



Development of Relation and Function e-Modules Based on Contextual Learning Integrated with Islamic Values

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Abstract: This research aims to develop an e-module about relations and functions based on contextual learning that is integrated with Islamic values that are valid, practical, and interesting. The research carried out is development research (R&D) using the ADDIE model, which goes through 5 stages, namely analysis, design, development, implementation, and evaluation. The research subjects were class VIII students at MTs Arafah Bitung, North Sulawesi. The data obtained was analyzed descriptively, and percentage data was used to represent the results. The research results show that the e-module developed on relation and function material is valid, practical, and interesting. The validity test obtained an average feasibility percentage of 86.8%. The practicality test obtained an average feasibility percentage of 90.1%. Meanwhile, the attractiveness test obtained an average feasibility percentage of 87.7%. The relations and function e-module specifications developed include understanding the concepts of relations and functions and presenting relations and functions based on integrated contextual learning of Islamic values. This proves that the e-module is suitable for use as teaching material and a means of independent education in the learning process.

INTRODUCTION

Currently there are many studies investigating the development of e-modules. The development of e-modules as teaching materials has become a trend in education to improve the quality of learning, one of which is mathematics learning using technology. Mathematics learning has an important role in the use of technology to provide a more flexible learning space and help students explore the knowledge they have (Jupri, 2018; Nurdiana & Hasanudin, 2023; Supianti, 2018). In line with educational goals, what can be done is by providing teaching materials that are integrated with technology such as e-modules (Meliana et al., 2022; Thahara et al., 2023). In line with educational goals, what can be done is to provide teaching materials integrated with technology such as e-modules (Meliana et al., 2022; Thahara et al., 2023). The integration of teaching materials such as modules in today's era is a breakthrough that should have been done so that the learning process continues to run in accordance with the times.

Research trends in developing teaching materials are growing every year, one of which is the development of mathematics e-modules. E-Modules are digital based non print media that can be used independently via communication tools such as smartphones,

computers, laptops and tablets (Triyono, 2021). This helps students to hone creative and thinking skills out of the box necessary to adapt to developments over time. Such as the existence of teaching materials in the form of e-modules that are linked to students' lives or are based on contextual learning (Juwantara et al., 2023; Wulandari et al., 2021).

Contextual learning aims to help students to actively construct their own knowledge, thereby providing an understanding of teaching material that is linked to the context of students' lives and providing motivation to learn, this is in line with what was conveyed (Saputra et al., 2022; Yeni, 2019). In addition, the learning process is holistic (Hasibuan, 2014), meaning that it is developed for students comprehensively from cognitive, social, and spiritual aspects (Firdaus et al., 2023) so that a knowledge framework is built and has an impact on daily life (Bodovski, 2013), which is in line with cognitive constructivist theory which focuses on developing quality intellectual competitiveness and having competitiveness in the future (Hamruni, 2015). The competitiveness of students in the future is highly demanded in the mastery of knowledge and technology, because learning patterns in the future will certainly change, this also becomes the basis for researchers in developing a learning e-module that can be a means of learning both now and in the future.

Contextual learning-based learning in the era of society requires a strategy that is in accordance with educational goals, such as making people intelligent and with commendable character (Angga et al., 2022; Erna et al., 2021). In order to achieve this goal, character cultivation is needed to form a person who has faith and piety, one of which is given in an integrative manner or integration with Islamic values including mathematics subjects (Nurhamdiah et al., 2020; Saraswati & Hidayat, 2019). To achieve this goal, character building is needed to form a person who is faithful and pious, one of which is given in an integrated manner or integrated with Islamic values including mathematics subjects. This study also wants to inform that there is a higher value than knowledge, namely religious values in the form of student character. The understanding of several experts who state that manners are above knowledge can also be understood that a collection of knowledge will become a new character and culture, so that good and quality student faith or character is needed to support the learning process in the future.

The integration of mathematics with Islamic values is important to study and continue to develop (Radjak, 2024), one of which is curriculum learning outcomes, where teaching materials need to be adapted to learning outcomes such as relationship and function material (Radjak, 2022). Relations and function material is still considered difficult, such as difficulty understanding questions, difficulty using concepts and principles, and difficulty carrying out computational aspects (Anggreni, 2022; Rosidah et al., 2019). Therefore, it needs to be linked to the environment and daily life so that it is possible to raise problems that need to be resolved in learning (Amni, 2023; Annisa et al., 2023). This is shown by the research trend which examines several mathematical concepts of relations and functions which are then integrated into the Qur'an (Radjak et al., 2023) and hadith (Alghar et al., 2023; Alghar et al., 2024).

