

Feasibility of Opportunity Material Module with Joymath Cognitive Behavioral Method to Reduce Mathematics Anxiety and Increase *Student Self-Efficacy*

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Abstrak

Siswa memerlukan media pembelajaran yang dapat membantu siswa mengurangi kecemasan matematika dan meningkatkan efikasi diri. Tujuan penelitian yaitu mengembangkan modul untuk mengurangi kecemasan matematika dan meningkatkan efikasi diri siswa pada materi peluang. Penelitian Research and Development ini menggunakan model ADDIE dengan lima tahap pengembangan yaitu analisis, desain, pengembangan, implementasi, dan evaluasi. Sumber data dan subjek dalam penelitian ini adalah ahli materi, ahli media, guru, dan 1328 siswa dari 24 SMP di Kota Yogyakarta. Teknik pengumpulan data yang digunakan yaitu wawancara, observasi, Focus Group Discussion (FGD), dan angket. Hasil menunjukkan bahwa produk yang dikembangkan yaitu modul materi peluang untuk mengurangi kecemasan matematis dan meningkatkan efikasi diri siswa layak digunakan dalam pembelajaran matematika. Pengambilan keputusan kelayakan produk didasarkan pada hasil analisis penilaian dari validator, ahli materi, dan ahli media yang menunjukkan bahwa modul sangat valid dan berpotensi menurunkan kecemasan matematis dan meningkatkan efikasi diri siswa.

Kata Kunci: Efikasi Diri; Kecemasan Matematika; Matematika; Modul.

Abstract

Students need learning media that can help students reduce mathematics anxiety and increase self-efficacy. The aim of the research is to develop a module to reduce mathematics anxiety and increase students' self-efficacy in opportunity material. This Research and Development research uses the ADDIE model with five development stages, namely analysis, design, development, implementation and evaluation. The data sources and subjects in this research were material experts, media experts, teachers, and 1328 students from 24 junior high schools in Yogyakarta City. The data collection techniques used were interviews, observation, Focus Group Discussion (FGD), and questionnaires. The results show that the product developed, namely the opportunity material module to reduce mathematical anxiety and increase students' self-efficacy, is suitable for use in mathematics learning. Decision making on product feasibility is based on the results of assessment analysis from validators, material experts and media experts which show that the module is very valid and has the opportunity to reduce mathematical anxiety and increase student self-efficacy.

Keywords: *Self-efficacy*; Mathematics Anxiety; Mathematics; Module.

I. INTRODUCTION

Mathematics is one of the fundamental branches of science, not only for daily life but also in the development of science (Yuliana et al., 2024; Parnabhakti & Ulfa, 2020). However, among students, mathematics is often perceived as a difficult and scary subject (Sriyanto, 2017; Aprilia & Fitriana, 2022; Kamarullah, 2017). One of the factors that contribute to this perception is mathematical anxiety, which is a psychological condition that hinders students from learning and understanding mathematics well (Hastuti et al., 2019; Indrawati 2019; Miatusun & Ulfah, 2023). Anxiety is defined as a psychological condition that causes discomfort and affects a person's daily functioning (Nurliawati, 2022; Rosyanti et al., 2023; Riani & Handayani, 2020). Dorland (2018) defines anxiety as a mood that creates discomfort, fear, and worry about things that are uncertain about happening. Nevid et al (2005) also refer to anxiety as an emotional condition characterized by increased physiological alertness, unpleasant tension, and a feeling that something bad is about to happen.

In the world of education, math anxiety can arise due to various factors, one of which is high academic pressure, especially because this subject is often considered difficult (Wulandari et al., 2023; Sari et al., 2023). Given the large negative impact of math anxiety on student achievement, a new approach is needed in mathematics learning that not only addresses anxiety, but also makes the learning process more enjoyable (Auliya, 2016; Tamba & Bermuli, 2023; Zay & Kurniasih, 2023). The use of psychology-oriented modules is one of the

innovative ways to reduce mathematics learning anxiety (Nurdyansyah & Fahyuni, 2016; Santoso & Ariyanti, 2023). This module combines a psychological approach with cognitive restructuring that replaces negative thoughts with positive thoughts (Wahyuningsih, 2022). This module is expected to create a more welcoming learning environment for students, where anxiety is reduced and academic achievement is improved.

