

Nuanced Statistics E-Module Development Islam and the Environment

L. M. Janah¹, R. W. Y. Putra¹, S. P. Nasution¹, Fredi Ganda Putra¹

¹Department of Mathematics Education, Faculty of Tarbiyah and Teacher Training, UIN Raden Intan Lampung

Abstract. The aim of this research and development is to create a statistical e-module infused with islamic elements and an environmental context, providing a resolution to students' challenges in comprehending statistical material while concurrently enriching their understanding of the correlation between statistical concepts and islamic principles within the environmental framework. Employing the research and development (r&d) method, the study utilizes the addie model, comprising distinct phases of analysis, design, development, implementation, and evaluation. The study encompasses middle school students in central lampung and mts students in central lampung as its participants. Data collection methods involve interviews, validation questionnaires, product attractiveness evaluations, and test questions. Expert assessments categorize the e-module as "very eligible" in terms of its material and media components, with religious experts also endorsing its eligibility with a "very eligible" rating. Small-scale attractiveness trials reveal an "interesting" rating for middle school students and a "very interesting" rating for mts students. In large-scale attractiveness tests, both middle school and mts students show consistent "very interesting" ratings. Effectiveness tests unveil a "moderate" score for middle school students and a "medium" score for mts, signifying the e-module's overall effectiveness in enhancing statistical comprehension. In conclusion, the developed statistics e-module, incorporating islamic nuances and an environmental perspective, demonstrates commendable feasibility, captivating appeal, and efficacy for educational implementation.

1 Introduction

Developments in the world of education today demand extraordinary changes, in addition to education having an important role as rapid technological developments, also because of the positive and negative impacts of these technological developments [1]. The progress of education science requires that humans are able to expand themselves in order to be able to fight against any changes that will occur in the future, one of which is mathematics [2]. One way to expand progress, especially in the world of education is to develop teaching materials that are more complex, teaching materials are a form of channel in learning that can be utilized so it is important because it can increase student knowledge, trigger lessons to make students more independent in learning.

Mathematics is one of the lessons that has a strong relationship with daily activities, so that when material is presented using everyday problems students can more easily understand it [3]. One of them is environmental problems, learning that is related to the environment besides being able to make it easier for students to understand the concept of material, as well as being able to implement government regulations regarding environmental education (LPH). As stated in the Decree Number: Kep.07/MENLH/06/2005 and Number: 05/VI/KB/2005, the essence of which is an appeal for environmental education (PLH) to be carried out starting from elementary school to high school [4].

In the realm of intellectual inquiry, mathematics is intricately entwined with Islamic perspectives, wherein the Al-Qur'an and hadith assume pivotal roles as sources of qawliyyah verses, while empirical observations, experiments, and logical reasoning are designated as sources of kauniyyah verses in the development of scientific knowledge. This unique positioning endows various domains of knowledge with a perpetual connection to the Al-Qur'an and hadith. Notably, the discipline of mathematics exemplifies such integration, evolving from foundational principles derived from the Qur'an and hadith, coupled with insights gleaned from systematic observations, experiments, and logical deductions. Mathematics itself has a very close relationship with the spiritual tradition of Muslims, is familiar with the Qur'an, and of course mathematics can also be used as a "path" towards achieving benefits and happiness both in this world and the hereafter [5].

Based on the problems above, researchers try to create teaching materials that are aligned with the needs of students. The teaching material that the researcher chose is e-module, e-module is considered the most effective because it can be taken anywhere and is easy to understand so that students can learn on their own without the help of other individuals. This e-module at least has more value than the teaching materials that are often found in schools. Namely, it does not only contain ordinary statistical material, but is packaged with the concept of Islam and the environment. The reason for choosing statistics material is that there are many students who have difficulty understanding the material, also because statistics is a mathematical material that functions to describe or explain data and events collected through research and investigation processes, this is in accordance with the e-module packaging design, namely mathematics topics presented with daily events that occur frequently.

In light of prior investigations, numerous research endeavors have been undertaken to formulate instructional resources for the teaching of statistical concepts [6–11]. Some of which the statistics teaching materials developed are valid, feasible, practical, interesting and effective to use. Based on research that has been done previously, the update in this research lies in the development of statistics teaching materials for SMP/MTs levels, the teaching materials developed have an Islamic orientation, which are complemented by Islamic values in the form of verses of the Qur'an and its explanation of mathematics presented and equipped with information from Muslim scientists. Not only that, the teaching materials or e-modules developed are also environmentally nuanced, so students can directly learn mathematics in real form through the environmental insights provided.

The explanation of the problems in the introductory discussion above shows that e-modules with Islamic and environmental nuances are one of the solutions offered. Therefore, the aim of this research is to develop e-module statistics with Islamic nuances and a suitable, interesting, and effective material environment for students.

2 Research method

The method used in research and development (R&D) is ADDIE. The steps in the ADDIE method are analysis, design, development, implementation, and evaluation.

