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USING THE DIGITAL MODULE *RAINBOW BOOK* AS A SUPPORTING MEDIA FOR LEARNING MATHEMATICS IN IMPROVING THE UNDERSTANDING OF PRIMARY STUDENTS

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Abstract

This research is motivated by the lack of available mathematics teaching materials that are attractive and in accordance with the characteristics of primary school students. In addition, students' mathematical understanding is still low regarding the Geometry material. Based on these problems, the purpose of this research is to develop rainbow book teaching materials and to analyze the impact of using these teaching materials on mathematical understanding of students. This research is a development research using the 4D model, namely define, design, develop and disseminate. At the disseminate stage, an analysis of the impact of using teaching materials on student understanding is carried out. The instruments used were questionnaires and tests, questionnaires were used to assess the appropriateness of teaching materials both in terms of content and media. While the test is used to see students' mathematical understanding. Based on the results of the development, it was found that the rainbow book teaching material was feasible based on the content and media expert's assessment. The assessment of the two experts shows that the rainbow book can be used as teaching material in geometry materials for primary school students. In addition, based on the results of user responses, students stated that students showed good responses to learning using the rainbow book. The results of the comprehension test showed that the remainder after learning to use the rainbow book obtained an understanding score of 83.75 with a very good achievement category.

Keywords: Teaching Materials, Rainbow Book

A. Introduction

Teaching and learning process is a process of interaction between students, teachers and learning resources. The interaction in the learning process is essentially a multi-directional interaction, so that this interaction will create an atmosphere of active student learning or student centered learning. One of the factors that support the creation of an active student learning environment is learning resources.

Learning resources are anything that can stimulate students' thoughts, feelings and curiosity, so that the learning process occurs in students. This is in line with the opinion of Pamungkas (2018) which states that learning resources are anything that can be used by students either alone or in combination with the aim of facilitating the learning process. According to the PEI Department of Education (2008) learning resources are not limited to printed and non-printed forms, but can be in the form of audio, visual, electronic, digital both hardware and software.

Learning resources related to the content dimension are teaching materials. Teaching materials are learning materials along with activities or learning experiences that are systematically arranged according to a certain approach. Based on the opinion of Rahmi, et.al (2014) teaching materials are learning materials that are arranged systematically and completely in learning activities. This is in line with the opinion that teaching materials are all forms of materials used to assist teachers in carrying out teaching and learning activities in the classroom and helping students achieve their competence (Ahmadi et al, 2010; Depdiknas, 2003).

Based on the above opinion, the teaching materials can be used as a means of helping students gain understanding of concepts. Understanding refers to what a person can do with this information (Uno and Kuadrat, 2009). Indicators of student understanding include when students understand something, they can explain concepts in their own sentences, use information appropriately in new contexts, make new analogies, and generalize (Diana et al, 2020). Obviously based on these several indicators, understanding is not limited to the ability to memorize or say something correctly. But in a deeper ability of the knowledge or concept.

The ability to understand is one of the goals of learning mathematics at all levels from elementary to high school, namely so that students have the ability to understand mathematical concepts, explain the relationship between concepts or algorithms, in a flexible, accurate, efficient and precise way in solving problems. Thus this ability is very important and the basic ability that

students must have before they have higher abilities.

However, the facts in the field show that students' understanding of mathematics is still low. This is based on the results of an international survey, namely TIMSS (Trends in International Mathematics and Science Study) and PISA in 2015, which states that the mathematics and science achievements of Indonesian students are still below the international average (OECD, 2015). This shows that the quality of students' understanding is still lacking. The low understanding of students is caused by several things including the learning process that is carried out still dominantly uses the teacher centered approach, this approach does not train students' thinking skills and the teaching materials used are still conventional. Based on the results of the analysis of teaching materials, it was found that the majority of teachers relied more on teaching materials from publishers than by developing teaching materials themselves in the form of student worksheets or textbooks.