Data analysis shows that students prefer practical, logical, and systematic learning, as well as following a clear structure (Chi, 1997). Through the modules developed, students are encouraged to learn in an organized atmosphere and follow a logical sequence in problem solving, making it easier for them to understand mathematical concepts. In addition, the level of self-efficacy, or students' confidence in their own abilities, also plays an important role in overcoming math anxiety. Students with high self-efficacy are more resilient and confident in facing academic challenges, while those with low self-efficacy tend to be pessimistic and give up easily (Bandura, 1997; Prajono, Gunarti, & Anggo, 2022; Siregar et al., 2024; Afriansyah et al., 2024). Through the developed modules, it is hoped that the level of self-efficacy of students can increase, which in turn can reduce mathematical anxiety and improve academic performance.

To reduce math anxiety and increase students' self-efficacy, the module was developed using the Joymath Cognitive Behavioral learning method. The Joymath Cognitive Behavioral learning method is a learning method that considers the

combination of psychological side factors with the aim of cognitive restructuring to replace negative thoughts with positive thoughts (Marhaeni et al., 2024). The use of the Joymath Cognitive Behavioral learning method is expected to reduce stress that may trigger greater anxiety. In addition, the use of the Joymath Cognitive Behavioral learning method is expected to create a safe, friendly environment, reduce anxiety, stress, depression, and increase student self-efficacy. The Joymath Cognitive Behavioral learning method has 3 (three) main syntax (Maxey, 1997), namely: (1) Joymath which is carried out with ice breaking as the first step to increase student happiness and introduce material through ice breaking; (2) Cognitive, where the learning process is carried out by integrating material on various platforms as well as identifying students' cognitive and affective skills. In addition, repeated exercises are carried out so that students can internalize the concepts learned; and (3) Behavioral which focuses on aspects of student behavior.

Opportunity material is the choice of material raised in the module using the Joymath Cognitive Behavioral learning method because opportunity material is still considered difficult by students (Putridayani & Chotimah, 2020; Maharani et al., 2022; Leonard et al., 2022; Sarkity et al., 2020). Opportunity materials can also be integrated using the Joymath Cognitive Behavioral learning method. So that opportunity material is chosen to be integrated in the module. Therefore, the researcher conducted a study Feasibility of Opportunity Material Module with Joymath

Cognitive Behavioral Method to Reduce Mathematics Anxiety and Increase Student Self-efficacy. It is hoped that by overcoming math anxiety and improving students' self-efficacy through opportunity material modules with the Joymath Cognitive Behavioral learning method, it is hoped that students can learn in a more positive and mentally healthy atmosphere, which not only improves academic outcomes, but also their overall psychological well-being.

II. METHOD

The type of research used in this study is R&D (Research and Development) using the ADDIE model. The ADDIE development model is a development model that has five stages of development, namely analysis, design, development, implementation, and evaluation (Sofyan et al., 2019; Purwoko et al., 2019). In the context of this research, ADDIE development stages will be carried out, namely analysis, design, and development. According to Sofyan et al (2019), the implementation of the analysis, design, and development stages is: (1) The analysis stage is by analyzing the curriculum, student characteristics, and material analysis; (2) The design stage is by designing based on the results of the analysis stage; and (3) The development stage is an activity in developing products from the previous stage. The resulting product will be validated by media expert validators and material expert validators. The output of this development stage is a product that has been declared valid for use. The product developed in this study is an opportunity material module with the

Joymath Cognitive Behavioral learning method.

