Alifmatika: Jurnal Pendidikan dan Pembelajaran Matematika
Volume 8, Issue 1, 101-120, June 2026
e-ISSN: 2715-6109 | p-ISSN: 2715-6095
https://journal.ibrahimy.ac.id/index.php/Alifmatika

Development of integrated Islamic mathematics modules based on high school students' mathematical communication skills in probability

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Received: March 2, 2026 | Revised: May 23, 2026 | Accepted: May 31, 2026 | Published: June 15, 2026
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***Abstract*:**
This study employs a research and development (R&D) methodology based on the ADDIE model, comprising the analysis, design, development, implementation, and evaluation phases. The objective is to produce a mathematics module integrated with Islamic values, grounded in high school students' mathematical communication skills, particularly regarding probability. The module aims to be valid, practical, and effective, and to enhance students' knowledge of Islamic studies. The study was conducted at MAN 4 Kampar during the odd semester of 2025/2026, with 10th-grade students in Class X.A and experts as subjects, and the developed module as the object of study. The research design used was a pre-experimental one-shot case study. Data were collected through questionnaires, tests, and documentation, resulting in both quantitative and qualitative data. Data analysis included the Aiken index (validity), percentage (practicality), normality test, and one-sample t-test (effectiveness and Islamic knowledge). The data analysis showed that the module was highly valid (0.87) and highly practical (81.26% for small groups and 88.69% for limited groups). The *posttest* results were calculated using the left-tailed *t-test*, yielding. Therefore, it is accepted and rejected, indicating that students' average learning outcomes have reached the mastery level. Furthermore, the results of the Islamic knowledge questionnaire were analyzed using *a* right-tailed *t-test*, yielding. Therefore, it was rejected and accepted, indicating that students' average Islamic knowledge had increased. Based on these methods, it can be concluded that the integrated mathematics module grounded in Islamic values, which focuses on high school students' mathematical communication skills in probability, demonstrates high validity, practicality, and effectiveness in the learning process and can enhance students' religious knowledge.

Keywords: Development; Islamic Integration; Islamic Knowledge; Mathematical Communication Skills; Module; Probability.

How to Cite: Ariani, D., Nufus, H., & Syami, S. S. (2026). Development of integrated Islamic mathematics modules based on high school students' mathematical communication skills in probability. *Alifmatika: Jurnal Pendidikan dan Pembelajaran Matematika*, 8(1), 101-120. https://doi.org/10.35316/alifmatika.2026.v8i1.101-120

Introduction

Probability is a branch of mathematics that is part of our daily lives. One application of probability is considering the likelihood of an event occurring. Probability material often uses story problems, which can make it difficult for students to interpret. It shows that students memorize without understanding the concept of probability (Tanzimah & Sutrianti, 2023). Teachers can use teaching materials to support learning and help students understand concepts in depth (Wahyudi, 2022). Teachers and students use teaching materials to support the learning process (Kosasih, 2021). One of the most effective teaching materials to use in the classroom is a module (Nurlatifah et al., 2022).

A module is a printed teaching material that contains subject matter, designed in an orderly and systematic manner to enable students to learn independently, to achieve specific learning outcomes (Ningtyas, 2019). Modules are designed mathematically to help students focus on understanding the material's concepts. Modules are an appropriate development in the current learning process because they make it easier for students to access subject matter and are more effective and efficient for teachers and students, with few obstacles in their use (Famulaqih & Lukman, 2024). Learning through modules must align with national educational goals, namely educating the nation and developing citizens holistically (Meiliasari et al., 2022).

The parts of the module, according to the Ministry of Education and Culture as quoted by Diana et al., (2023) are: (1) The beginning of this module includes the title, table of contents, information map, learning objectives, and a pre-test; (2) The core section of the module includes an introduction that covers a description of the material, assignments, and a summary; (3) The concluding section includes a glossary, a final test, and a table of contents. This opinion is added by Kustandi & Darmawan (2020) that the module consists of (1) the initial section includes portrait photography module learning materials, module uses, general learning objectives, the structure and interrelationships between module titles, and instructions for studying the module. The back cover and front page of the module will include an ISBN (*International Standard Book Number*); (2) The content or core section contains an introduction that includes a brief description of the material in the module, specific learning objectives, the benefits of the material in the module, and the sequence of the main topics in the module. The learning activities will include a description of the learning materials, related examples, exercises, summaries, and formative tests. The bibliography contains a list of sources and readings that module users can use to enrich the main topics; (3) The closing section contains the module conclusion, glossary, and appendices related to this portrait photography module. Therefore, the researcher developed a module with the following components:(1) cover; (2) opening page of the module; (3) introduction; (4) module description; (5) table of contents; (6) learning objectives and outcomes; (7) learning instructions; (8) concept map; (9) introduction to the material; (10) learning activities; (11) practice questions; (12) answer key; (13) glossary; (14) index; and (15) bibliography.

