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Development of a Contextual-Based Learning Module for Quadrilateral Material

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Abstrak

Modul pembelajaran adalah salah satu sumber belajar yang dapat digunakan oleh guru dan peserta didik dalam proses pembelajaran. Penelitian ini memiliki tujuan untuk mengembangkan modul pembelajaran matematika dengan materi segiempat berbasis kontekstual yang valid. Penelitian ini merupakan Research and Development dengan model Thiagarajan. Dikarenakan adanya keterbatasan waktu, peneliti hanya melakukan 3 tahapan dari 4 tahap yaitu Define, Design, dan Develop. Selain modul pembelajaran bagi peserta didik, penelitian ini juga mengembangkan panduan guru yang terkait dengan modul pembelajaran tersebut. Hasil dari penelitian ini diperoleh modul pembelajaran materi segiempat berbasis kontekstual dikatakan valid dengan persentase 83,12% sehingga modul pembelajaran layak digunakan oleh peserta didik dalam proses pembelajaran.

Kata Kunci: *Modul, segiempat, kontekstual*

Abstract

Learning modules are one of the learning resources that can be used by teachers and students in the learning process. This research aims to develop a mathematics learning module with valid contextually based quadrilateral material. This research is Research and Development with the Thiagarajan model. Due to time constraints, researchers only carried out 3 stages out of 4 stages, namely Define, Design, and Develop. Apart from learning modules for students, this research also develops teacher guides related to these learning modules. The results of this research showed that the contextual-based rectangular material learning module was said to be valid with a percentage of 83.12% so the learning module was suitable for use by students in the learning process.

Keywords*: modules, quadrilateral, contextual*

Introduction

Mathematics is a subject that exists at all levels of school. Mathematics is seen as an important science because it is needed in various fields, including in everyday life. This is supported by the opinion of Kamarullah (2017) who states that no activity is independent of mathematics, therefore mathematics is very necessary and will continue to develop according to needs. Mathematics learning itself is a process where students can solve mathematical problems by applying concepts according to their understanding (Khairani et al., 2021). So, it

is very important to teach mathematics to students from an early age.

Mathematics is an important subject, but learning mathematics at school is often considered scary for students (Sholekah et al., 2017). This is in line with research by Kamarullah (2017) which states that mathematics is scary for students, especially in Aceh. Apart from that, mathematics is seen as a difficult subject (Mutia, 2017) because the concepts in mathematics are too abstract (Yeni, 2015).

One of the mathematical materials that is difficult for students to understand is flat figures. Based on an interview with one of the mathematics teachers at SMP Negeri 2 Yogyakarta, it was found that students still had difficulty in certain material in learning mathematics such as quadrilaterals, where students were still confused in determining the area and perimeter of combined shapes. Apart from that, research by Fatqurhohman (2016) states that students still have difficulty solving problems regarding flat shapes. Other research also states that in completing the material on the area and perimeter of flat rectangular shapes, students find it difficult (Aditya & Putra, 2016).

Students' difficulties with flat shapes, especially quadrilaterals, can be overcome by packaging the material so that it is not too abstract. Connecting mathematical material to students' daily lives is an alternative to making the material less abstract. Therefore, in learning mathematics, a learning resource is needed, especially contextually based rectangular material which can later help students to represent abstract mathematical problems into everyday problems.

Contextual learning is a learning concept that helps teachers connect learning material with the circumstances around students so they can construct the knowledge that exists within them. In constructing this knowledge, students can use meaningful problems such as problems in everyday life (Kadir, 2013). Previous research also concluded that contextual learning can overcome students' mathematics learning difficulties (Fanany et al., 2019).

One learning resource that can be used in learning mathematics is learning modules. The learning module aims to help students in the learning process. According to Novitasari (2019), a learning module is a set of learning resources that are packaged systematically and use simple language so that students can learn easily. Apart from that, the learning module itself is a learning resource that contains complete components from other learning resources, such as worksheets and handouts (Yerimadesi et al., 2017). A good learning module also requires an approach that is present in students' daily lives, therefore the approach in developing this learning module is contextual. So according to researchers, it is important to create learning modules as a learning resource. This is also reinforced by the results of teacher interviews at schools, where in the learning process teachers usually use a combination of learning resources, such as modules, books, and the internet.