The data sources and subjects in this study are material experts, media experts, teachers, and 1328 students from 24 junior high schools in Yogyakarta City. The data collection techniques used in this study are interviews, observations, Focus Group Discussions (FGD), questionnaires. Interviews are conducted with teachers to find out the needs of teachers in learning mathematics. In addition, teacher interviews are conducted to ensure the availability of teachers in implementing the opportunity material module with the Joymath Cognitive Behavioral learning method that is being developed. Observations were carried out in 24 junior high schools in Yogyakarta City which were the subjects of the study. Observation is carried out to find out the mathematics learning process that takes place so that the opportunity material module with the Joymath Cognitive Behavioral method that will be developed can help students in learning mathematics. Focus Group Discussion (FGD) was conducted with material experts and media experts to determine the validity of the opportunity material module with the Joymath Cognitive Behavioral learning method. The opportunity material module is said to be valid if the results of the validation of material experts and media experts are in a good category so that the product can be used to the implementation stage and the evaluation stage.

III. RESULT AND DISCUSSION

This section will discuss the steps of ADDIE development at the analysis, design, and development stages

A. Analysis Stage

The analysis stage was carried out by observing 24 junior high schools in Yogyakarta City and interviews with teachers in Yogyakarta City who were the subjects of the research. The results of the analysis stage are as follows.

1. Curriculum Analysis

The results of the curriculum analysis showed that 24 junior high schools in Yogyakarta that were the subjects of the study all used the independent curriculum. Teachers use Capaian Pembelajaran (CP) according to the guidelines from the ministry to create a Alur Tujuan Pembelajaran (ATP). The Learning Objectives for the opportunity material are as follows:

Table 1.
Learning Outcomes of Opportunity Materials

Phase	Learning Outcomes
D	Students can explain and use the meaning of chance and relative frequency to determine the expected frequency of an event in a simple experiment (all experimental results can appear equally).

Table 1 shows the Capaian Pembelajaran (CP) used by teachers in creating the Alur Tujuan Pembelajaran (ATP). The Alur Tujuan Pembelajaran (ATP) developed by each teacher is different because it is adjusted to the characteristics and abilities of students in each school.

2. Analysis of Student Characteristics

The results of the analysis of student characteristics showed that students had difficulty focusing on learning mathematics

because they felt that mathematics learning was not interesting. In addition, students feel that learning mathematics is not related to daily life. This result was obtained from observations conducted in 24 junior high schools in Yogyakarta that were the subject of the study. In the mathematics learning process, students tend to be crowded and chat by themselves when the teacher explains the material. This causes students to have difficulty understanding the math material.

3. Material Analysis


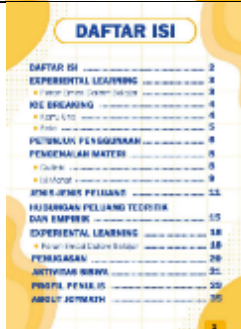


The results of the material analysis show that the opportunity material is one of the materials in mathematics that makes students difficult. This is known from the results of interviews with teachers who stated that students have difficulty in connecting opportunity materials with daily life. In addition, students also have difficulty in solving problems in the opportunity material. From the results above, students need products that can help students reduce math anxiety and increase self-efficacy. Therefore, the product to be developed is an opportunity material module to reduce math anxiety and increase student self-efficacy.







B. Design Phase

In the design stage, the product developed, namely the opportunity material module to reduce mathematical anxiety and increase self-efficacy, will be designed based on the results in the analysis stage. The output at this design stage is the design of the opportunity material module to reduce math anxiety

and increase self-efficacy. The design can be seen in Table 2.

