



CONTEXTUAL BASED MODULE: IMPLEMENTATION ON CRITICAL THINKING SKILLS

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ABSTRACT

This study aims to produce a contextual-based module to improve students' mathematical critical thinking skills on whole numbers and fractions that have aspects of validity, practicality, and effectiveness. The subjects used were seventh-grade junior high school students. The type of research is research and development (R&D). The development model is ADDIE, consisting of analysis, design, development, implementation, and evaluation stages. Instruments include questionnaires and tests. Data analysis includes aspects of validation, practicality, and effectiveness. The results showed that the contextual-based mathematics module fulfilled the essential elements, namely valid and practical. In addition, the contextual-based module can be used to develop students' mathematical critical thinking skills (effectively).

Keywords: Contextual, Critical Thinking Skills, Module

INTRODUCTION

Education is a necessity of human life that can develop one's potential (Made & Masaong, 2007). Education aims to create a person's physical and spiritual to improve self and social life. Education in the 21st century requires critical thinking skills (Mardhiyah *et al.*, 2021). Education also does not only form politeness but can make a person develop through science, one of which is knowledge of Mathematics. Mathematics is a science that teaches development from an early age until now. There are many concepts in mathematics. Mathematics trains someone to create critical, creative, and disciplined thinking in applying everyday knowledge.

The purpose of teaching mathematics in schools is to form students' ability to solve problems, one of which is the ability to think critically (Slavin, 2009). In line with Permendiknas (Regulation of the Minister of National Education), Indonesia No. 23 of 2006 explains that the subjects that must be given at the Junior High School (SMP) level are Mathematics. It aims to provide basic knowledge about critical, logical, analytical, systematic, and creative thinking skills.

Mulyasa (2013) stated that the 2013 curriculum has to prepare Indonesian citizens to become individuals who can contribute to society and the country according to their abilities. In implementing the 2013 curriculum, it is not only curriculum transition, but students are required

to follow the learning process with the help of teaching materials. One of the teaching materials used is a module. The module is a learning media in the form of a book for teaching and learning activities and learning references for teachers (Daryanto, 2013). The module consists of an opening, body, and closing section. The thing that must be considered in the development of the module is that it is adjusted to students' learning interests, students' abilities in learning, characteristics, and what is needed when students learn. Soenarto (2005) explains the limitations of research and development as a process in product development that will be used in learning. In line with Seel & Richey (1994) stated that development is a process of designing specifications into tangible form. The modules used must be the appropriate material for the current school year. The module must be clear about the material presented to make it easier for students to use it.

Students' critical thinking skills is still low because learning activities still rely on the teacher, not student-centered (Ratnawati *et al.*, 2020; Siamy *et al.*, 2018). Teaching materials that teachers often use are textbooks. In its use, books present questions that are still simple to be solved by formulas (Novtiar & Aripin, 2017). In addition, the presentation of the problem does not reflect everyday life, meaning that it is still monotonous and does not vary (Madroji *et al.*, 2019). Thus, developing a teaching material that stimulates students' mathematical critical thinking skills is necessary. One of them is a contextual problem-based module.

Mulyasa (2019), in his book, states that contextual learning is the relevance of learning materials in everyday life faced by students. According to Alvareset *et al.* (2007), contextual involving students in daily activities can be related to the lessons and academic material they get at school in real-life contexts. When students find a problem, make a choice, dig up information, then draw conclusions, and make a decision, they can relate knowledge in real life to find meaning. Based on the above background, this study aims to produce teaching materials in contextual-based modules that meet valid, practical, and affective aspects.

METHODS

Research is a source needed by researchers to obtain data. The place of research was carried out at SMP Negeri 3 Kroya in odd semesters for seventh-grade students, developing contextual-based modules with whole numbers and fractions material.

In this study, the type of research is Research and Development (R&D) or research and development. The development model used in this study is ADDIE with Dick and Carry Theory

(1996), which consists of analysis, design, development, implementation, and evaluation stages. The instruments used include a validity questionnaire, a teacher and student response questionnaire, and a critical thinking ability test. The data analysis of this research is to obtain modules that meet the valid, practical, and effective aspects (Prabowo *et al.*, 2016).

RESULT AND DISCUSSION

This section will explain each stage of development used, namely analysis, design, development, implementation, and evaluation. Based on the research and development carried out, the following results were obtained:

Analysis Stage

Based on the results obtained in the field, the need for teaching materials in the form of modules that can help students be active and enthusiastic in the learning process. Previously, the teaching materials were only textbooks, and students felt bored and did not understand if they only learned from books. The materials used in making the module are integers and fractions. Mariani's research (2010) explains that understanding fractional material begins with connecting it to everyday life (contextual). In line with Afriansyah (2017), who revealed that contextual-based learning helps students understand the concept of fractions.