One of the goals of national education is to shape faithful individuals, devout to God Almighty, and of noble character (Meiliasari et al., 2022). Modules, as teaching materials for achieving learning objectives and national education objectives, should contain Islamic values. Islamic values integrated into the school learning process can lead students to acquire cognitive knowledge and to understand and apply them (Darto &

Afandi, 2022). Islamic integration means combining the study of science with Islamic values, thereby forming a unity (Yusuf, 2022).

Islamic values include: (1) faith, which is the basis of a Muslim's belief in Allah SWT; (2) sharia, which is a set of rules and guidelines for living that originate from the Qur'an and Hadith; and (3) morals, which are behaviors and attitudes that reflect obedience to Allah's rules (Ma'muroh, 2021). The scope of aqidah includes *Ilahihah, nubuwwah, ruhanih,* and *sam'ya* (Rustam & A. Haris, 2018). The scope of sharia includes worship, *muamalah, munakahat, jinayat,* and *siyasah* (Sudirman, 2026). The scope of morals includes morals towards Allah SWT and towards creatures (Mustaring, 2021). In this study, Islamic integration is defined as the incorporation of Islamic values into mathematics learning. The Islamic values that are integrated include: (1) faith, with a scope of *divinity*, *prophethood*, and *spirituality*; (2) sharia, with a scope of worship and *politics*; (3) morals, with a scope of morals towards Allah and morals towards creatures.

In addition to having spiritual abilities acquired through learning with integrated Islamic modules, students must also possess mathematical thinking skills, including mathematical communication skills (Hendrina et al., 2021). Mathematical communication skills are a process of expressing mathematical thoughts and ideas developed as a means of interaction between the sender and receiver of a message using mathematical language in the form of symbols, words, pictures, graphs, algebra, and others, either verbally or in writing (verbal communication), reinforced by nonverbal communication (Riyanto et al., 2024).

Building on the importance stated earlier, mathematical communication skills remain a key aspect of the learning process. Moreover, this is supported by Regulation of the Minister of National Education of the Republic of Indonesia No. 22 of 2006, which states that the goal of mathematics education is for students to be able to express ideas and explain problems through various forms of representation, such as pictures, diagrams, tables, and other media (Nasional, 2006). In line with this, the development of an integrated mathematics module based on Islamic values that focuses on mathematical communication is expected to help students better understand the material, relate it to Islamic teachings, and encourage them to convey ideas clearly and in a structured manner.

According to Kusuma et al., as cited in the components of mathematical communication skills include: (1) *Writing* text; (2) Drawing; and (3) *Mathematical* expressions (Lutfi et al., 2024). Triana and Zubainur state that indicators of mathematical communication skills include the following: (1) transforming real objects, pictures, or diagrams into mathematical concepts; (2) expressing mathematical ideas, situations, and relationships both orally and in writing by utilizing concrete objects, pictures, graphs, and algebraic symbols; (3) listening to, discussing, and writing down mathematical ideas; (4) reading and understanding written mathematical presentations; (5) constructing arguments and formulating definitions and generalizations; and (6) restating mathematical explanations in one's own words (Maulyda, 2020).

Furthermore, Sumarmo, quoted from Hendrina et al., (2021), argues that mathematical communication indicators include: (1) Transforming real-world objects, situations, and everyday events into mathematical models; (2) Explaining mathematical ideas and models (pictures, tables, diagrams, graphs, and algebra) using everyday language; (3) Formulating and explaining questions related to the material being studied; (4) Listening, discussing, and writing about mathematics; (5) Reading and

understanding written presentations; (6) Making conjectures, constructing arguments, formulating definitions and generalizations.

According to Zarkasyi (2018), Indicators of mathematical communication skills include several aspects. First, they involve relating real objects, pictures, and diagrams to mathematical concepts. In addition, they require expressing mathematical ideas, situations, and relationships both orally and in writing through various forms of representation. Furthermore, describing everyday events in mathematical language is essential. Another key aspect involves listening to, discussing, and recording mathematical ideas. Equally important is reading and understanding written mathematical presentations. Moreover, formulating mathematical questions relevant to problems demonstrates communication skills. Finally, making conjectures, constructing arguments, and formulating definitions and generalizations are crucial components as well. Based on this, the indicators and components used in this study are: (1) restating mathematical concepts in one's own words in writing; (2) explaining mathematical ideas and relationships orally and in writing using representations like objects, pictures, tables, diagrams, graphs, and algebraic symbols; and (3) modeling and solving contextual problems mathematically.

