



# Enhancing student learning motivation: Developing an integrated mathematics module with islamic values

Husnul Hifzhi\*, Ali Asmar, Ahmad Fauzan, Elita Zusti Jamaan

Universitas Negeri Padang, Sumatera Barat, Indonesia.

✉ [hifzhilusnul@gmail.com](mailto:hifzhilusnul@gmail.com)\*

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## Keywords

Islamic values; Learning motivation; Module.

## Abstract

**Background:** The teaching of mathematics in Islamic schools has not yet succeeded in attracting and motivating students to learn. The lack of relevant context and meaningful values in the teaching materials can lead to low student motivation. Integrating Islamic values into mathematics learning modules is expected to provide more meaningful, relevant learning experiences and increase students' motivation to learn.

**Aim:** This study aims to produce a mathematics module integrated with Islamic values to enhance students' learning motivation. The module is designed to meet the criteria of being valid, practical, and effective.

**Method:** This research employs the Plomp development model, which consists of three stages: preliminary stage, development stage, and assessment stage. The developed module has been validated by experts in content, language, and media.

**Results:** The implemented module meets the criteria of validity, practicality, and effectiveness. The module is valid with an average score of 88.9%, practical with an average score of 89.7%, and effective in improving students' mathematics learning outcomes, with 86.67% of students achieving mastery. The module also successfully increased students' learning motivation, with 84.50% of students showing improved motivation.

**Conclusion:** Based on these results, it can be concluded that the mathematics module integrated with Islamic values is valid, practical, and effective.

## INTRODUCTION

Current mathematics education still fails to engage and motivate students to learn (Ingram et al., 2020; Kusurkar et al., 2013). Meanwhile, learning motivation is a crucial aspect that needs to be enhanced and maintained to enable students to achieve optimal learning outcomes and fully develop their potential (Cayubit, 2022). Students with high learning motivation are more actively involved in the learning process, show perseverance in completing tasks, and possess a strong desire to deeply understand the subject matter (Graciani Hidayat et al., 2020; Rahiem, 2021). These students are also more adept at facing academic challenges and finding creative solutions to problems (Bhat et al., 2023). Therefore, it is imperative to increase learning motivation.

Enhancing learning motivation can be achieved through external conditions such as teachers presenting lessons with varied media, appropriate methods, dynamic communication, and flexible teaching materials (Lin et al., 2017; Orsini et al., 2018). Additionally, learning motivation needs to be balanced with strong spirituality (Stela et al., 2023; Usman & Zainuddin, 2021).

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The learning process in schools must be capable of shaping students' religious character. Strong character and good moral values will help students face everyday life challenges (Daud et al., 2023). Through the integration of religious values into education, students can internalize ethical and moral principles that guide them in making correct and responsible decisions (Cohen & Elder, 2018). This integration also fosters a conducive learning environment where values such as honesty, cooperation, and patience are appreciated and applied in all aspects of school life (Hafid & Rhomadania, 2024).

One way to achieve this is by integrating science and religion (Maarif, 2015). This integration can take the form of incorporating religious content and values into the curriculum. According to Masturin (2022), students' character can be shaped through teaching materials that integrate religion and culture. Therefore, meaningful and innovative learning that integrates the spiritual life values of students is highly necessary (Abdussakir, 2017).

However, mathematics education still faces numerous challenges. Many students struggle to understand mathematical concepts due to teaching approaches that are neither engaging nor relevant (Hartatik et al., 2022; Indah & Hidayati, 2021). The available teaching materials do not integrate values that could enhance students' learning motivation (Kholil & Usriyah, 2019). As a result, students tend to be less motivated to actively engage in mathematics lessons, which is reflected in their low participation in activities such as asking questions, responding, and taking notes.

Therefore, innovation is needed in the development of teaching materials that not only focus on mathematical content but also integrate spiritual values to shape character and enhance students' learning motivation. This aligns with Nurrita et al (2018a) statement that engaging teaching materials can improve learning outcomes and increase students' interest in studying mathematics. One innovative effort that can be undertaken is the development of mathematics modules integrated with Islamic values (Fadli & Sudrajat, 2020; Nafiah, 2020). The integrated mathematics module referred to in this research aims to combine general mathematics with Islamic values. This module is expected to change students' perception of mathematics as merely numbers and formulas by demonstrating that Islamic values are embedded within it. Consequently, students will be more motivated to learn mathematics.

