

THE VALIDATION OF TEACHING MODUL BASED ON SCAFFOLDING “KATA SEPAT” TO INCREASE THE ABILITY OF MATHEMATICAL CONCEPT OF QUADRILATERAL MATHEMATICS COMPREHENSION

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Abstract

This study aims to validation a teaching module based on the Kata Sepat scaffolding in quadrilateral mathematics copenhension. This teaching module is the result of development research consisting of define, design, develop and disseminate (4D) stages. The instruments used in this study were observation sheets, interviews and validation questionnaires. This research is still at the developpe stage and needs to be continued at the disseminate stage. Validation results conclude that teaching modules are valid for learning mathematics.

Keywords: Kata Sepat, Teaching Modul, Mathematical Concept, Quadrilateral, Validation

INTRODUCTION

Professional teacher must control four teacher competence. Teacher competence consists from competence pedagogic , competence personality , competence social and competence professional (Ministry of National Education, 2005) . These competencies are interrelated with one another and teachers are required to master all of these competencies (Dirgantoro, 2018). Pedagogic competence is related to the teacher's understanding of students and the management of learning in the classroom. Personal competence is related to the teacher's personality which is steady, stable, authoritative, wise, mature and has a noble character who is a role model for students. Social competence relates to the teacher's ability to communicate with all school members. Meanwhile, professional competence is the teacher's ability to master the subject matter. Based on this explanation, it can be seen that the teacher's competency in learning management is related to the creation of creative learning materials in the form of teaching modules.

Module is one of the teaching materials that can be developed systematically based on a certain curriculum and packaged in the form of the smallest learning unit and allows it to be studied independently in a certain time unit so that students master the competencies being taught (Sitanggang et al., 2023). The independent curriculum that applies in schools places teaching modules as teaching tools that support teachers in lesson planning. The teaching modules in the independent curriculum are means, methods and guidelines that are systematically designed and become implementations of the flow and objectives of learning (Burhanudin et al., 2023).

This teaching module consists of 3 parts, namely general information, core components and attachments (Anggraena et al., 2022; Maulida, 2022; Nisa & Sholihah, 2023; Okta et al., 2023; Sitanggang et al., 2023). General information consists of the identity of the module author, initial competence, Pancasila student profile, facilities and infrastructure, target students, learning model used, then the core component consisting of learning objectives, meaningful

understanding, triggering questions, learning activities, assessment, enrichment and remedial. Appendices are the last component in the preparation of teaching modules, containing student worksheets, teacher and student reading materials, glossaries and bibliography. Teachers can develop teaching modules according to the needs, context and characteristics of students.

This study aims to develop teaching modules that are valid according to the needs, context and characteristics of students. The teaching module contains learning aids (scaffolding) that have been prepared by researchers to teach quadrilateral material. This scaffolding was prepared based on an analysis of students' difficulties in understanding the material properties of quadrilaterals. It is hoped that the teaching modules can be used by teachers in quadrilateral learning

RESEARCH METHOD

This research is a development research that aims to produce valid teaching module based on the Kata Sepat scaffolding to increase mathematics ability concept. This development research model refers to the 4D model which consists of Define, Design, Develop and Dessiminate (Sommel et al., 1974).

The discussion in this article only reaches the Develop stage because the teaching modules that are made are still at the revision stage of the validator. The research instruments used were observation sheets, interviews and expert validation questionnaires. Observation sheets and interviews are used to analyze the needs of teaching modules. The expert validation questionnaire sheet contains assessment components to assess teaching modules that will be assessed by the validator. The validator's assessment is determined using table 1 (Hobri, 2010)

Table 1 Determination Validity

The average value of validity	Information
$3 \leq V_a \leq 4$	Valid
$2 \leq V_a \leq 3$	Valid Enough
$1 \leq V_a \leq 2$	Invalid

FINDING(S) AND DISCUSSION

FINDINGS

1. Define

Researchers interviewed 6 junior high school mathematics teachers. The interview was carried out by asking several questions to make an initial diagnosis of problems at school when studying the material on the properties of quadrilaterals. It is hoped that the initial diagnosis can be used to make scaffolding that is suitable for the material with quadrilateral properties. The problems faced by students are that students find it difficult to distinguish and remember the properties of quadrilaterals and students cannot visualize quadrilaterals. Students tend to lack confidence in communicating student understanding and lack of student motivation in learning mathematics

The researcher also analyzed the concept, namely designing the material for quadrilateral properties by mapping out the concepts that can be used to understand the concept. At the define stage, the researcher also determines the learning objectives by using a scaffolding-based teaching module This part presents the findings and discussion of the research.