Many learning module developments have been carried out. Research by Sukiminiandari et al. (2015) with the title "Development of Physics Learning Modules with a Scientific Approach" Obtained material expert results of 87.33% and, learning media evaluation of 87.71%. The evaluation results of high school physics teachers were 84.20%, and the small and large group student questionnaires were 84.69% and 87.76% respectively. Based on these results, it was concluded that the media developed was suitable for use in physics learning. Therefore, research was conducted to develop a contextual-based

mathematics learning module for quadrilateral material. By developing this module, it is hoped that students can understand and master quadrilateral material better.

Method

The type of research used in this research is Research and Development (R&D) research with qualitative and quantitative approach techniques. Research and Development is one of the research methods for producing, developing, or creating a product by testing and evaluating the impact of the product being developed (Sugiyono, 2011).

The data obtained in this research is in the form of qualitative data and quantitative data. Qualitative data consists of data from semi-structured interviews with mathematics subject teachers. Meanwhile, quantitative data is in the form of validation sheet questionnaire results by material experts and media experts using a Likert scale. Then from these results, the average score is calculated to determine the feasibility of the learning module. Next, calculate the percentage score and criteria that indicate whether the learning module developed is valid or not (Syafa'ati, 2018).

The subjects of this research were class VII junior high school students. The object of this research is the quality of the learning modules developed in terms of the validity of the learning modules. The Research and Development model used is 4D (Define, Design, Develop, and Disseminate). Due to limited time in carrying out research, researchers only carried out the first 3 stages of the four stages. The stages of the 3D Research and Development model are shown in Figure 1.

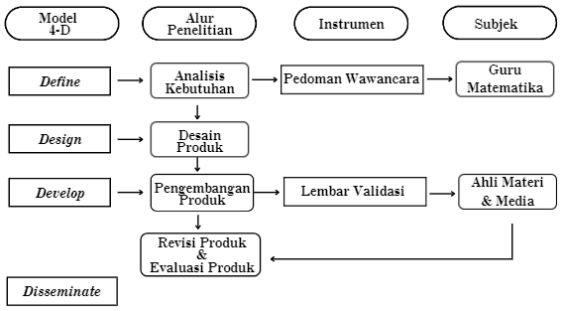

Figure 1. 3D Research and Development Model

Define stage, at this stage a needs analysis is carried out by conducting interviews with mathematics teachers. Next, at the design stage, the researcher creates a concept design for the activities that will be displayed in the learning module. Then, at the development stage, researchers prepare the tools used to create learning modules such as Ms. Word and Canva. After developing the product, the researcher carried out a product validation test with a validation sheet by material experts and media experts to determine the feasibility and validity of the learning module with a Likert scale and percentage of validity scores as in table 1 below.

Table 1. *Skala Likert*

Category	Score
Very Good	5
Good	4
Enough	3
Less	2
Very Less	1

Source: (Syafa'ati, 2018)

After the validator provides an assessment through the validation sheet, then calculates the average score, then calculates the percentage score and interprets it into each criterion as in table 2 and table 3.

Table 2. *Learning module eligibility criteria*

Criteria	Mean score
Very Good	4, 20 $< \bar{X} \leq$ 5,00
Good	3, 40 $< \bar{X} \leq$ 4, 20
Enough	2, 60 $< \bar{X} \leq$ 3, 40
Less	1, 80 $< \bar{X} \leq$ 2, 60
Very less	1, 00 $< \bar{X} \leq$ 1, 80

Table 3. *Learning module validity criteria*

Criteria	Percentage
Very Valid	90% $< P \leq$ 100%
Valid	80% $< P \leq$ 89%
Valid enough	65% $< P \leq$ 79%
Less Valid	55% $< P \leq$ 64%
Inalid	$P \leq$ 54%

RESULT AND DISSCUSSION

The development of learning modules in this research is based on 3D stages: Define, Design, and Develop.