Although research trends in the development of relation and function e-modules have been widely carried out, such as research by Fitri et al. (2021), who know the feasibility and response of students to the design of learning tools using *sigil software*,

Kusumaningrum (2022), which uses a constructivist learning design model, and module development by Ats-Tsauri et al. (2021), which emphasizes students' communication skills so that they can be used as teaching materials for teachers to help students, researchers found several limitations in terms of the content of the material integrated in learning. This means that the development of mathematics e-modules integrated with Islamic values related to relationship and function material has been minimally carried out, and it is still rare to reveal further the phenomenon of learning that contains Islamic values using technology and contextual-based learning. Moreover, Madrasah Tsanawiyah is a school with Islamic characteristics that is required to follow developments in science and technology in order to facilitate the learning process.

Based on the theory and facts that researchers have described, it is very clear that learning requires a media that is able to deliver or facilitate students in the learning process. Researchers have not found much development of contextual learning media with Islamic characters that are still many and needed in the learning process. This research process is focused on the development of teaching materials in the form of e-modules of relations and functions based on contextual learning and integrated Islamic values as a means of learning as well as study materials and guidelines for educators on the material of relations and functions.

METHOD

This research process aims to develop an e-Module of Relationships and Functions Based on Integrated Contextual Learning of Islamic Values. The research uses the type of research and development (R&D) with the development model used is the ADDIE model which consists of 5 stages, namely Analysis, Design, Development, Implementation, and Evaluation. These stages are the focus or reference for researchers in conducting research so that the development process carried out can be more precise and directed. ADDIE is an approach that emphasizes analyzing how each component interacts and coordinates (Abuhassna et al., 2024; Adeoye et al., 2024; Ibrahim et al., 2024; Özerbaş & Kaya, 2017). ADDIE development model (Branch, 2009), The stages of research carried out can be seen and observed in Figure 1.

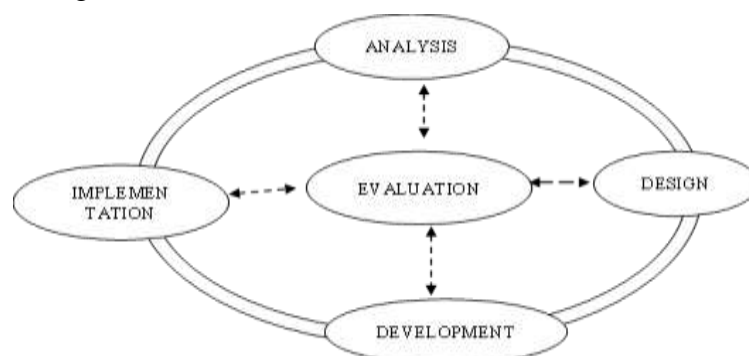


Figure 1. ADDIE Development Model

The first phase is the analysis, which includes three things: (1) curriculum analysis, (2) needs analysis, and (3) student characteristics analysis. The second phase of design,

namely the design of the e-module developed, includes flowcharts, storyboards, programming, and the preparation of evaluation instruments. The third stage of development is the development of a product that has been designed and validated by the validator to determine its validity and practicality. The four stages of implementation are a limited trial (small group) involving six students. The results of the trial were analyzed and formed the basis for the revision of the e-module. Subsequently, a field test (large group) involving 30 students is carried out. The five stages of evaluation were carried out to give an assessment of the e-module that has been developed.

The subjects used in this research were class VIII MTs. Arafah Bitung, a total of 30 people who can represent the population with high, medium, and low qualifications based on their initial abilities. initial test results and recommendations from mathematics teachers. The data collection instrument is a validation sheet addressed to predetermined experts, namely material experts, Islamic experts, language experts, learning experts, and design experts, to determine the validity of the e-module being developed, and the assessment questionnaire is divided into two assessment criteria, namely practical aspects that are shared with teachers to find out the practicality of the e-module and interesting aspects that are shared with students to find out the response to making the e-module that has been developed.