2. Design

At the design stage the researcher designed teaching modules in accordance with the criteria for compiling independent curriculum teaching modules. This teaching module consists of 3 parts, namely general information, core components and attachments (Anggraena et al., 2022; Maulida, 2022; Nisa &

Sholihah, 2023; Okta et al., 2023; Sitanggang et al., 2023).

Researchers also designed details of scaffolding-based learning activities. The learning steps refer to the scaffolding which consists of three steps and each has its own characteristics (Damayanti, 2016). At step 1, the assistance provided by the teacher is preparing a student learning environment (classroom organization). Activities carried out by the teacher in preparing the learning environment include forming groups (peer collaboration), arranging seats (sequencing and pacing), and giving structured tasks (structured tasks). While step 2, between teachers and students are directly involved in an interaction. The intended form of interaction includes: explaining (explaining), namely conveying the concept being studied, reviewing (reviewing), namely refocusing student attention and restructuring (rebuilding understanding), namely simplifying something abstract so that it can be understood by students. Then step 3, there is interaction between the teacher and students aimed at developing conceptual thinking by creating opportunities to express understanding for students and teachers. The formulation of scaffolding also integrate Kata Sepat.

3. Develop

The researcher compiled the teaching modules according to the design of the teaching modules. Expert validation is also carried out to determine the validity of the teaching module. This validation was carried out by 4 experts. The description of the validity of the teaching module can be seen in table 3

Table 3
Expert Validation Results

Validators	Criteria		
	Information General	Core Components	Attachment
Validators 1	4	3,25	3,33
Validators 2	4	3,75	3.67
Validators 3	4	3,75	3.67
Validators 4	4	4	4.00
Average	4	3,69	3.67
Total average	3.78		
Information	Valid		

4. Dessiminate

This stage has not been carried out by researchers because the teaching module development process is still at the teaching module revision stage. Teaching modules need to be adjusted to learning activities so that they can be more effective in increasing understanding of mathematical concepts. The teaching module dissemination phase is planned for the second year after the teaching module is revised

DISCUSSIONS

This research begins with initial allegations of students' difficulties in learning the material properties of quadrilaterals. This difficulty researchers get from the analysis of relevant research results. Many students experience difficulties in distinguishing the properties of a quadrilateral (Sumiati & Agustini, 2020). In addition, students also experience misconceptions about rectangular material, for example identifying the properties of a rectangle that are the same as a parallelogram where what is meant by a parallelogram is a slanted rectangle and identifying the properties of a rhombus are the same as the properties of a rectangle (Budiarto, 2016). The results of the relevant research analysis were used by researchers to

develop teaching modules based on aphrodisiacs.

The stages of this development research consist of define, design, develop and disseminate. At the define stage, researchers analyzed the needs of schools and students through literature studies, interviews and observations. Researchers interviewed 6 junior high school mathematics teachers. The interview was carried out by asking several questions to make an initial diagnosis of problems at school when studying the material on the properties of quadrilaterals. It is hoped that the initial diagnosis can be used to make scaffolding that is suitable for the material with quadrilateral properties.

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The conclusions from interviews with junior high school mathematics teachers include that students still have difficulty understanding the material properties of quadrilaterals. This difficulty is marked by several things, namely: students find it difficult to distinguish and remember the properties of quadrilaterals and students cannot visualize quadrilaterals. The teacher has identified the causes of the difficulties experienced by students, namely: Students cannot concretize abstract things, students do not understand the concept of quadrilaterals, students remember many of the properties of quadrilaterals without being accompanied by a deep understanding, not confident to