Based on these problems, research was carried out by developing textbooks that could help students understand the concept of geometry in elementary schools. The textbooks developed are designed using the full color concept, containing fictional stories to make them interesting to read. The textbook is called a rainbow book.teaching materials *Rainbow Book* in which there are introductory stories about animal tales is a means to increase students' interest in learning and reading. This is because the age of the child is experiencing growth and development, both cognitively, physically, and psychologically. Eagle argues that children can learn to understand fairy tales before they are able to think logically, before they can write and read. In addition, Coles said that fairy tales can improve memory, recall abilities, understanding, enthusiasm for learning on lesson topics (Juwita, 2017).

This teaching material *Rainbow Book* was chosen because the module is one type of teaching material that students can use independently. They can use the module with or without a teacher, because in the module there are instructions for use in it. In line with the opinion of Cecep et al (2019), it is stated that modules make it easy for students to access flexible learning resources wherever and whenever. In addition, thechosen *Rainbow Book* wasbecause of its attractive book design and contains flat shapes presented with an introductory story set in a fairy tale. Animal or animal figures in the form of fairy tales that convey activities daily lifeabout mathematics aim to foster students' interest in learning mathematics.

Teaching materials *Rainbow Book* is one alternative that is appropriate for use in primary schools, teaching materials is expected to assist teachers in implementing the learning activities in mathematics and any learning material can be presented more attractive and can increase the yield of understanding in learning mathematics courses.

B. Research Methodology

This study aims to produce a product in the form of teaching materials, namely the rainbow book for elementary school students. This research is a development research which focuses on the design of teaching materials. According Ruseffendi (2005), research and development *(Development Research)* is research to develop and produce educational products in the form of materials, media, tools and or learning strategies, evaluation, and so on to address the issue of education, and not to test the theory.

The research and development procedure consists of two stages, namely developing the product and testing the quality and / or effectiveness of the product. this product was developed with a 4D development model. This model consists of four stages, namely: *define*, *design*, *develop* and *disseminate* (Thiagaraja et.al, 1974). The following is an explanation of each stage.

a. *Define*

Activities carried out in this stage are potential and problem analysis. In this study the potential use for the development of teaching materials is to utilize the resources available as a computer laboratory facilities and infrastructure both electronic means and nonelektronik.By utilizing these sources,-aided teaching materials can be developed software *mathematica*. Meanwhile, the problem in this research is the unavailability of teaching materials in accordance with the demands of mathematical abilities.

b. *Design*

At the design stage, the researcher has made an initial product (prototype) or a product design tailored to existing needs and potentials. In this case the prototype is in the form of student teaching material design for mathematics computation subject.

c. *Develop*

At this stage the activities carried out are divided into two activities, namely: *expert appraisal* and *developmental testing*. In the expert appraisal activity the product design that has been made is validated by an expert to see the feasibility of the product design. The results of this activity are in the form of suggestions which will be used to improve the

product designs that have been prepared.

Whereas at thestage *developmental testing,* the product design is tested on limited subject targets, this is done to see the responses, reactions and comments of the target product users. The results of this activity are used as material for revisions in improving the product. After the product has been repaired, it is then tested again to obtain effective results.

d. *Disseminate*

The last stage of this development is the dissemination stage, at this stage the activity carried out is *validation testing.* In thephase of *validation testing,*the product which has been revised during the development stage *(develop)* and then implemented on the real target. At the time of implementation, the measurement of the achievement of the objectives was taken. This measurement is carried out to determine the effectiveness of the product being developed. After the product is implemented, the developer needs to see the results of achieving the goals. The unattainable goal needs to be explained for the solution so that the same mistakes are not repeated after the product is disseminated.

The data in this study were collected using a product assessment questionnaire. Questionnaire data processing was carried out using a Likert scale. The Likert scale is used to measure media ratings for each expert test. Each expert is asked to answer the items in the expert assessment sheet with very good, good, adequate, lacking, and very poor answers.

Table 1. Scores for the Questionnaire Rating Scale

Statements	Very Goog	Good	Moderate	Less	Very Less
Score	5	4	3	2	1

From the table above, it can be seen that for each statement the score. The maximum score on the Likert scale for a unit of analysis is the number of items on the scale multiplied by 5 with the symbol 5k, while the minimum score for the Likert scale for each unit of analysis is the number of items on the attitude scale multiplied by 1 with the symbol k (Djaali and Muljono, 2008).