The need for this module was also based on discussions with tenth-grade mathematics teachers at one of the Islamic high schools in Kampar Regency. The discussion revealed that teachers had been using various teaching materials, including mathematics modules, but had not yet used integrated Islamic modules. In addition, teachers have developed students' mathematical communication skills, but these are still limited to group presentations of results. On the other hand, MAN does not yet have an integrated mathematics module incorporating Islamic values that focuses on mathematical communication in the context of probability, so such a module needs to be developed. The uniqueness of this study lies in the development of a mathematics module that integrates Islamic values and is specifically designed to enhance students' probability communication skills. This study links the concept of probability to an Islamic context, with numerical representations in the Qur'an and hadith, so that students not only learn mathematical concepts abstractly but also understand their application within the context of Islamic values.

Recognizing the importance of instilling Islamic values and mathematical communication skills in students, as well as their relevance to the availability of opportunity modules, research combining these three elements is needed. However, to date, no research discussing this topic has been found. The Islamic Education Research and Development Agency has developed integrated Islamic teaching materials on mathematical communication skills (Hayatun Nufus & Amri Darwis, 2023); however, these materials are presented in textbooks rather than modules. In addition, integrated Islamic modules on set theory (Lajiba, 2021) and three-variable linear equation systems Kinanti & Wulantina, 2023) have been developed. Still, none of the modules are based on mathematical communication skills. In addition, another study examines the development of learning modules to improve students' mathematical communication skills in the area of relations and functions (Ats-Tsauri et al., 2021) and two-variable linear equations (Saputro et al., 2025), but none of them are integrated with Islamic studies.

Given the importance of mathematical communication, an understanding of Islamic values, and the availability of modules, no research has yet been found on the development of Islamic-integrated mathematics modules that integrate mathematical

communication into probability topics intended for high school students. It has prompted the conduct of this development study on probability topics, which are taught in the 10th grade during the odd semester of Phase E of the Merdeka Curriculum. The results of this study are expected to serve as a new reference in mathematics education.

Research Methods

R&D (*Research and Development)* research using the ADDIE model, which stands for *Analysis, Design, Development, Implementation*, and *Evaluation* (Joko et al., 2023). Based on the ADDIE model, the first stage of research is analysis, gathering information to determine the importance of module development in learning objectives. The second stage is design: designing mathematics modules based on module components, taking into account specific competencies, methods, teaching materials, and strategies. The third stage is development, producing modules that have been declared valid and producing other supporting instruments. The fourth stage is implementation, using the modules developed during the learning process. The fifth stage is evaluation, which involves evaluating the results of the research implementation.

This study aims to develop a mathematics module that meets the criteria of validity, practicality, and effectiveness and enhances students' religious understanding. This study employs a pre-experimental one-shot case study, as described by Lestari & Yudhanegara (2018). The sampling technique used is non-probability purposive sampling, chosen to represent variation in students' academic abilities. It aligns with Ritonga's (2025) view that purposive sampling is conducted according to specific criteria relevant to the research objectives.

This developed module is integrated with Islamic studies, making it more appropriate for use in madrasahs, so the researchers conducted their study at MAN 4 Kampar. The research subjects were validators to assess and validate the module and test questions, and 10th-grade students at MAN 4 Kampar to determine the module's practicality and effectiveness. The validators included: instrument validators; product validators, which included learning material experts, Islamic material experts, and educational technology experts; and test question validators. The study examined an Islamic-integrated mathematics module focused on the mathematical communication abilities of high school/MA students in probability.

The data sources for this study are classified as primary because the researcher collected them directly. The data comprise two types: qualitative and quantitative. According to Sugiyono (cited in Rudini & Azmi, 2023), quantitative data consist of numbers, or qualitative data transformed into numeric form, while qualitative data appear as words, sentences, gestures, expressions, diagrams, images, or photographs. This section also outlines the data collection techniques: tests, non-tests, and documentation. The relationship among research aspects, methods, and instruments is detailed in Table 1.

Data analysis techniques using the Aiken index to test validity (Astuti et al., 2024) and percentages to measure practicality (Hilda, 2021), as well as normality tests and one-sample *t-tests* to test effectiveness and Islamic knowledge. The normality test uses the chi-square formula. Assegaf (2020), by comparing the values with the null

hypothesis at a 5% significance level and degrees of freedom. The results obtained are concluded with the following conditions:

a. If $X^2_{hitung} \geq X^2_{tabel}$, it means the data distribution is not normal
b. If $X^2_{hitung} > X^2_{tabel}$, it means the data distribution is normal.