Data analysis in this study uses quantitative analysis data to calculate the percentage of questionnaire scores obtained from validation sheets from several experts: material experts, Islamic experts, language experts, learning experts, design experts, and practicality and attractiveness questionnaires. The data that has been collected is then calculated for the percentage of validity, practicality, and attractiveness using the formula.

$$P = \frac{\sum x}{\sum x_i} \times 100\% \dots \dots \text{(equation 1)}$$

In this study, from the formulation above, the results of the percentage calculation obtained will then be changed into descriptive verbal data using guidelines that already have certain standards (Sugiyono, 2018). The valid, practical, and interesting Qualification standards are presented in Table 1.

Table 1. Qualifications for Validity, Practicality and Attractiveness.

Achievement Level (%)	Qualification	Remarks
20 - 29	Invalid/not practical/uninteresting	Revision
30 - 49	Invalid/insufficient practical/less interesting	Revision
50 - 69	Valid enough / sufficient practical/quite interesting	Minor Revisions
70 - 89	Valid/practical/ interesting	No Revision Required
90 - 100	Very valid /very practical / very interesting	No Revision Required

Table 1 explains the qualification values of validity, practicality and attractiveness of a developed module, where the final assessment results will be made in the form of assessment scoring, namely from the lowest value of 20% to the highest value of 100%. In the assessment process, there are various types of conclusions based on the percentage of the value obtained. The level of qualification that has been described based on the value

will be the basis for researchers to make decisions whether revisions are needed, moderate revisions or declared good without having to be revised.

RESULT AND DISCUSSION

Analyze Stage

Phase Analysis At this stage, an online interview analysis was conducted with one of the mathematics teachers in the eighth grade of Arafah MTs in order to obtain information related to the problems that form the background developed e-module of relations and function-based contextual learning integrated Islamic values. The data obtained from the learning process reports four things: (1) the available teaching materials are still conventional, such as less interactive books and printed modules; (2) the materials used are still difficult to understand if integrated with Islamic values; (3) the application of contextual learning is not optimal in the matrasah and only focuses on theory; and (4) the student's inability to solve problems relevant in particular to the material of relations and functions. Based on the data obtained, it is necessary to develop teaching materials such as e-modules of relationships and functions based on contextual learning and integrated Islamic values as (Radjak, 2024), showed the integration of mathematics with important Islamic values is studied and continuously developed.

Design Stage

At the design stage, the e-module is designed, including the flowchart preparation of the e-module presented in Figure 2.