Various teaching products that have been developed have proven effective in enhancing the quality of education (Gunung & Darma, 2019; Lu, 2023; Shu, 2022; Xue, 2020). One effective method is through the use of teaching modules (Iranda & Periantalo, 2022; Kaharuddin et al., 2021). The use of teaching modules in education has been implemented by Dini et al. (2023), Kusuma et al. (2022), and Ndoa & Jumadi (2022), demonstrating that teaching modules can increase students' learning motivation. Recent research by Ismaniati & Iskhamdhanah (2023) developed a mathematics teaching module aimed at improving students' learning motivation, though it was effective only for specific topics.

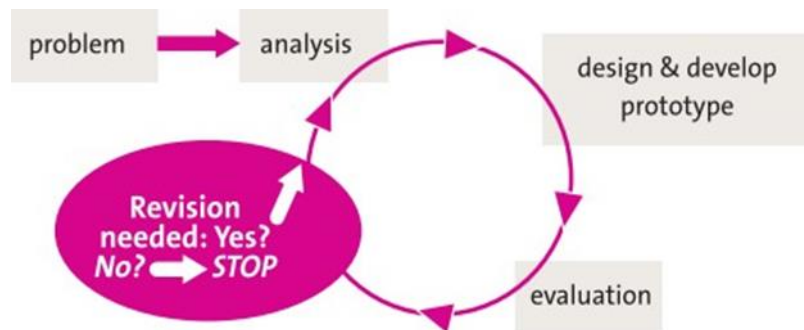
This research aims to fill that gap by developing a mathematics teaching module integrated with Islamic values, focusing on enhancing students' learning motivation. By integrating Islamic values into the mathematics learning module, it is hoped that students can see the relevance between the lessons they learn and the spiritual values they adhere to. This module not only aims to improve students' understanding of mathematical concepts but also to shape better character by instilling Islamic values. This integration can provide a more holistic

learning experience, where students not only gain academic knowledge but also internalize important moral and ethical values for everyday life.

## METHODS

### *Design:*

This research employs a Research and Development (R&D) approach, a type of study used to produce specific products and test their validity, practicality, and effectiveness (Sugiyono, 2011). The aim of this research is to develop a mathematics module on Relations and Functions integrated with Islamic values, which includes test questions for assessing the learning outcomes of eighth-grade students. Additionally, the module contains elements designed to boost students' learning motivation at specific points. The development model used is the Plomp model. According to Plomp (2013), this model consists of three phases: preliminary research, development phase, and the assessment phase.



**Figure 1.** Systematic Research Design Cycle

### *Plomp Development Model*

#### **1. Preliminary Research**

In the preliminary research phase, a needs analysis was conducted through interviews and observations to identify problems and challenges faced during the learning process from the perspectives of both educators and students, particularly regarding the use of modules. Interviews were conducted with educators teaching mathematics to eighth-grade students. Additionally, a curriculum analysis was performed to ensure that the material taught aligns with the core competencies and basic competencies established in the first-semester curriculum for eighth-grade students at the pondok pesantren. Concept analysis was also carried out to help students achieve learning objectives using the mathematics module integrated with Islamic values. Lastly, an analysis of the characteristics of eighth-grade students was conducted to understand their traits, ensuring that the design of the developed module meets their needs and characteristics.

#### **2. Development Phase**

The analysis results from the preliminary research phase serve as the foundation for designing the development of the mathematics module integrated with Islamic values. In designing the product, three key characteristics must be considered: content/material appropriateness, graphics, and language. The development phase of the mathematics module integrated with Islamic values begins with self-evaluation to test the validity of the designed teaching materials,

correcting errors in the content, typing, punctuation, and layout. Next, expert reviews are conducted by competent validators to provide improvement suggestions. Once validated, a one-on-one evaluation is performed to test the practicality of the module by observing student activities and conducting interviews.