Table 1. Relationship between Aspects, Data Collection Techniques, and Research Instruments to the Module

No.	Aspects Studied	Data Collection Techniques	Research instruments
1.	Module validity	Questionnaire	Module validity questionnaire for learning materials Islamic material section module validity questionnaire Module validity questionnaire for the display section
2.	Practicality of the module	Questionnaire	Practicality questionnaire
3.	Module effectiveness	Test	Mathematical communication skills test questions
4.	Islamic knowledge	Questionnaire	Islamic knowledge questionnaire

Next, *a* one-sample *t-test* was analyzed by calculating. Then, comparing with the condition and a significance level of 0.05 (Baidowi et al., 2024). Normality and *t-tests* were conducted to analyze the posttest results and Islamic knowledge questionnaires. The posttest results were calculated using a one-sample left-tailed *t-test*. The hypothesis was as follows:

1. H_0: $\mu \geq 80$, the average academic performance of students using the integrated Islamic mathematics module, as measured by their mathematical communication skills in probability, is at least 80.
2. H_0: $\mu < 80$, the average academic performance of students using mathematics modules integrated with Islamic studies, as measured by their mathematical communication skills in probability, is less than 80.

A score of 80 is the Learning Objective Mastery Criteria (KKTP) for mathematics at MAN 4 Kampar. The post-test analysis results were concluded with the following conditions:

a. If $-t_{tabel} \leq t_{hitung,}$ it means H_0 is accepted, and H_a is rejected.
b. If $-t_{tabel} > t_{hitung,}$ it means H_a is accepted, and H_0 is rejected.

Unlike the analysis of posttest results, the Islamic knowledge questionnaire was calculated using *a* one-sample right-tailed *t-test*. The hypothesis was as follows:

1. H_0: $\mu < 36$, the average level of Islamic understanding among students using the Islam-integrated mathematics module, as measured by their mathematical communication skills in probability, is a maximum of 36.

2. H_0: μ > 36, the average level of Islamic understanding among students using the Islam-integrated mathematics module, as measured by their mathematical communication skills in probability, is over 36.

A score of 36 is the midpoint of the Likert scale multiplied by the number of statements in the Islamic knowledge questionnaire, namely. The results of the Islamic knowledge questionnaire analysis were concluded with the following conditions:

a. If $-t_{\text{tabel}} > t_{\text{hitung}}$, it means H_0 is rejected, and H_a is accepted.
b. If $-t_{\text{tabel}} \leq t_{\text{hitung}}$, it means H_a is rejected, and H_0 is accepted.

Results and Discussions

This study developed an integrated mathematics module grounded in Islamic values, designed to enhance high school students' probability communication skills. Furthermore, the results and discussion of this study are presented in accordance with the ADDIE model.

Analysis Stage

The analysis stage includes performance analysis and needs analysis. In the performance analysis process, researchers discussed with mathematics teachers at MAN 4 Kampar. The discussion concluded that the madrasah had already integrated Islamic values into mathematics instruction but had not yet used integrated Islamic modules. Given that madrasahs are based on Islam and participate in madrasah science competitions, it is necessary to develop teaching materials that integrate Islamic values into the curriculum. In addition, mathematical communication skills also need to be improved in accordance with the Ministry of Education Regulation No. 22 of 2006. Probability material is relevant to the mathematical communication indicators in this study, namely writing, drawing, and mathematical expression. Therefore, the developed module integrates Islamic values with a focus on probability material and mathematical communication for high school/MA students.

The needs analysis phase involves detailing the instructional materials. The developed module focuses on probability, with the following learning outcomes: students will be able to explain probability, determine the expected frequency of joint events, and understand independent and mutually exclusive events and their probabilities. Learning objectives include: (1) Determining the sample space and probability distribution; (2) Distinguishing between relative frequency and expected frequency; (3) Using expected frequency to predict probability; (4) Distinguishing between mutually exclusive and non-mutually exclusive events; (5) Applying the addition rule to two independent events; (6) Applying the addition rule to dependent events; (7) Distinguishing between independent and dependent events; (8) Applying the multiplication rule to two independent events.