1. Analysis, the analysis stage is a process of identifying what students will learn, namely conducting a needs analysis, namely to determine the abilities or competencies that students need to learn to improve learning outcomes. The characteristics of students are to find out and clarify whether the problems they face require a solution in the form of making learning tools.
2. Design The activities carried out at this stage are the selection of the format and the initial design of the e-module, the selection of the format and parts of the e-module according to the analysis of the needs and characteristics that have been carried out in the analysis stage.
3. Development After going through the analysis and design stages well, the next is the development stage. The main objective of this stage is to develop the e-module according to the e-module design at the design stage, along with the steps that will be carried out at the e-module development stage, namely expert validation and e-module revision.
4. Implementation The next step is to try out the Islamic and environmental statistics e-module to students in class, with the aim of knowing the attractiveness and effectiveness of the developed e-module. Implementation can be done only if it has received eligibility status from expert validators.
5. Evaluation is a stage that is always carried out at each stage of the ADDIE model, so that the resulting product becomes a valid product. At the evaluation stage, development is carried out with progress, so that deficiencies during the development process have been detected and revised. The results of the evaluation of the e-module are expected to be suitable for use by students and educators in the learning process, because they have gone through research and development procedures in stages and precisely.

The research was carried out in the even semester of the 2022/2023 school year at SMP and MTs Central Lampung. Data collection with questionnaires, tests and documentation. The questionnaire consists of an e-module validation questionnaire and a response questionnaire for educators and students. The effectiveness of the e-module is seen through tests. To see the feasibility of the e-module, the results of the assessment sheet filled in by material experts, media experts, and religious experts, then the data is used as reference material for revising the developed e-module. Guidelines for evaluating each e-module component developed are as follows [12].

Table 1. Product Eligibility Criteria

Score Intervals	Criteria
$80\% < P \leq 100\%$	Really Worth it
$60\% < P \leq 80\%$	Worthy
$40\% < P \leq 60\%$	Decent enough
$20\% < P \leq 40\%$	Not Worth It
$0\% < P \leq 20\%$	Very unworthy

Then the results of the responses of educators and students are explained in the following table: [13]

Table 2. Product Interests Criteria

Quality Score	Criteria
$3,26 < \bar{x} \leq 400$	Very Interesting
$2,51 < \bar{x} \leq 3,26$	Interesting
$1,76 < \bar{x} \leq 2,51$	Less Attractive
$1,00 < \bar{x} \leq 1,76$	Very Unattractive

The instrument in the form of a test is used to determine the effectiveness of the created e-module, the data is calculated using the effect size formula, with the following criteria:

Table 3. Product Effectiveness Criteria

Qualitas Score	Criteria
$E_s \leq 0,2$	Low
$0,2 < E_s \leq 0,8$	Currently
$E_s > 0,8$	High

3 Result and discussion

The development of e-module statistics with Islamic and environmental nuances has been carried out.

3.1 Analysis phase

The analysis phase, namely the researcher conducted observations and interviews with several SMP and MTs students. This aims to determine the learning needs and conditions of students as a consideration for researchers to develop products according to needs. From the results of the interviews conducted by the researchers, the reasons and explanations from the students were that they still had difficulty understanding mathematics because the teaching materials used were not attractive and the language used was quite difficult to understand. They also explained that they had never used teaching materials with Islamic or environmental nuances, they also thought that they would like mathematics to be associated with Islam and the environment. therefore the researcher wants to develop an e-module of statistics with Islamic nuances and environmental insight.

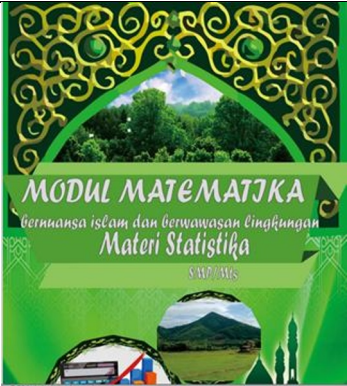
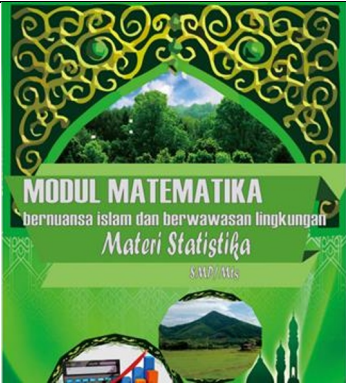
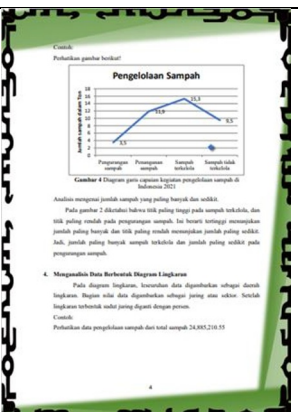
3.2 Design Stage