Following this, a small group evaluation is conducted with a group of eighth-grade students to test the practicality and effectiveness of the module before its wider implementation. The final stage is field testing, where the module's practicality and effectiveness are assessed in the classroom as a whole to determine the extent to which the module can improve students' learning outcomes and motivation.

### 3. Assessment Phase

After the module is deemed valid and practical, the next step is to conduct a summative evaluation. The purpose of the summative evaluation is to assess the overall effectiveness of the product (Plomp, 2013). The effectiveness of the module is measured using test questions to evaluate student learning outcomes. The aspect of effectiveness observed in the learning process using the module is the improvement in students' learning results.

#### ***Participants***

This research resulted in the development of a mathematics module integrated with Islamic values, designed according to problem-based learning indicators. The module was validated by six experts: three mathematics experts as content validators, one language expert as a language validator, one design or graphics expert, and one expert in Al-Qur'an and Hadits.

#### ***Instruments***

The instruments used in this research include interviews, observations, questionnaires, and documentation. These instruments were employed to gather data on the validity, practicality, and effectiveness of the module.

#### ***Data Analysis***

The instruments used in this research include interviews, observations, questionnaires, and documentation. These instruments were employed to gather data on the validity, practicality, and effectiveness of the module.

##### 1. Expert validation analysis

Using percentage calculations in accordance with Arikunto (2021), the qualitative criteria for the percentage range are shown in Table 1.

**Table 1.** Module Validity Categorization Criteria

Range Percentage	Category Validity
$0 \leq V \leq 20$	Invalid
$20 < V \leq 40$	Less Valid
$40 < V \leq 60$	Fairly Valid
$60 < V \leq 80$	Valid
$80 < V \leq 100$	Very Valid

## 1. Practicality Analysis

$$P = \frac{x}{y} \times 100\%$$

Information:

P : Final grades from educators and participants educate

X : Amount all score

Y : Score maximum

The qualitative criteria of the percentage range are shown in Table 2.

**Table 2. Criteria for Categorizing Module Practicality**

Range Percentage	Category Practicality
$0 \leq P \leq 20$	Impractical
$20 < P \leq 40$	Less Practical
$40 < P \leq 60$	Enough Practical
$60 < P \leq 80$	Practical
$80 < P \leq 100$	Very Practical

## 2. Module Effectiveness

Using mathematics learning outcome tests conducted by students, compared to the Minimum Learning Criteria (KBM) of 70. The criteria for an effective module are presented in Table 3.

**Table 3. Criteria for Categorizing Module Effectiveness**

Range Percentage	Category Effectiveness
$0 \leq E \leq 20$	Ineffective
$20 < E \leq 40$	Less effective
$40 < E \leq 60$	Enough Effective
$60 < E \leq 80$	Effective
$80 < E \leq 100$	Very effective

## RESULTS AND DISCUSSION

In this research, an integrated product of Islamic values based on problem-based learning has been produced which is adapted to the research steps for developing the Plomp model as follows:

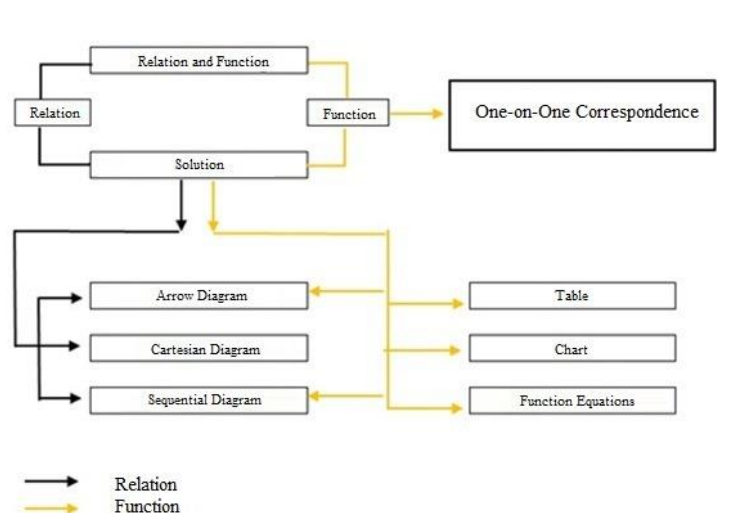
### **Result**

#### ***Preliminary Research***

Based on analysis need obtained information 1) Required procurement teaching materials in the form of book text or book other handles are used For Study mathematics. 2) References besides book required for help student in understand material learning. 3) The mathematics learning materials provided are not yet *contextual* and have not been integrated with Islamic values. 4) Alternative teaching materials that can be used to study practical and interesting concepts of Relations and Functions. 5) Educators agree that it is necessary to develop teaching materials such as learning modules integrated with Islamic values in mathematics learning.

Mathematics learning at the Islamic Boarding School in Minangkabau Village, Padang City continues to refer to the 2013 Curriculum from the Department of National Education. However, the Islamic Boarding School carries out development in accordance with Islamic values which are the basis of education (Rojii et al., 2019). In its application, the Islamic Boarding School in Minangkabau Village, Padang City applies an implementation approach by combining general education and classical religious education into one curriculum. With this approach, mathematics learning and all school activities cannot be separated from the framework of Islamic teachings and messages. The curriculum analysis carried out includes Core Competencies and Basic Competencies (KD) in mathematics material for class VIII semester I. Spiritual attitude competencies, namely appreciating and living up to the teachings of the religion one adheres to. The social attitude competency is respecting and appreciating honest, disciplined, polite, confident, caring and responsible behavior in interacting effectively in accordance with children's development in the environment, family, school, community and natural environment, nation, state and region. regional.

Based on the concept analysis, the material that can be studied by islamic boarding school students integrated with islamic values is the material of relations and function. from the indicators that have been formulated, the number, title and sequence of modules are arranged. concept map of the relationships and Functions material in the module being developed.



**Figure 2.** Concept Map of Relationships and Functions Material in the Developed Module

Based on Figure 2, the module was tested in four learning activities. The order of the material is arranged in relation to each other, this is so that students know the relationship between one material and another so that students understand the material more quickly.

Based on interviews with educators, it is known that students have varying abilities to learn mathematics, namely high, medium and low abilities. The age of class VIII students is around 12-14 years, which according to Piaget's theory, the characteristics at this stage are that students already have the ability to think abstractly, reason logically, solve problems through systematic experimentation and draw conclusions from available information. So that they can carry out learning that leads them to discover a concept for themselves and at the end of the lesson students are able to draw conclusions.

### *Development Stage*

#### **Analysis of expert review results**

Based on the validity test of the material, graphics, language and Islamic values by the validators, it shows that the revised module can determine its validity criteria by determining the average score of these three aspects as in Table 4.

**Table 4.** Average Score and Module Validation Category

No	Rated aspect	Average Score	Category
1	Validity test material mathematics	82.5	Very Valid
2	Test the validity of Islamic values material	95	Very Valid
3	Validity test graphics	84.38	Very Valid
4	Test the validity of the language	93.75	Very Valid
	Average	88.90	Very Valid

Based on table 4.9, the results of the validation of the integrated mathematics module with Islamic values received an average score of 88.90%. This score is included in the "very valid" criteria, meaning that the material, graphic and language aspects of the module which were developed with several revisions are very suitable for use in testing the practicality of the module at the next stage.

#### **Module Practicality Analysis Results**

Based on the practicality test of the module carried out by educators and students, it shows that the revised module can determine its practicality criteria by determining the average score from the assessments of educators and students. Can seen in Table 5 below.

**Table 5.** Average Score and Module Practicality Category

No	Observed Aspects	Average Score	Category
1	Practicality test educator	90.60	Very Practical
2	Practicality test participant educate	88,826	Very Practical
	Average	89.7	Very Practical

Based on table 4.18, it shows that the results of the practicality of the integrated mathematics module with Islamic values received an average score of 89.7%. This score is included in the "very practical" criteria, so this shows that the module can be used by educators and students in learning mathematics.