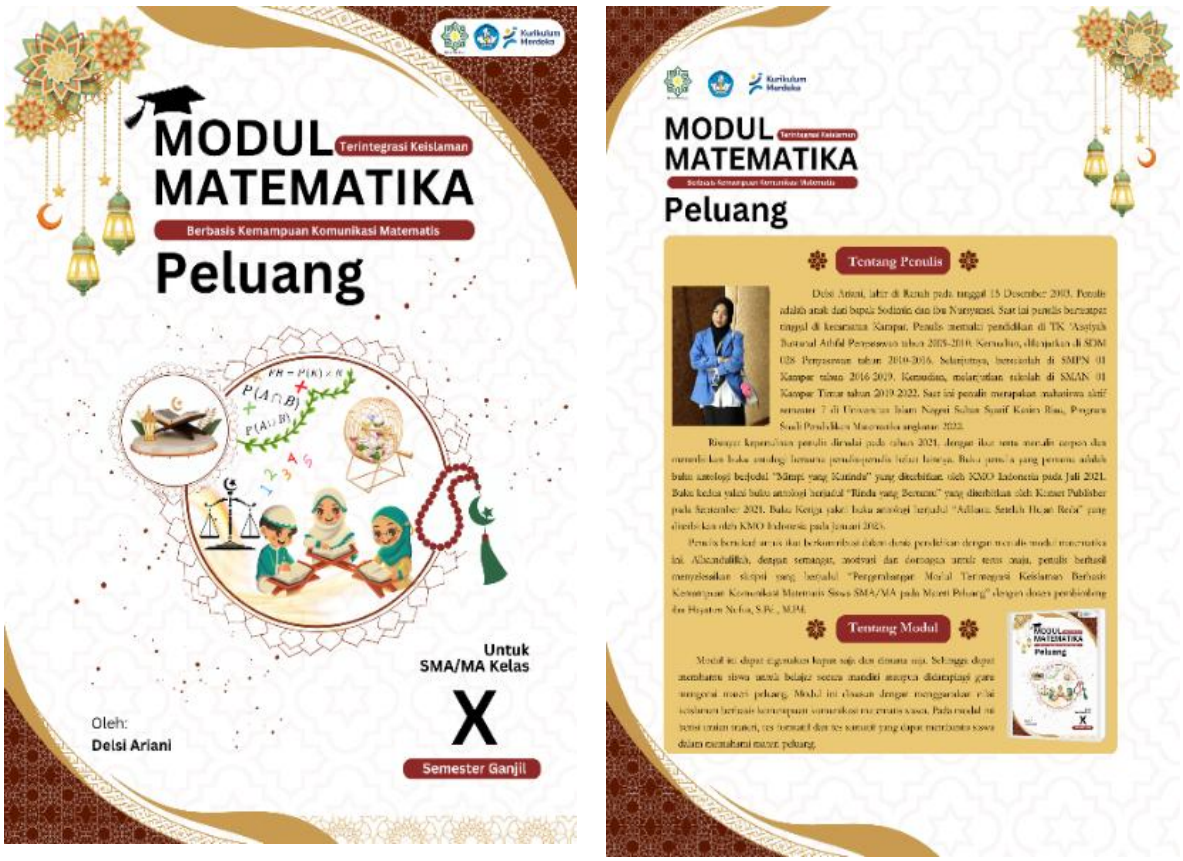
The indicators and components of communication mathematical skills used in this study are: (1) restating mathematical concepts in one’s own words in writing; (2) explaining mathematical ideas and relationships orally and in writing using representations like objects, pictures, tables, diagrams, graphs, and algebraic symbols; and (3) modeling and solving contextual problems mathematically.

The probability module is organized into four learning activities based on the results of a needs analysis and the learning objectives. This structure is designed so that

each topic can be studied effectively over two class periods during each learning activity, while also supporting the development of mathematical communication skills and the integration of Islamic values. The module is designed for use with teacher guidance during classroom instruction or for students to use independently. In their use, teachers act as facilitators, guiding and directing the learning process. In contrast, students act as active users of the modules to understand the material, complete learning activities, and communicate mathematical ideas.

Design Stage

In the design stage, the module is intended to be integrated with Islamic studies, leveraging its existing components to develop mathematical communication skills. These components are: (1) cover; (2) opening page of the module; (3) introduction; (4) module description; (5) table of contents; (6) learning objectives and outcomes; (7) learning instructions; (8) concept map; (9) material introduction; (10) learning activities; (11) practice questions; (12) answer key; (13) glossary; (14) index; and (15) bibliography. The following are some parts of the developed product:



Picture 1. Front Cover and Back Cover Design

The module cover specifically illustrates the learning material discussed in the module.

Picture 2. Table of Contents Design, as well as Learning Objectives and Outcomes Design

The table of contents lists all components in the module and their page numbers. The learning objectives and outcomes section explains the main focus of learning using the module.

Picture 3. Design of Material Introduction and Sample Question Design in Learning Activities

The introduction to the material reinforces to users the connection between the material on opportunities and Islamic values. Furthermore, each learning activity includes learning objectives, a prayer before studying, a description of the material, sample questions, a summary, formative test questions, and a prayer after studying. The module also includes a summative test consisting of 15 questions. Each formative and summative test in the module is accompanied by an answer key presented on a separate page.