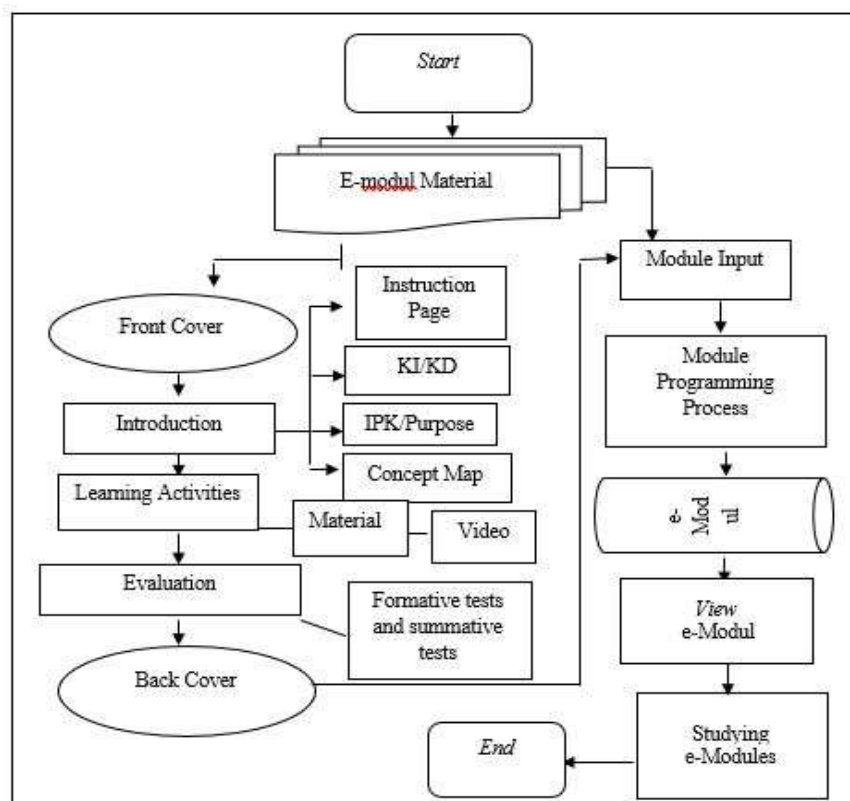


Figure 2. Flowchart E-modul

Based on Figure 2, the flow chart, intended to facilitate the programming process, consists of specific images and symbols that describe in detail the sequence of actions and link the instruction (process) with other instructions (Wibawanto, 2017). Next, compile the e-module storyboard used to describe the guidelines for everything about the appearance of the application. Then program the e-module for the display process that has been designed through a storyboard on a computer or laptop. In drafting the e-module draft using hardware (laptop or smartphone) and software (software), the operating system is Microsoft Windows 11 and the Flip PDF Pro application. The last thing to do at the design stage is to compile the instrument design shown in Table 1.

Development Stage

Product specifications were developed using the Flip PDF Pro application. The resulting product comprises four parts: (1) The opening part consists of the front cover, introductory words, contents list, e-module description, instructions on the use of buttons, and instructions for learning. (2) The introductory part includes core competences (KI), basic competencies (KD), indicators of competence achievement (IPK), and a concept map. (3) the learning activity part, consisting of learning activities, learning purposes, material descriptions, summaries, evaluations, self-assessments, glossaries, and math games. (4) The evaluation part includes quizzes, answer keys, deduction guidelines, attachments of pre-requisite materials, reference lists, and a back cover. This research process has designed an attractive initial display of the e-Module image and in accordance with learning quality standards. The initial cover page of the e-module is also equipped with an initial menu to go to the next page and is made as a trigger for student enthusiasm in learning. The front cover that has been made can be seen in Figure 3.

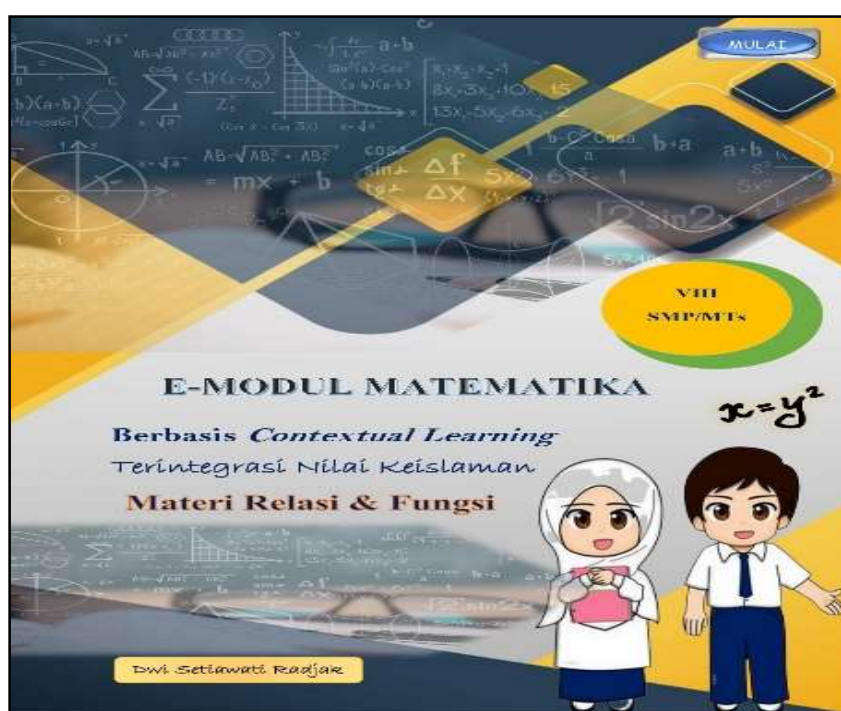


Figure 3. Cover of e-Module

The next page is a context-based learning activity that integrates Islamic values with student skills training that covers knowledge, skills, and attitudes. A view of learning activities is presented in Figure 6.