### *Assessment Phase*

Student learning outcomes after using the module are compared with the minimum learning completeness score (KBM), which is 70, then the student's percentage of completeness is determined. The test questions have previously been validated by mathematics education experts and Islamic religious education experts. The percentage of students' mathematics learning achievement test completion in the field test can be seen in Table 6 below:

**Table 6.** Percentage Completeness Learning Results Test Mathematics Students in Field Test

Final Test	Complete	Not Completed
Amount Learners	26	4
Percentage	86.67%	13.33%

Tabel 6 shows that of the 30 students who took the learning outcomes test in the field test, there were 4 students who did not complete it. The percentage of learning completeness in the field test is 86.67%. The module developed can be said to be effective if the percentage score of students who complete is more than 60%, so it can be concluded that using an integrated mathematics module with Islamic values is said to be very effective in improving students' mathematics learning outcomes.

Next, semi-structured interviews were conducted with research subjects. The instrument used, namely the interview guide, has been validated by expert lecturers. This shows that the instrument has valid qualifications, so it can be used in the field. The complete interview transcript will be presented in a discussion of the presentation and analysis of product test data. After carrying out the final test and interview, a learning motivation questionnaire was then given to determine students' motivation in learning mathematics using an integrated mathematics module with Islamic values. The results of the student learning motivation questionnaire have been validated by experts and obtained analysis results with a percentage of 87%. This shows that the instrument has very good qualifications, so it can be used in the field. For results analysis questionnaire motivation Study as many as 30 subjects.

### **Discussion**

In the process of developing an integrated mathematics module with Islamic values for class VIII Islamic Boarding School students, it underwent several improvements so that a valid, practical and effective module was obtained. The discussion of the development or prototyping phase stages is described as follows:

#### **Validity of the Mathematics Module**

Material validation was carried out for all components in the module developed both from the mathematical material aspect and the Islamic values material aspect. The validation results show that the mathematics module is in accordance with the established criteria, namely integrated Islamic values based on *problem-based learning*, conformity with the 2013 curriculum, the correctness of the material can be accounted for, the steps for *problem-based learning* are appropriate, the order of presentation is systematic, there is a presentation. material with pictures according to students' needs, making it easier for students to understand the material. Piaget also stated that knowledge is a construction from students' own knowledge building activities (Bereiter & Scardamalia, 2014). Like Piaget, Vygotsky's learning theory also believes that intellectual development occurs when students are faced with new experiences and when they try to solve problems on their own (Lourenço, 2012). The relationship between mathematics material and Islamic values is appropriate, Islamic values can motivate students to apply them to everyday life and the truth of Islamic values in the module can be justified. Thus, aspects of the mathematics material and Islamic values in the module developed have met the validity criteria.



Graphic validation by educational technology experts shows that the module has attractiveness such as appropriate combinations of size and type of letters, color combinations and arrangements are correct and easy to understand, and the illustrations/images used are appropriate to the level of students at the Islamic Boarding School. This is in accordance with Prastowo (2019) view that images/illustrations are really needed to support and clarify the content of the material. In line with this, Nurrita (2018b) said that interesting learning media can improve learning outcomes and students' interest in learning mathematics. The module developed has an attractive overall appearance. Thus, the graphic aspects of the module meet the validity criteria.

Validation of the language of the mathematics module integrated with Islamic values shows that the module uses good and correct Indonesian in accordance with the general guidelines for Indonesian spelling (PUEBI), using language that is clear, communicative and easy for students to understand. This is in accordance with the opinion of Nugraha & Binadja (2013) who state that linguistic standards or readability in learning materials include good and correct use of Indonesian, clarity of the language used and ease of reading. Thus, validation of the material, graphics and language in the integrated mathematics module with Islamic values has been carried out and meets the very valid criteria.

### ***Practicality of Mathematics Modules***

Based on the results of observations, it can be seen that the implementation of learning with mathematics modules integrated with Islamic values is going well. When learning takes place, students are actively involved, very happy and enthusiastic in solving the problems in the module. According to Freudenthal (2002) mathematics is a form of human activity. Therefore, mathematics should not be given to students as a ready-to-use product but rather as a form of work activity in developing mathematical concepts. When students understand the Islamic values contained in the material, students are immediately interested in studying the module. Students can understand that mathematics and Islamic values are not separate things.