Meanwhile, as a basis and guidelines for determining the percentage level of the respondent group for each statement in the questionnaire, the score interpretation criteria are used as shown in the following table.

Table 2. Score Interpretation Criteria

Criteria (%)	Classification
$80 < P \leq 100$	Very Approriate
$60 < P \leq 80$	Feasible
$40 < P \leq 60$	Fair
$20 < P \leq 40$	Poor
$0 < P \leq 20$	Very Poor

Riduwan (2009)

C. Research Result and Discussion

The results of this study consisted of several stages including; problem analysis phase, the data collection phase, the design development phase *Rainbow Book,* design validation *Book Rainbow* phase, test phase improvement (revision) design *Book Rainbow* and product trial stage. This research and development is carried out by collecting data through expert instruments and user response questionnaires.

1. Define

Analysis of the problems obtained through observations in elementary schools in Lebak Regency. Based on the results of observations, it was found that problems in learning were the lack of learning resources in accordance with the characteristics of elementary school students, especially on the topic of geometry. After identifying the problem, the researcher focuses on basic competences related to geometry, namely solving problems related to the perimeter and area of squares, rectangles and triangles. Learning objectives on the material perimeter and area of a square, rectangular and triangular shape, namely 1) Students can determine the circumference of a rectangular, rectangular and triangular shape correctly. 2) Students can determine the area of a square, rectangular and triangular shape appropriately. 3) Students can solve problems related to the perimeter of a square, rectangular and triangular shape properly. 4) Students can solve problems related to the area of squares, rectangles and triangles properly. Furthermore, the researchers poured the material into a rainbow book.

2. Design

At the data collection stage, it is carried out by conducting *astudy literature*. *studies are Literature* carried out by collecting data from various sources such as books, journals and articles related to teaching materials and can support the making ofteaching materials *Rainbow Book.* To make these teaching materials as reference materials, use textbooks from various publishers and from available journals. For the images needed to

complement the teaching materials, they are taken from the internet where the source is included in the bibliography of teaching materials.

3. Develop

The development of product designs that will be developed in the form of teaching materials *Rainbow Book* by refining based on the revision of the due diligence and suggestions from the expert team. This stage is described as follows: Making a *storyboard* This is intended as an initial plan so that the making ofteaching materials *Rainbow Book* can easily compile the beginning to the end of the teaching materials.

After the process of making theteaching materials is *Rainbow Book* complete. Before being tested, this product must first be validated by experts. This stage aims to obtain suggestions, opinions and evaluations from experts on theteaching materials *Rainbow Book* that have been developed. Validation also aims to determine whether or not theteaching materialsappropriate or not *Rainbow Book* that have been created or developed are.

The following is an explanation of the results of the validation ofteaching *Rainbow Book* materials on flat-building materials carried out by experts. Expert tests for the validation of teaching materials are as follows:

Design Experts

The results of validation by design experts are reviewed from the graphic aspect where there are three indicators of assessment, namely the size of teaching materials,*cover*design and content design of teaching materials. Following are the results of the design expert validation calculations:

Table 3. Design Expert Validation Results

Validator	Score	Description
I	87%	Very Eligible
II	85%	Very Eligible

Based on table 3 it can be seen that the results of the design expert I's assessment obtained a score of 87% which falls into the "very feasible" category. Design expert I argues that theteaching materials *Rainbow Book* are good and can attract students to be more enthusiastic about learning and be able to train students' understanding. This teaching material is considered suitable for use with a slight revision in the cover section by changing the animal image according to its content and replacing the letters in the formula from capital to lowercase.

The result of the assessment from the design expert II, namely obtaining a score of 85% which falls into the "very feasible" category. Design expert II believes that theteaching materials *Rainbow Book* are generally good and can be used for field test performances. This teaching material is considered suitable for use without any revision.