write/communicate quadrilateral properties, lack of media learning used subject four to teach in class. The teacher has also provided some learning assistance to reduce the difficulties faced by students in the material on the properties of quadrilaterals, but the teacher explains that the assistance provided by the teacher has not maximized students' understanding of the properties of quadrilaterals. For example, subjects one and two will use math aids in learning the properties of quadrilaterals because based on the reflection results students need one-on-one guidance using math aids. Mathematical teaching aids can visualize abstract concepts so that an understanding of mathematical material is obtained (Laski et al., 2015). In addition to the use of mathematical teaching aids and interactive media, subject six relates mathematics learning to everyday life so that students understand more about mathematical material. The discussion method is also used by subject two to facilitate students exchanging information that students have with other students. Subjects three, four and five provide exercises to strengthen understanding of the concept. The teacher also realizes that learning improvements must also be made to improve learning achievement. Therefore, researchers provide assistance to teachers by creating modules to teach quadrilateral properties.

The second stage in this research is the design of the researchers designing the teaching modules. Researchers also designed details of scaffolding-based learning activities. The learning steps refer to the scaffolding level which consists of three levels and each has its own characteristics (Damayanti, 2016). At level 1, the assistance provided by the teacher is preparing a student learning environment (classroom organization). Activities carried out by the teacher in preparing the learning environment include forming groups (peer collaboration), arranging seats (sequencing and pacing), and

giving structured tasks (structured tasks). While level 2, between teachers and students are directly involved in an interaction. The intended form of interaction includes: explaining (explaining), namely conveying the concept being studied, reviewing (reviewing), namely refocusing student attention and restructuring (rebuilding understanding), namely simplifying something abstract so that it can be understood by students. Then level 3, there is interaction between the teacher and students aimed at developing conceptual thinking by creating opportunities to express understanding for students and teachers. the learning steps are also added with Sepat Word media (square smart cards) and live worksheets in the practice questions section. Media Kata Sepat are cards whose contents consist of the definition of each quadrilateral, its inherent properties, the formula for the perimeter of the area, and the name of each quadrilateral with an English term to increase students' knowledge. The word seppat serves to visualize quadrilaterals so that students can understand the properties of quadrilaterals.

The next stage is the develop stage. At this stage the researcher compiled the teaching modules and validated the teaching modules. The formulation of scaffolding is in the form of learning steps that integrate Kata Sepat. Steps for learning mathematics based on Kata Sepat consist of three stages, namely stage 1 preparing the student learning environment (classroom organization). Stage 2 consists of explaining (explaining), namely conveying the concept being studied, reviewing (reviewing), namely refocusing students' attention and restructuring (rebuilding understanding), namely simplifying something abstract so that it can be understood by students. Stage 3, namely the interaction between teachers and students aimed at the development of conceptual thinking. The scaffolding formula is described in teacher and student activities for learning the

properties of a quadrilateral. Teacher and student activities are written in the teaching modules developed by researchers. The average total validation from experts is 3.78 which is categorized as a valid teaching module.

The validator also provides suggestions for improving teaching modules. These suggestions include: the teaching modules that are developed are made clearer for elementary school students who are in Phase C or middle school students who are in Phase D, Live Worksheets should be made even more interesting (not just writing), this learning is designed in groups, but the observed Pancasila Student Profile is independent, the validator suggests changing it to "work together", some teaching module sentences still have typos such as "doing" should be "doing", learning activities are still focused on the teacher, teaching modules are added learning models Certain methods that are integrated with scaffolding techniques and teaching module designs can be made more attractive.

The researcher has not carried out the disseminate stage yet. This stage has not been carried out by researchers because the teaching module development process is still at the teaching module revision stage. Teaching modules need to be adapted to learning activities so that they can be more effective in increasing understanding of mathematical concepts. The teaching module dissemination phase is planned for the second year after the teaching module is revised.

CONCLUSION(S)

The conclusion of this study is mathematics learning teaching module based on scaffolding "Kata Sepat" that was developed is valid for use in learning mathematics on the material properties of quadrilaterals.

mathematics learning teaching module that was developed is only at the valid stage

so that before being used it can be tested on students to see how far the practicality of the teaching module is. This teaching module has also not been tested for its effectiveness in increasing students' conceptual understanding abilities. Based on these conditions, it is necessary to carry out research to test the practicality and effectiveness of mathematics teaching moduls.

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