1 | 0 | 0 | 0 |
| f. The content of the teaching materials reflects the RME approach | 1 | 0 | 0 | 0 |
| **2. Student Worksheets (LKPD)** | | | | |
| a. LKPD is easy for students to understand | 0 | 1 | 0 | 0 |
| b. LKPD contains the RME approach | 1 | 0 | 0 | 0 |
| c. LKPD helps students gain knowledge and understanding of the material | 1 | 0 | 0 | 0 |
| **3. Implementation of Learning** | | | | |
| a. The RME approach helps students solve real problems | 1 | 0 | 0 | 0 |
| b. The learning atmosphere in the class is fun and not boring | 1 | 0 | 0 | 0 |
| c. Students can understand the concept of material properly and correctly | 1 | 0 | 0 | 0 |
| **Average *Prg* (%)** | **91,7** | **8,3** | **0** | **0** |

Based on table 6 above, it can be seen that the positive responses of educators, which included Strongly agree (SS), reached a value of 91.7%, Agree (S) of 8.3%, while Disagree (TS), and Strongly Disagree (STS) respectively each by 0%. Consequently, the response of educators can be said to be positive because the responses given by educators are 100% ≥ 70%.

Furthermore, the analysis results of the student responses were obtained from a questionnaire filled in by 24 students, as shown in table 7 below.

**Table 7.** Results of Questionnaire Analysis of Student Responses to Learning Devices

| Learning Media | SS | S | TS | STS |
|---|---|---|---|---|
| 1. Teaching materials (BA) | | | | |
| a. The appearance of the cover and contents of BA is attractive and easy to understand | 96 | 4 | 0 | 0 |
| b. BA helps us discover the concept of matter | 100 | 0 | 0 | 0 |
| c. BA made us study independently | 63 | 21 | 16 | 0 |
| 2. Student Worksheets (LKPD) | | | | |
| a. LKPD is easy to understand | 71 | 29 | 0 | 0 |
| b. LKPD helps us understand the material | 96 | 4 | 0 | 0 |
| c. LKPD makes it easier for us to study independently | 96 | 4 | 0 | 0 |
| 3. Implementation of Learning | | | | |
| a. With the RME approach makes learning more active | 100 | 0 | 0 | 0 |
| b. The learning atmosphere in the class is fun and not boring | 100 | 0 | 0 | 0 |
| c. We are passionate about the learning process | 96 | 4 | 0 | 0 |
| Average ***Prs*** **(%)** | 91 | 7 | 2 | 0 |

Based on table 7 above, the students' positive responses included strongly agree (SS) and agree (S) responses reaching 98, exceeding 70%, so the learning device could be said to be practical.

After the implementation of learning in four meetings, a learning achievement test was carried out to determine the level of students' understanding of the material, mastery, and success of educators and also the extent to which the accuracy of the learning devices developed and used during the learning process, the same thing was stated by Novsyah (2019).

The results of the student learning tests, which 24 students attended, can be seen in table 8 below.

**Table 8.** Classical Completeness

| KKM | Complete | Incomplete (%) |
|---|---|---|
| 65 | 79,2% | 20,8% |

Based on the learning outcomes tests of 24 students, the developed devices can be said to be effective because the classical completeness achievement of 79.2% exceeds 75% as a criterion for the effectiveness of learning devices, and the other 20.8% does not reach the KKM. One of the reasons for the incompleteness of students is the students themselves because they study material outside of face-to-face hours, according to the opinion (Ratumanan and Laurens, 2016).

## 4. Conclusion

Based on the research results, it is concluded that the learning devices (RPP, BA, and LKPD) that have been developed meet the criteria for quality learning devices. The developed device is declared valid because the average lesson plan validation results obtained a value of 3.5, and the average BA validation results obtained a value of 3.3. The average LKPD validation results obtain a value of 3.4, and the average general assessment obtains a value of 3.3 so that it can be concluded that the average validation of lesson plan, BA, LKPD as well as general assessment each meets the validity criteria of ≥2.50. Then the learning devices developed were also stated to be practical because the teacher's positive response received a score of 100% and the positive responses of students obtained a value of 91.3%, respectively ≥ 70%, which means that they meet the practical requirements. The developed devices also meets the effectiveness criteria because the percentage of classical completeness reaches 79.2%> 75%.

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