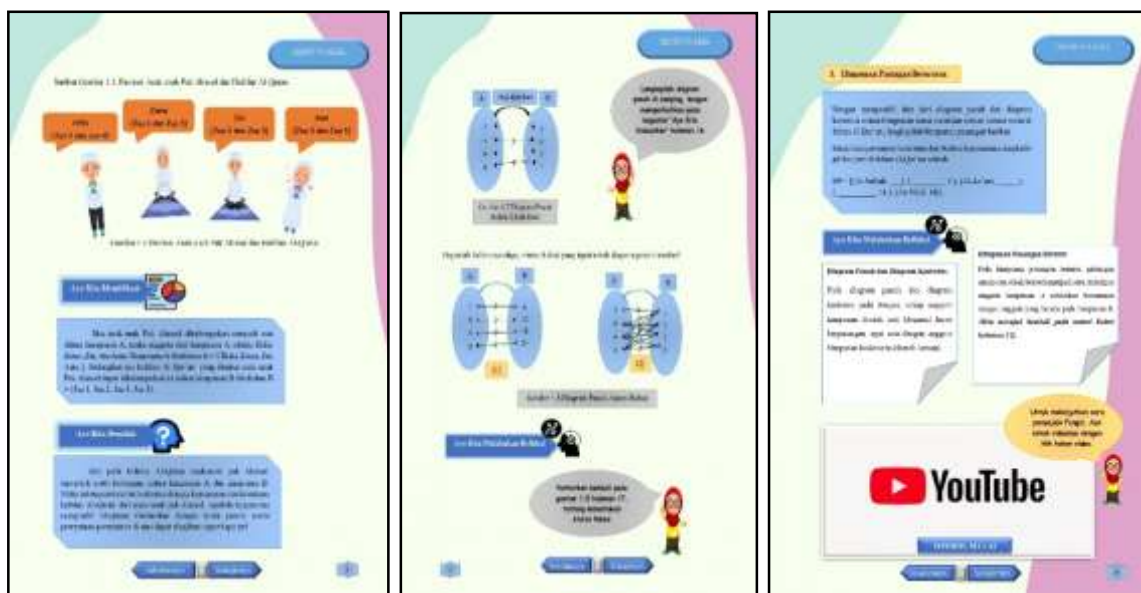


Figure 6. Display of Learning Activities

The next page is a review of the material in the form of a summary and is supplemented with evaluations and quizzes to measure the ability of students in using the developed e-modules. An activity view is shown in Figure 7.

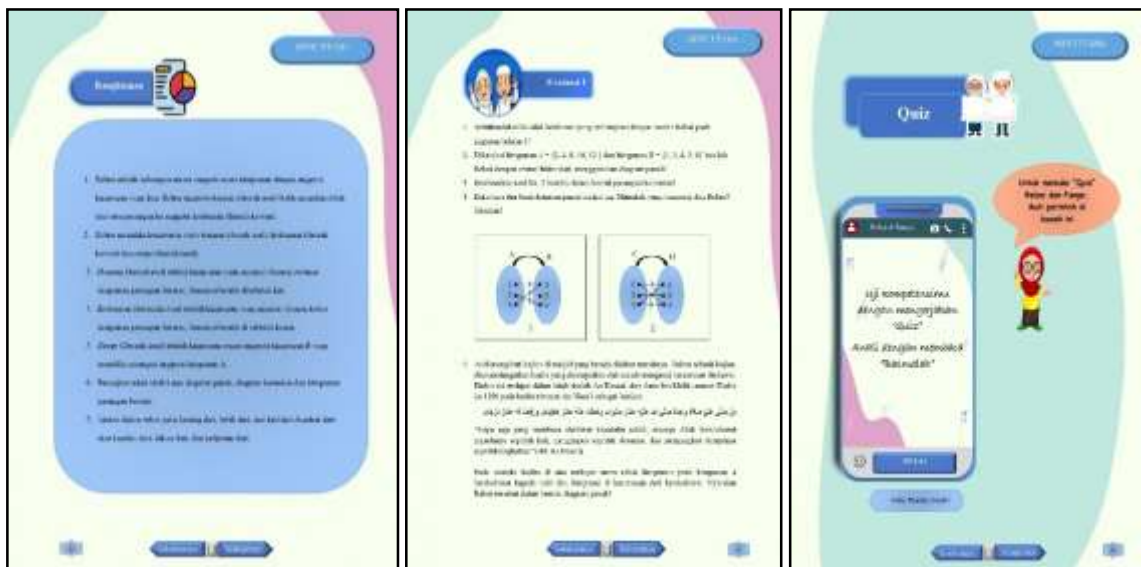


Figure 7. Summary Display, Evaluation of Learning Activities, and Quiz

The next page, which is the evaluation button used to access the answer key attachment, the glossary, the prerequisite material, and the printable learning module, is equipped with match games. The next page is the evaluation button used to access the answer key attachment, glossary, prerequisite materials, and printable learning modules, complete with matching games. Evaluation is an important and inseparable part of the

learning process and some experts state that evaluation is also part of the learning process itself. A good evaluation is a question that is arranged and designed as well as possible and can arouse interest, enthusiasm and is not confusing. The evaluation in this module has been designed and analyzed by experts (logical validity) to determine whether or not the evaluation to be used is appropriate. The evaluation buttons and match game attachments are presented in Figure 8.