Development Stage

At this stage, researchers developed research instruments and modules intended for validation by validators. (1) Three instrument validators validated the questionnaire instrument, and the instrument was compiled based on a predetermined questionnaire grid. The research instruments consist of a questionnaire validation sheet for subject matter experts, a questionnaire for Islamic subject matter experts, a questionnaire for educational technology experts, a practicality questionnaire, an Islamic knowledge questionnaire, and test questions. (2) The modules are validated by three product validators, including subject matter experts, Islamic subject matter experts, and educational technology experts. (3) Three validators validated the test questions. The validation process aims to ensure that the questions align with the module content, mathematical communication indicators, and Islamic values. During the validation process, several suggestions were received to improve the questionnaire, module, and questions used in the study.

Table 2. Posttest Question Outline for the Effectiveness Test

Learning Objectives	Sub-Topics	Indicators of Mathematical Communication Skills	Indicators of Islamic Values	Question Indicators
Using expected frequencies to predict the probability of an event	The Probability of an Event	Restating mathematical concepts in one's own words in writing	Creed	A narrative regarding the expected frequency of positive outcomes derived from reading the letters Alif, Lām, and Mīm is presented in the form of a bar chart. Students are expected to restate this information in their own words, explaining the bar chart of expected frequency data and identifying the number of repetitions.

Learning Objectives	Sub-Topics	Indicators of Mathematical Communication Skills	Indicators of Islamic Values	Question Indicators
Distinguishing between independent and dependent events	Probability of Compound Events	Explaining mathematical ideas and relationships orally and in writing using representations like objects, pictures, tables, diagrams, graphs, and algebraic symbols	Sharia	The narrative presented involves non-mutually exclusive events, meaning the elements of one set are also elements of another set. The narrative pertains to certain voluntary prayers performed individually and to those performed both individually and in congregation. Students are expected to identify that these events are non-mutually exclusive by drawing a Venn diagram.
Using the multiplication rule to determine the probability of two independent events	Probability of Compound Events	modeling and solving contextual problems mathematically	Morals	The following narrative describes independent events in the surahs of the Qur'an, divided into four groups based on length: Ath-Thiwal, Al-Mi'un, Al-Matsani, and Al-Mufashshal. Students are expected to create a mathematical model to determine the probability of selecting a surah classified as Al-Mi'un and a surah classified as Al-Matsani, and to solve it.

The instrument validation underwent one revision after analysis, during which the instrument was declared valid and reliable. It is reinforced by the view of Febriana et al. (2023) that valid and reliable instruments can serve as standards. The researcher selected a sample from the validation sheet using a trusted source, namely Muslich (2020), and modified it to align with the presentation of the material and its appearance in the module. The practicality questionnaire used a reference from Kosasih (2021), which the researcher modified based on the students' responses and was to be filled in by the students regarding the module. The Islamic Knowledge Questionnaire was compiled based on the Islamic values of faith, law, and morals. It was reinforced by Sinaga, who stated that questionnaires used in research can be modified by other researchers or created by researchers themselves based on literature reviews, provided that new questionnaires are tested for validity and reliability (Sinaga, 2017). The validation of the *posttest* questions stated that the questions on students' mathematical communication skills presented were valid.

The modules were validated by subject-matter, Islamic studies, and educational technology experts, with three validators per category. The results indicated that the

modules met the criteria for "highly valid." Based on this assessment, the module content aligns with Islamic studies material and students' mathematical communication skills in accordance with the learning objectives. It aligns with the definition of a module as teaching material that includes a series of planned learning activities to help students achieve specific learning objectives (Maha et al., 2022). A good module is written in simple, easy-to-understand language, presented engagingly, and includes pictures and explanations (Fatmawati et al., 2023). Based on Sawitri et al., as cited by Tpoenifu, a learning module is considered high-quality and suitable for use if it meets validity standards set by experts (Tpoenifu et al., 2023).

Implementation Stage

During the implementation stage, modules declared valid were tested for practicality and effectiveness. The modules were tested with 11th-grade students who had studied probability. A total of 30 students were involved in small groups. In small groups, the printed modules were given to read and understand, then the students completed a practicality questionnaire. The data analysis showed that the module's practicality in small groups was 81.26%, indicating it was "Very Practical".

Furthermore, the module was used by 31 tenth-grade students who had not yet studied probability. The results of the data analysis showed that the module's practicality in the limited group was 88.69%, indicating that it is "Very Practical". Therefore, the module does not need to be revised and is suitable for student use. This module is very practical. Student surveys confirm that it is integrated and helps students understand the material. These results are reinforced by Famulaqih's opinion that the module can make it easier for students to accept learning materials without many obstacles in their use (Famulaqih & Lukman, 2024). A module is considered practical if users do not have difficulty in using and understanding the material presented (Susilawati et al., 2023).