Design Stage

At this stage, the researcher begins to design the module to be developed. The framework section of the module includes module cover, introduction, table of contents, concept map, introduction, competency map, whole number, fraction material, evaluation, and bibliography. Figure 1 below describes the concept map made on integer material.

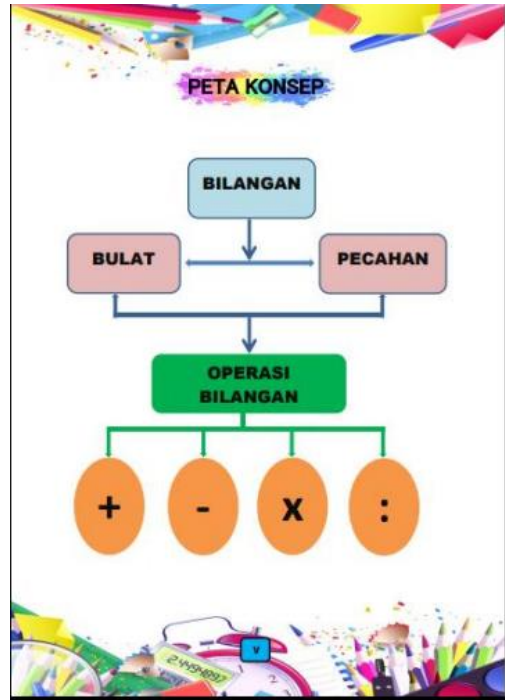


Figure 1. Integer Concept Map

Development Stage

This stage describes the extent to which the location of the module product is contextually based. The feasibility test involved two people, one material expert and one learning media expert. Table 1 and Table 2 respectively show the validation results by media and materials experts.

Table 1. Media Expert Validation Recapitulation

No.	Dimension	Score	Criteria
1	Modul Design	3,5	Very Good
2	Modul Quality	2,75	Good
3	Contextual	2,6	Good
Average		2,95	Good

Table 2. Recapitulation of Material Expert Validation

No.	Dimension	Score	Criteria
1	Material Suitability	3,3	Very Good
2	Attractiveness of Module	3,4	Good

3	Usefulness	2,8	Good
4	Language Spoken	3	Good
5	Contextual	3,1	Good
Average		3,12	Good

The validation results by media experts gave a score of 2.95 (Good), while the results of the validation by material experts were 3.12 (Good). It can be concluded that the contextual-based module with material on fractions and integers fulfills the valid aspects.

Implementation Stage

This stage aims to apply the modules that have been developed and have been declared suitable for use in learning. In carrying out this stage, researchers involved eight students as samples and carried them out for five days (pandemic Covid-19). The activity was carried out in a class consisting of 4 male students and four female students. The sample was chosen randomly but only for class VII. Table 3 and Table 4 respectively describe the results of student and teacher responses using the module.

Table 3. Recapitulation of Student Response Results

No.	Dimension	Score	Criteria
1	Modul Design	3	Good
2	Modul Content	2,6	Good
3	Language	2,9	Good
Average		2,83	Good

Table 4. Recapitulation of Teacher Response Results

No.	Dimension	Score	Criteria
1	Contextual material	3,25	Good
2	Language	3,1	Good
Average		3,17	Good

The results of student responses in using contextual-based modules were 2.83. The score indicates that the student's response is in the very good category. The results of the teacher's

response were also shown in the same way. The score obtained is 3.17 (Good). Thus, contextual-based modules on practical integers and fractions are used in the learning process.

Furthermore, contextual-based modules are given during learning, and students are given critical thinking ability test questions. The number of questions is two items (description). This trial was conducted on 16 students. Table 5 below describes the results of the pre-test and post-test.

Table 5. Pre-Test and Post-Test Results

No.	Type	Average Score	
		Question 1	Question 2
1	Pre-Test	50	42,5
2	Post-Test	70	65
Difference		20 (up)	23,5 (up)

The increase in the pre-test and post-test results each showed an increase. It can be concluded that the contextual-based module on fractions and integers effectively improves critical thinking skills. This is in line with the research of Syahbana (2012), Dewi *et al.* (2019), and Khairunnisa *et al.* (2019), who both explained that contextual-based learning tools could improve students mathematical critical thinking skills, one of which is the module.

Evaluation Stage

The last stage is evaluation. Researchers improve the module based on input from material experts, media experts, teachers, and students. Contextual-based modules on whole numbers and fractions meet valid, practical, and effective aspects of students' mathematical creative thinking skills.

CONCLUSION

The research and discussion above conclude that the contextual-based mathematics module on integers and fractions fulfills the valid, practical, and affective aspects. Contextual-based modules can be used to develop junior high school students' mathematical critical thinking skills. Further research can be developed as a digital-based module (e-module) with other mathematical abilities, including the ability to think creatively. This follows the era of digitalization, and

creativity is one of the cognitive skills that students must have to face the challenges of the 21st century.

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