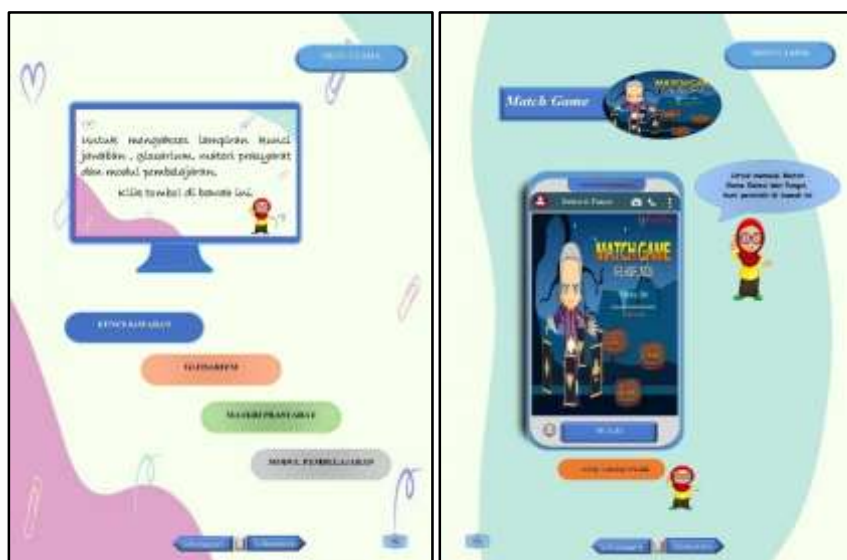


Figure 8. Evaluation Display and Match Game Buttons

The next phase of validation is conducted by five experts: material experts, Islamic experts, language experts, learning experts, design experts, and practitioners. For validity and practicality in development, it must be valid by the provisions that should be assessed/measured by paying attention to aspects of the curriculum and providing ease of use (Nieveen, 1999; Rochmad, 2020). Analysis of logical validity or asking for expert opinion is an important part of the development process, one of which is teaching materials. Experts here are intended to assess and provide careful and measured considerations for the Islamic character e-module being developed. Experts will greatly influence the considerations or quality of the module in the future, and experts will also be responsible for the quality of the module, so that the e-module analyzed by the expert is truly good and can be accounted for both now and in the future as long as this e-module is used and no revisions have been made. The results obtained as input and suggestions are used as a reference for improvement so that the e-module product being developed is declared valid and practical to apply.

In this study, logical validation is an important part that must be carried out by experts or professionals, therefore the validator used in the analysis is called an expert validator. The expert validator will provide more detailed considerations from the results of the e-module analysis that has been made as well as provide suggestions that can be used before the module is used in the learning process. The expert validators involved in the e-module development process are those who are competent in their fields with a minimum qualification of a Doctoral (S3) lecturer and have a minimum of 5 years of teaching experience. As for practitioners, there are as many as three people with

qualifications as teachers of mathematics subjects, minimum undergraduate education (S1), and 5 years of teaching experience. Expert assessment is the standard for the e-model used. Data from expert assessment is presented below, which can be seen in Table 2.

Table 2. Data from expert Assessment Result

Criteria	Percentage (%)	Qualification
Materials Expert	76 %	Valid
Muslim Expert	99 %	Very Valid
Linguist Expert	94 %	Very Valid
Learning Expert	75%	Valid
Design Expert	90 %	Very Valid
Average Percentage	86,8 %	Valid

Based on Table 2, it is shown that generally, the e-modules that have been developed obtain an average of 86.8%, which means validity, so no revision is needed. The results of e-module validation by five experts based on Table 2 show that the e-module on relation and function material based on contextual learning integrated with Islamic values obtained an average validation percentage of 86.8% in the "valid" category, so the e-module was declared valid for use. This is supported by the results of previous research from (Suhandri & Sari, 2019), which reaches the validity value in the feasibility of being valid.