Based on interviews with students, it was concluded that the use of the module was easy to understand and use, the appearance of the module was attractive and not boring, the time available was appropriate for each activity, the practice questions given had varying levels of difficulty and the Islamic values in the module motivated students to apply it in everyday life and become a new experience for students in studying mathematics. Based on its ease of use, students can do exercises and complete each step of problem-based learning well and easily, students get the module for free. The modules are designed to be used either independently or in groups. This criterion is an alternative for educators and students in choosing learning media that is easy to learn, can be used anywhere and anytime. Similarly, according to Febrianti et al., (2017) opinion, the module can be used anywhere, so it is more practical for students and educators to carry anywhere and anytime. This shows that students are more interested in learning if they find it easy to receive learning resources.

Based on the efficiency of learning time, the time allocation for carrying out learning activities at each meeting is appropriate, students can use their free time to study mathematics using the modules that have been distributed anytime and anywhere easily. Based on the benefits, it is known that the mathematics module integrated with Islamic values can help students understand the material, each step of *problem-based learning* is inserted with Islamic

values which motivate students to work on and understand mathematics material, the learning process becomes more enjoyable, instilling Islamic values in the material, example questions, exercises, Islamic character values, use of Islamic terms and names, inserting verses from the Koran and Hadith that are relevant to the material provide motivation and attraction for students to study mathematics so they can improve students' mathematics learning outcomes. In line with this, according to Kurniati (2015) the use of integrated modules of Islamic values as teaching materials in mathematics learning can improve students' mathematics learning outcomes. Therefore, it can be concluded that the integrated mathematics module with Islamic values that was developed meets the very practical criteria based on the assessment aspect.

### ***Effectiveness of Mathematics Modules***

Students' mathematics learning outcomes have increased due to several things, including in the module each *problem-based learning step* is arranged systematically which aims to require students to independently build the knowledge they need to know by following scientific steps, this supports the results of testing the effectiveness of the module in improving mathematics learning outcomes. This is in line with Bruner's learning theory or also known as discovery theory which states that by carrying out cognitive processes in the discovery process, students will gain sensation and intellectual satisfaction which is an intrinsic reward, the only way to be able to learn techniques (Bruner, 1966). In making discoveries, students have the opportunity to make discoveries and by making discoveries it will strengthen memory retention. Based on Piaget's theory, it is also said that at this stage students have acquired the ability to think abstractly, reason logically, solve problems through systematic experimentation and draw conclusions from the available information (Piaget, 1976).

### ***Implication***

Mathematical logic can help in evaluating and detailing scientific arguments, as well as establishing standards of rationality in research. Uncertainty and Probability in mathematical logic, especially probability, can help the philosophy of science in understanding aspects of uncertainty and randomness in science. It is important to acknowledge the limits and complexity of our knowledge.

## **CONCLUSIONS**

Based on the process and results of the research, it can be concluded that the mathematics module integrated with Islamic values for eighth-grade students meets the criteria of validity, practicality, and effectiveness. The module is valid with an average score of 88.9%, demonstrating alignment with the 2013 curriculum, appropriate problem-based learning steps, and the use of graphics and language consistent with PUEBI. The module's practicality is also high, with an average score of 89.7%, reflecting ease of use, completeness of components, and suitability of time for activities. Additionally, the module is effective in enhancing mathematics learning outcomes, with 86.67% of students achieving mastery, and in boosting students' motivation to learn mathematics, with a percentage of 84.50%.

This research indicates that integrating Islamic values into mathematics education can be an effective strategy for improving student learning outcomes and motivation. The module not only helps students better understand mathematical concepts but also instills important moral

and ethical values for everyday life. For future research, it is recommended to test this module in various educational contexts, such as public schools and other religious-based schools, to see if similar results can be achieved. Additionally, further studies can develop similar modules for other mathematics topics or subjects that can be integrated with Islamic values or other moral values.

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## **AUTHOR CONTRIBUTIONS STATEMENT**

HH is the designer and implementer of the research. AA as supervisor and EZ and AF as a contributor in completing the research.

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