Next, to determine the module's effectiveness, students were given a post-test after learning from it. There were three post-test questions, selected from six test questions based on validity, reliability, discriminating power, and difficulty level. After the *post-test* data were collected, a normality test was conducted using the normality test formula proposed by Sugiyono, which states that the chi-square test is used to test data normality (Assegaf, 2020). The chi-square test is a statistical test used to assess the normality of data. It can be applied to samples of 30 or more (Liang & Ahad, 2020).

The normality test determines whether the data collected by researchers are normally distributed. The results of the normality test show that $X^2_{\text{hitung}} < X^2_{\text{tabel}}$ is 1.375161 < 11.070, so H_0 is accepted, and H_a is rejected, meaning that the posttest data is normally distributed.

Table 3. Recapitulation of *Posttest* Score Distribution

Score	n	$\bar{x}$	*SD*	X_{max}	X_{min}	*Score*	*Ideal*
Posttest	31	9.24	3.3363427	12	1	300	372

After the *posttest* data were found to be normally distributed, *a* one-sample *t-test* was conducted with KKTP as the comparison, yielding a p-value of 80. *The t-test* results showed that $-t_{\text{tabel}} < t_{\text{hitung}}$, with -1,697261 < 0.196501, so H0 is accepted, and H_a is rejected. Based on the assessment criteria, students' average learning outcomes were at

least 80, indicating that the developed mathematics module was effective and suitable for instruction.

Based on the *posttest* results, the module has a positive effect on achieving the learning objectives. Using appropriate, high-quality teaching materials can enhance learning effectiveness (Puspitaningrum et al., 2024). These results align with Ndruru's research, which found that modules can improve student learning outcomes (Ndruru, 2022). If, when used, teaching materials affect learning outcomes, they are considered effective (Saragih et al., 2023).

This integrated Islamic module is also expected to increase students' knowledge of Islam. Therefore, an Islamic knowledge questionnaire was given to students after using the module. Similar to the *posttest* calculation process, the Islamic knowledge questionnaire scores were also analyzed using normality tests and one-sample *t-tests*. The students' Islamic knowledge questionnaire scores were analyzed using a normality test, which showed that $X^2_{hitung} < X^2_{tabel}$ (4.740554 < 11.070), so H_0 is accepted and H_a is rejected, indicating that the Islamic knowledge questionnaire data were normally distributed.

Table 4. Recapitulation of Score Distribution Results
Islamic Knowledge Questionnaire

Score	n	$\bar{x}$	*SD*	X_{max}	X_{min}	*Score*	*Ideal*
Posttest	31	50.00	11.4309	60	12	1584	1860

After the Islamic knowledge questionnaire data were found to be normally distributed, *a* one-sample *t-test* was performed with a right-tailed test and a Likert scale midpoint of 36 as the comparison. *The t-test* results showed that $t_{hitung} < t_{tabel}$ is 7.217417>1.697261, so H_0 is rejected and H_a is accepted. Based on the testing criteria, students' average Islamic knowledge was more than 36. It was concluded that the developed mathematics module could enhance students' Islamic knowledge. The integration of Islamic teaching materials can increase students' knowledge of Islam (Kinanti & Wulantina, 2023). Eryandi argues that integrating Islamic values into learning can improve students' understanding of Islam (Eryandi, 2023).

Evaluation Stage

In the evaluation stage, researchers address the module's shortcomings based on suggestions and feedback from validators and students. (1) Development stage evaluation, at this stage, it will be known whether the developed module is valid or not. The validity level of a product can be calculated using the Aiken index formula (Astuti et al., 2024). Table 5 presents the results of module validation by learning material experts, with an average score of 0.88 on the highly valid criterion.

Table 5. Module Validation Results by Learning Material Experts

No.	Aspect	Indicator	Validation	Criteria
1.	Content Suitability	Alignment of materials with Learning Outcomes and Learning Objectives.	0.85	Highly valid
		Accuracy of the material.	0.88	Highly valid
		Learning Support Materials.	0.91	Highly valid

No.	Aspect	Indicator	Validation	Criteria
2.	Presentation Feasibility	Presentation techniques.	0.86	Highly valid
		Learning presentation.	0.90	Highly valid
		Completeness of presentation.	0.85	Highly valid
3.	Language suitability	Appropriateness for the students' level of development.	0.83	Highly valid
		Communicativeness.	0.88	Highly valid
		Coherence and consistency of thought.	0.92	Highly valid
4.	Mathematical communication skills	Rephrasing a mathematical explanation or description in your own words.	0.83	Highly valid
		Explain mathematical concepts and relationships both orally and in writing using concrete objects, pictures, tables, diagrams, graphs, and algebraic symbols.	0.83	Highly valid
		Modeling real-world objects, situations, and everyday events in mathematical terms and solving them.	0.92	Highly valid
Total			**10.46**	
Average			**0.88**	**Highly valid**

Furthermore, Table 6 presents validation results from Islamic studies experts, with an average score of 0.88, indicating high validity.