Content Expert

The results of the validation by material experts are viewed from the aspects of content feasibility, presentation feasibility and language feasibility. Following are the results of the material expert validation calculations:

Table 4. The results of the material expert validation

Validator	Score	Description
I	84%	Very Eligible
II	86,7%	Very Eligible

Based on table 4, it can be seen that the results of the expert's assessment of material I obtained a score of 84% which falls into the "very feasible" category. Design expert I argued that theteaching materials *Rainbow Book* were good and could attract students to be more enthusiastic about learning, he commented on improving teaching materials, namely symbols used to be more consistent and he argued that this teaching material could be developed with other materials. This teaching material is considered suitable for use with a slight revision in the section on writing formulas and structuring instructions for use.

The results of the assessment from the material expert II, namely getting a score of 86.7% which falls into the "very feasible" category. Material expert II is of the opinion that theteaching material *Rainbow Book* is generally good and needs revision in the explanation section of the flat shape material so that students understand better what is being conveyed from the teaching material.

4. Design Improvement (Revision)

At this stage, validated teaching materials are then revised in accordance with suggestions and input from experts during validation. Furthermore, theteaching materials were revised *Rainbow Book* as follows:

Design Experts The

Results of validation by design experts show that theteaching materials *Rainbow Book* still require revision in certain parts so as not to cause misconceptions based on suggestions / comments given by the design expert.

Content Experts

From the results of validation by material

experts, it is known that theteaching materials *Rainbow Book* still require revision in certain parts so as not to cause misconceptions based on suggestions / comments given by material experts.

5. Disseminate

The next stage is the product trial stage. Product testing in this study is limited to knowing the user's response to the product being developed and knowing the results of students' understanding. This product trial was conducted with the aim of knowing the response of students, teacher responses and the results of students' understanding of theteaching materials *Rainbow Book.* The trial was carried out by distributing 20 teaching materials to students. Previously, the researcher conducted the learning process in 2 meetings on different days. On the first day the researcher carried out the learning process with the material around the flat shape, then on the second day the researcher carried out the learning process with the geometry material, and distributed user response questionnaires and conducted an understanding test.

Analysis of User Responses

To see the responses of users of theteaching materials, it *Rainbow Book* was tested on fourth grade elementary school students. With 34 students. The following is an analysis of user response assessment data which is presented in the following table:

Table 5. Data on User Response Results

User Response	**Aspects**			
	Content	Language	Layout	Graphic
Final Score (%)	98,3	95	97,5	96,625
Average	97%			

Based on the data in the table above, the results showed that the user response was very good, students stated that students enjoyed learning using the rainbow book module. According to students, it is equipped with interesting stories, students can gain knowledge about mathematics through the animal stories.

To see the success of the students' understanding test, thisteaching material *Rainbow Book* was tested on fourth grade elementary school students in a state school in Lebak Regency. In this comprehension test, the success index is seen from the comprehension test result criteria. The data obtained is presented in the following table:

Table 6. Data Analysis of Comprehension Test Results

	Number Question					Score
	1	2	3	4	5	
Final Score	89,7	79,7	83	82	82	83,75
Description	Very Good	Good	Very Good	Very Good	Very Good	Very Good

Based on the data from the table above, it was found that the students' understanding test for each indicator achieved good and very good quality achievements. On average, it shows that students' understanding is very good. This is in line with the research conducted by Haryanti and Saputro (2016) and Nilasari et al. (2016) which states that modules are effective in increasing students' conceptual understanding skills and have an effect on student learning outcomes.

D. Conclusion

Based on the research conducted, the following conclusions were obtained:

1. The Rainbow book digital module developed is suitable for use in mathematics learning in elementary schools. The feasibility of this module is based on the results of expert judgment from both material experts and media experts.
2. Students' response to the digital rainbow book module is very good at 97%. 3. Students' understanding of the concept of geometry after using this module got a mean score of 83.75, which is very good.

Based on the research results and conclusions above, it can be suggested as follows.

1. Research on the development of this teaching material is limited to the geometry. Therefore, further researchers should be able to develop this teaching material in other materials.
2. The product of this teaching material *Rainbow Book* can be used as an alternative to be used as a learning resource, especially for the material on the geometry.

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