Table 2.
Opportunity Material Module Design

No.	Module Design	Information
1		Module Cover
2		Module Table of Contents
3		The Role of Emotions Before Learning
4		Ice Breaking

No.	Module Design	Information	No.	Module Design	Information
5		Module Usage Instructions	10		Author Profile
6		Material			
7		Student Activities			
8		Home Assignment			
9		The Role of Emotions After Learning			

The design results in Table 2 will be continued at the development stage to test the validity of the opportunity material module developed.

C. Development Stages

In the development stage, the researcher will validate the opportunity material module to reduce mathematical anxiety and increase self-efficacy with material expert validators and media experts. The validation was carried out by Nuryadi, S.Pd.Si., M.Pd., M.CE. and Dr. Riawan Yudi Purwoko, M.Pd. The validation was carried out on Monday, September 23, 2024. In the implementation of the validation carried out, there are comments and suggestions from material experts and media experts that have been summarized. Comments, suggestions, and follow-up from the results of the validation with material experts and media experts, as follows.

1. Adding Illustrations Related to Opportunity Materials on the Cover

The results before and after revision can be seen in Figure 1.



Figure 1. Before the Revision (Left) and After the Revision (Right).

2. Use the Right Emoji Expressions and Provide a Reason Column so that Students can Express Their Feelings
The results before and after revision can be seen in Figure 2.



Figure 2. Before the Revision (Left) and After the Revision (Right).

3. Adding Learning Outcomes (CP) and Learning Objectives (TP)
The results before and after revision can be seen in Figure 3.



Figure 3. Before the Revision (Left) and After the Revision (Right).

4. Eliminate the Combined Opportunity Material of Two Events

The results before and after revision can be seen in Figure 4.

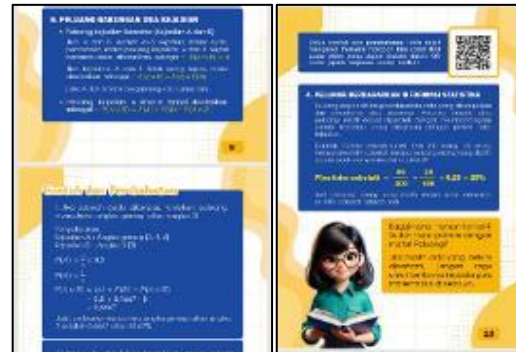


Figure 4. Before the Revision (Left) and After the Revision (Right).

5. Correct Sentences and Mathematical Symbols Properly and Correctly

The results before revision can be seen in Figure 5.



Figure 5. Before the Revision.

The results before revision can be seen in Figure 6.



Figure 6. After the Revision.

6. Adding some examples of the application of opportunities that exist in daily life

The results before and after revision can be seen in Figure 7.



Figure 7. Before the Revision (Left) and After the Revision (Right).

7. Changed "Practice Questions" to "Student Activities"

The results before and after revision can be seen in Figure 8.



Figure 8. Before the Revision (Left) and After the Revision (Right).

8. Changed the Sentence in the "Two dice toss" Table to "Two-coin toss"

The results before and after revision can be seen in Figure 9.

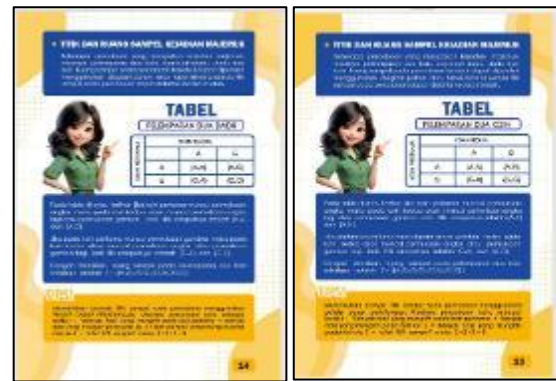


Figure 9. Before the Revision (Left) and After the Revision (Right).

After the comments, suggestions, and follow-ups that have been carried out in Table 3, the development stage will continue with the analysis of the assessment results by material expert validators and media experts. The instrument used is a validation questionnaire for material experts and media experts. In the validation questionnaire instrument, material experts and media experts use a Ligt scale that will be used to classify the criteria for the opportunity material module that is developed. The classification of criteria for the validation results of material experts and media experts can be seen in Table 3 and Table 4.