Table 6. Module Validation Results by Islamic Material Experts

No.	Islamic Values	Validation	Criteria
1.	Creed	0.86	Highly valid
2.	Sharia	0.89	Highly valid
3.	Ethics	0.90	Highly valid
	Total	**2.64**	
	Average	**0.88**	**Highly valid**

Furthermore, Table 7 presents validation results from educational technology experts, with an average score of 0.86, indicating high validity.

Table 7. Module Validation Results by Educational Technology Experts

No.	Aspect	Component	Validation	Criteria
1.	Graphic suitability	Module size	0.88	Highly valid
		Module skin design	0.86	Highly valid
		Module content design	0.84	Highly valid
	Total		**2.57**	
	Average		**0.86**	**Highly valid**

Based on calculations of module validation results by learning material experts, Islamic material experts, and educational technology experts, the module validation level is "highly valid," with an average of 0.87.

(2) Evaluation of the implementation stage, carried out by evaluating the results of improvements in the previous stage. At this stage, it will be determined whether the developed module is practical. According to Hilda (2021), practicality is assessed using a percentage formula. The practicality results are presented in the following Table 8.

Table 8. Results of the Small Group Practicality Test

No.	Aspect	Percentage of Ideal	Criteria
1.	Aspect of Availability of Learning Materials	83.22	Very practical
2.	Presentation of Activities and Exercises Aspect	78.38	Practical
3.	Use of Language	80.60	Very practical
4.	Connection between Sample Questions and Practice Questions (Formative Test Questions) and Mathematical Communication Ability Indicators	78.17	Practical
5.	Islamic Integration	85.83	Very practical
	Total	**406.20**	
	Average	**81.26%**	**Very practical**

Table 9. Results of Limited Group Practicality Test

No.	Aspect	Percentage of Ideality	Criteria
1.	Aspect of Availability of Learning Materials	87.46	Very practical
2.	Presentation of Activities and Exercises Aspect	89.35	Very practical
3.	Use of Language	88.90	Very practical
4.	Connection between Sample Questions and Practice Questions (Formative Test Questions) and Mathematical Communication Ability Indicators	88.06	Very practical
5.	Islamic Integration	90.11	Very practical
	Total	**443.89**	
	Average	**88.69%**	**Very practical**

Based on this recapitulation, it can be concluded that the developed module meets the criteria of "very practical" (81.26% for small groups and 88.69% for limited groups).

(3) The post-instruction test was used to assess the module's effectiveness. The analysis results showed that the students' average score was 80.65 (rounded to 81), indicating that the module was deemed effective for instructional use. Based on the posttest results, the students' highest communication skill was explaining mathematical ideas and relationships orally and in writing, using representations such as objects, pictures, tables, diagrams, graphs, and algebraic symbols, with a score of 90.32. Second was the modeling and solving contextual problems mathematically skill, with a score of

83.06. Finally, the restating of mathematical concepts in one's own words in writing skills scored 68.54 among all students in the experimental class.

(4) Evaluation of students' Islamic knowledge using an Islamic knowledge questionnaire given to students learning using the module, to determine whether the developed module can improve students' Islamic knowledge or not. Based on the analysis, the average level of Islamic knowledge among students was 51.10 (rounded to 51). It was concluded that the developed module can improve students' Islamic knowledge.

Conclusions and Suggestions

Based on a study conducted at MAN 4 Kampar, the integrated Islamic mathematics module on mathematical communication for the probability unit demonstrated high validity, with an average score of 0.87. The developed module was very practical in small-group trials (81.26%) and in limited groups (88.69%). The developed module was effective for learning, as indicated by *the t-test* results, which showed that $-t_{tabel} < t_{hitung}$ it was $-1.697261 < 0.196501$, so H_0 is accepted and H_a is rejected. Based on the assessment criteria, students' average academic performance reached at least 80. The developed module can improve students' Islamic knowledge, as indicated by *the t-test* results, which showed that $t_{hitung} > t_{tabel}$ it was $7.217417 > 1.697261$, so H_0 is rejected and H_a is accepted. Based on the testing criteria, students' average Islamic knowledge exceeds 36.

Acknowledgements

The researchers would like to thank Baznas Riau Province for providing research scholarships, which helped reduce the burden of research.

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