There are five experts evaluating the validity of the product developed. The first material expert covers two aspects: (1) content feasibility aspects, inter alia, material compatibility with learning accessibility, accuracy, and up-to-date material, material content coverage, and (2) aspects of assessment of contextual learning, among others, components of context-based learning and contextual truth learning. The two Islamic expert assessment indicators such as the connection of Islamic values with material, examples of questions, and practice of issues, as well as accuracy in choosing Islamist values as illustrations or illustrations in explaining material concepts in the e-module developed. The three linguists expert cover assessment indicators such as languages used in e-modules that are straightforward, communicative, dialogue-based, and interactive. The four learning experts cover assessments such as presentation techniques and learning presentation support. The five designers expert assessments like the size of the e-module, cover design, e-module content design, clarity and accuracy of the use of learning buttons, and practicality and operability.

To perfect the e-module that has been developed, each expert validator provides advice and input. (1) material experts, on matters of validity still have inappropriate writing and use fundamental conceptual definitions; (2) The Islamic expert, examples of Islamic values are already appropriate, Arabic fonts may be enlarged; they can be adapted to a more convenient appearance, and the texts of hadith and mahfudzat should be given a clearer mark and given a reference. (3) the linguist expert, passing the repairs from the beginning to the end of the page, and after that, the e-module is worthy of use on the field. (4) The learner expert, the corrections according to the notes contained in the draft e-module. (5) The designer expert, the button to display the link to the website should be displayed, especially if it leads to YouTube, and the font should be more attractive than the standard

font and also clearly readable and not confusing.

This study obtained data that the e-module is valid and can be used, in other words the e-module that has been made is very good and worthy of being distributed. After the e-module is declared valid, the research enters the next stage, namely a practicality test by three practitioners according to the previously determined criteria. The most important criterion that is the benchmark is that the practitioner is indeed an expert and has a skilled and recognized field of study. The practicality test is intended so that the e-module used can really be used by students and does not burden students when using the e-module. The results of the expert analysis for the field focused on the results of the practicality test are presented in Table 3.

Table 3. Data from Practitioner Assessment Results

Criteria	Practitioner			Amount	Percentage (%)	Qualification
	1	2	3			
Aspek appearance on Module	22	28	22	72		Practical
Aspect material on e-Module	42	43	42	127	96,2	Very Practical
Aspect benefit and use e-Module	28	31	26	85	88,5	Practical
Average Percentage					90,1	Very Practical

In Table 3, it is shown that all aspects have a category with a percentage of eligibility: the display aspect of the e-module has an eligibility of 85.7% in the practical category, the presentation aspect of the material on the e-module has an eligibility of 96.2% in the very practical category, and the benefit aspect of using the e-module has an eligibility of 88.5% in the very practical category. Table 3 shows that the e-module obtained an average practicality percentage of 90.1% by three practitioners and is in the "very Practical" category. So, the e-module is stated to be very practical as research (Afrianti & Qohar, 2019; Kurniati, 2018; Yuniati, 2018; Fadilah et al., 2021), obtained the convenient and feasible category to be used. The valid category obtained by the researcher is actually an indication that the e-module that has been created is a truly good and quality e-module from an expert perspective and also theoretically. It is undeniable that in the research and development process, the results theoretically and from an expert perspective have indeed provided initial conclusions, but trials must still be carried out on research subjects. Trials on research subjects are to see how the products that have been created are in accordance with the reality in the field, both the quality of the e-module and the impacts caused, so trials must be carried out, both limited trials and continued with the application of subjects to the research as a whole.

Implementation Stage

The implementation stage obtains interest from students' responses after being given the product developed through a questionnaire. At this stage, limited trials (small class) and field trials (large class) are carried out. The limited testing process is intended so that the designed e-module can first know the shortcomings and advantages of the instrument before it is actually used in the overall test. The limited test will be an early indicator of what things need to be considered before researchers conduct overall testing (on the research object). If the constraints and advantages of the limited trial have been obtained,

it will be an important and valuable note to continue research on the overall test. Limited trials were carried out on six students. Data were obtained based on the results of limited trials, which are presented in Table 4.