Table 3.

Classification of Material Expert Validation Criteria

No.	Value	Category
1	$\bar{x} > 67$	Highly Valid
2	$54 < \bar{x} \leq 67$	Valid
3	$42 < \bar{x} \leq 54$	Quite Valid
4	$29 < \bar{x} \leq 42$	Less Valid
5	$\bar{x} \leq 29$	Very Invalid

Table 4.

Classification of Media Expert Validation Criteria

No.	Value	Category
1	$\bar{x} > 59$	Highly Valid
2	$48 < \bar{x} \leq 59$	Valid
3	$36 < \bar{x} \leq 48$	Quite Valid
4	$25 < \bar{x} \leq 36$	Less Valid
5	$\bar{x} \leq 25$	Very Invalid

Based on the classification of the validation criteria for material experts and media experts in Table 3, a classification will be carried out from the results of the assessment of material expert validators and media expert validators. The results of the validator assessment can be seen in Table 5.

Table 5.
Validator Assessment Results

Vallidator Name	Position	Validation Type	Score	Category
Nuryadi, S.Pd.Si., M.Pd., MCE	Dean of FKIP Universi tas Mercu Buana Yogyaka rta	Material Expert Validation	69	Highly Valid
		Media Expert Validation	67	Highly Valid
Dr. Riawan Yudi	Dean of FKIP Universi tas	Material Expert Validation	70	Highly Valid
Purwoko, M.Pd.	Muham madiya h Purwor ejo	Media Expert Validation	63	Highly Valid

Based on the results of the validator assessment in Table 5, it can be seen that the product developed, namely the opportunity material module to reduce mathematical anxiety and increase student self-efficacy, is in the very valid category. Therefore, it can be said that the opportunity material module developed is suitable for use in mathematics learning.

The results that have been described show the stage of product development of the opportunity material module to reduce mathematical anxiety and increase student self-efficacy. The stages carried out include the analysis stage, design stage, and development stage. The analysis stage

produces student needs which are the basis for the development of material module products, opportunities to reduce mathematical anxiety and increase student self-efficacy. Product development is also adjusted to the curriculum that applies in 24 junior high schools in Yogyakarta City which are the subject of research. At the design stage, producing a prototype of the material module is an opportunity to reduce mathematical anxiety and increase students' self-efficacy.

The development stage carried out produces a product of opportunity material modules to reduce mathematics anxiety and increase student self-efficacy that is valid and suitable for use in mathematics learning. This was obtained after the opportunity material module was developed through the validation of material experts and media experts. The results of the validation resulted in comments and suggestions. These comments and suggestions are used as the basis for developing an opportunity material module to reduce math anxiety and increase students' self-efficacy. In addition, validation activities also produced assessments that showed that the material module was an opportunity to reduce mathematical anxiety and increase students' self-efficacy was valid materially.

These results can be the basis that the opportunity material module to lower mathematical anxiety and increase students' self-efficacy developed is worthy of use in mathematics learning. This is in line with previous research which stated that modules can lower math anxiety and increase students' self-efficacy.

IV. CONCLUSION

Based on the results that have been implemented, it shows that the product developed, namely the opportunity material module to reduce mathematical anxiety and increase students' self-efficacy, is suitable for use in mathematics learning. The development of the opportunity material module is based on the results of the analysis which shows that students need learning media that can help students reduce mathematical anxiety and increase self-efficacy. The decision making on product feasibility is based on the results of assessment analysis from validators, material experts, and media experts who show that the material module is an opportunity to reduce mathematical anxiety and increase students' self-efficacy is declared to be very valid. The suggestion for previous research is that research needs to be continued at the implementation stage and the evaluation stage.

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