1. Define

At this stage, the researcher carried out a needs analysis by interviewing mathematics teachers regarding the material they found difficult and the learning resources used during learning at school. The results of this analysis show that the material to be used is a quadrilateral with learning resources in the form of learning modules. After analyzing, the researcher looked for several literature studies regarding the development of related mathematics learning modules that had been carried out previously. As well as examples of activities or activities and also concepts from the learning modules that will be developed.

2. Design

At this stage, the researcher proceeds to the stage of designing the concept of the learning module that will be created on a contextual basis. The learning module contains a foreword, instructions for using the module, a table of contents, learning outcomes, competency achievement indicators, concept map, chapters 1 to chapter 4 which correspond to learning outcomes, a summary, reflection, competency test, and bibliography.

The concept of each chapter in the learning module is presented based on contextual learning starting with learning activities, exploration, conclusions, example questions, and practice questions. In the first chapter, students are expected to be able to identify the properties and types of rectangular shapes. The quadrilaterals discussed in the learning module based on Alexander & Koeberlein (2014) start with quadrilaterals that have special properties to quadrilaterals that have general properties, namely, squares, rectangles, rhombuses, kites, parallelograms, and trapezoids. In the second chapter, students are expected to be able to discover the concepts of area and perimeter of rectangular flat shapes. Then in the third chapter students are expected to be able to present the concept of area and perimeter of rectangular flat shapes. In the last chapter, students are expected to be able to solve problems with the area and perimeter of flat rectangular shapes.

After designing the concept of the learning module that will be created, the researcher continues by designing the appearance of the learning module. When designing the appearance of the learning module, researchers used two applications, namely Ms. Word and Canva.

3. Develop

The concept that was designed in the previous stage is then developed at this stage. The researcher prepared the supporting tools used in the form of a laptop with several applications that were used to create learning modules with previously designed concepts. The following is a display of the learning

module that researchers have created as shown in the picture.

Figure 2. Display of the learning module

After developing the learning module, the researcher then evaluated by experts to improve the learning module being developed. At this assessment stage, there were two validators, namely a mathematics teacher at SMP Negeri 2 Yogyakarta and a master's student at Sanata Dharma University. The results of this validator are used to improve the learning module so that it is suitable for future use by students. The following are the feasibility and validity results of the two validators as in table 6.

Table 6. *Learning module feasibility results*

Validation	Observed aspects	Validator 1	Validator 2
Materials Expert	Content	39	40
	Presentation	28	28
	Language	20	24
Media Expert	Cover design	16	18
	Content design	20	24
	Content	4	5
Total Score		127	139
Average Score		3,97	4,34
Category		Good	Very good
Percentage		83,12%	

Based on the results of the feasibility and validity of the learning module by experts, it was found that the learning module got a score of 127, an average score of 3.96, and got the 'Good' category from validator 1. The learning module got a score of 139, an average score of 4.34, and got the 'Very Good' category from validator 2. In table 6 it can also be seen that the learning module got a percentage of 83.12%. From this percentage it can be said that the learning module is 'Valid', so the learning module can be used in research.

Conclusion

This research has developed a contextual-based quadrilateral mathematics learning module for class VII students. This development goes through three stages, namely: (1) analyzing needs by conducting interviews, then obtaining the material that will be presented, namely quadrilaterals and learning resources that will be created, namely learning modules. (2) create a learning module design, namely a contextual-based learning concept, and design the product appearance. (3) developing learning modules according to the design results, which is then followed by assessment by material and media experts. The validator results showed that the learning module received a good category by validator 1 with a total score of 127 and a very good category by validator 2 with a total score of 139. Then the learning module was said to be valid with a percentage of 83.12% so that the learning module was suitable for use by students in the learning process.

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