Tabel 4. Data on Response Result from Limited Trial Students (small class)

Criteria	Subject						Amount	Percentage (%)	Qualification
	R1	R2	R3	R4	R5	R6			
E-Module Display Aspects	24	17	19	24	19	23	126	87,5	Attract
E-Module Content Aspects	35	25	35	35	31	37	198	82,5	Attract
E-Module Using Aspects	19	17	16	19	18	18	107	89,2	Attract
Average Percentage Score								86,4	Attract

The results of the study presented in Table 4 clearly show that of the three criteria tested on limited groups or also called small groups, they have an average percentage of 86.4 with Qualification Attract (very good) and can also be concluded as feasible and good to use. The results of this small group analysis are the basis and reference for researchers to continue to the test in the actual research class (basara group class). The large group trial process and can also be called a field trial (Large Group) was carried out on 30 students of class VIII MTs. Arafah Bitung. The results of the field trial can be seen in Table 5.

Tabel 5. Data on Response Result from field Trial Students (large class)

No	Criteria	Percentage (%)	Qualification
1	Aspect Display e-Module	88,2 %	Attract
2	Content aspect e-Module	85,7 %	Attract
3	Aspects of use e-Module	89,2 %	Attract
Average Percentage		87,7 %	Attract

In Table 5, it is shown that all aspects have categories with a percentage of eligibility: the display aspect of the e-module has an 88.2% eligibility with an attractive category, the content aspect of the e-module has an 85.7% eligibility with an interesting category, and the benefit aspect of using the e-module has an 89.2% with an exciting category, thus obtaining an average of 87.7% eligibility results for e-modules with interesting categories. This suggests that the developed e-module can be used for learning by learners.

Evaluation Stage

The evaluation stage is carried out to find out whether the e-Module product that has been developed can be implemented and used as a teaching material for educators and a learning resource for students. Validity analysis data was obtained from 5 experts: material experts, Islamic experts, learning experts, language experts, and design experts. Data from the practical analysis was obtained from 3 practitioners. Meanwhile, the results of the analysis of the attractiveness of student responses were obtained from 30 grade VIII students who were the sample used as the main research subjects.

This development research produces a relation and function Module based on contextual learning integrated with Islamic values that are valid, practical, and interesting. The feasibility components of the e-Module assessment developed in this research include the appropriateness of material, Islamic language, learning, and design. This is by the component criteria for the feasibility of evaluating teaching materials which, according to (Al Azka et al., 2019), the components of a teaching material by the feasibility instrument issued by the national education standards body consist of four main components, namely the content feasibility component, presentation component, linguistic component, and graphic components. The additional feasibility component in this research is the Islamic component because the e-Module developed is integrated with Islamic values so that experts validate the development of the e-Module according to their specified field of expertise.

The advantages of the e-modules that have been developed are that they are alternative teaching materials that can be accessed both online and offline. For educators, the e-module developed can provide support and reference as the learning generation of millennials tends to be active with technology, as demonstrated by oleh Baharudin & Yogihati (2022), dan Nada et al.(2022), the presence of educational media integrated with technology can provide learning that is flexible and not monotonous. Animations and image media included in the development of e-modules have a positive impact on the learning outcomes of students' cognitive realms ((Habibah et al., 2024; Sholehah et al., 2024). At the same time, the material presented is contextual learning-based and integrated with Islamic values, centered on students, so that can form a religious personality. It is in accordance with the results of previous research (A. Mahyuddin, 2023; Fitriyani & Kania, 2019; Saraswati & Hidayat, 2019) that states the integration of the values of faith and taqwa in the mathematical perspective can be used as a solution to improve the quality of learning mathematics and student character in Indonesia. From the results of the research that has been carried out, the e-module developed is worthy of use and has received a positive response from the students.

CONCLUSION

Based on the research that has been carried out, it produces data presentation and discussion, namely e-Modules relation and function based on contextual learning integrated with Islamic values, has valid qualifications, is very practical and exciting. The average feasibility percentage is, validity is 86.8%, practicality is 90.1%, and attractiveness is 87.7%. Validity result values were obtained from each expert, namely material experts, Islamic experts, language experts, learning experts, and design experts. The practicality results were obtained from 3 practitioners, and the attractiveness results were obtained from the responses of students who were used as subjects in the research. In this way, the e-module being developed can impact students' direct involvement in obtaining source-based learning and integrated with Islamic values. This research still needs to be further developed by researchers so that the e-learning modules produced are more innovative, with the integration design of Islamic values and learning features that are more contextual

and interesting. At the same time, it is suggested that we develop e-modules with different learning materials and models.

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