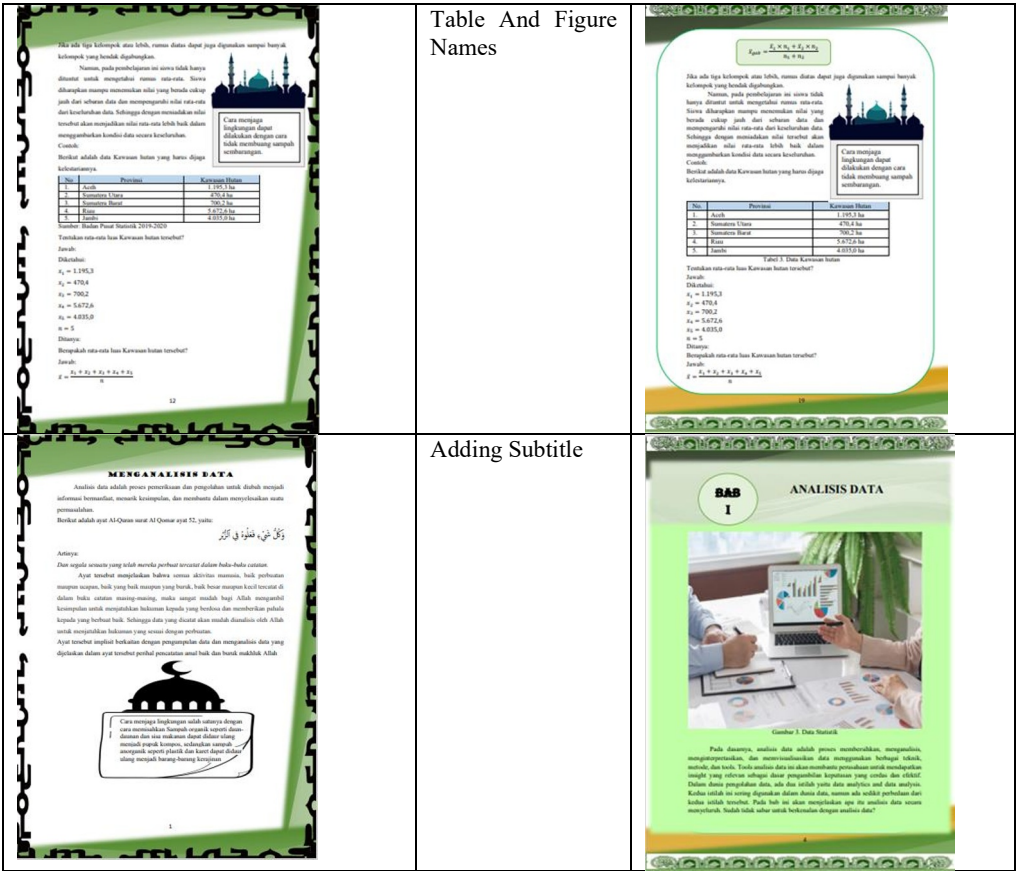
This stage begins with determining the title of the e-module, preparing books and other reference sources that will be used in making the e-module, identifying basic competencies and identifying indicators of competency achievement. After everything has been prepared, the researcher begins to design the e-module using the predetermined application.

3.3 Development Stage

Development (development), namely by opening the Microsoft Word application to compile statistical material, sample questions, exercises, and answer keys. Then look for links between statistics and Islamic values and environmental insights. After the contents of the material are made, the researcher begins to make the introduction and bibliography. Then create an outer page with the help of Corel DRAW X8. E-modules that have been completed are immediately validated. Validation was carried out by material experts consisting of 2 lecturers and 1 teacher, media experts also consisting of 2 lecturers and one teacher, and Islamic religious experts consisting of 1 lecturer. These experts provide suggestions and comments on what needs to be corrected/revised. The revision was made to make it better and usable, so a revision was made according to the validator's suggestion. As for the improvements that have been made as follows.

Table 4. Description of the Revision of the Islamic and Environmental Statistics E-module

Before Revision	Revision Decision	After Revision
	Title Writing	
	Frame E-Module	
	The Phenomenon of environmental insight	



The revised Islamic and environmental statistics e-module was then re-validated and obtained the following results:

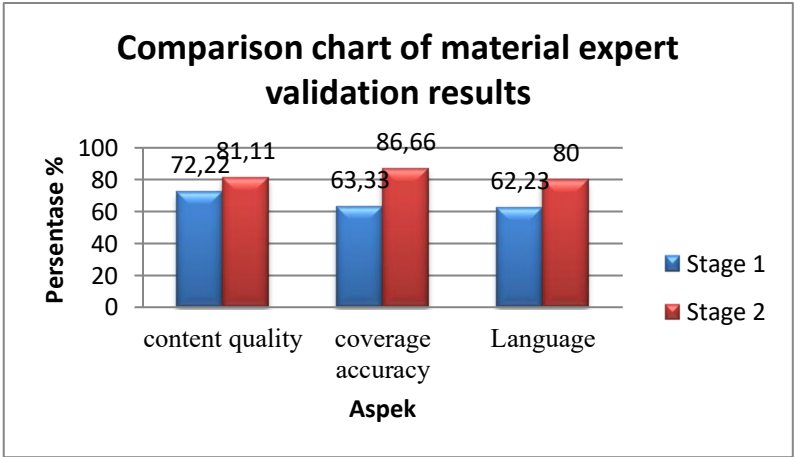


Fig. 1. Graph of Material Expert Validation Questionnaire Results

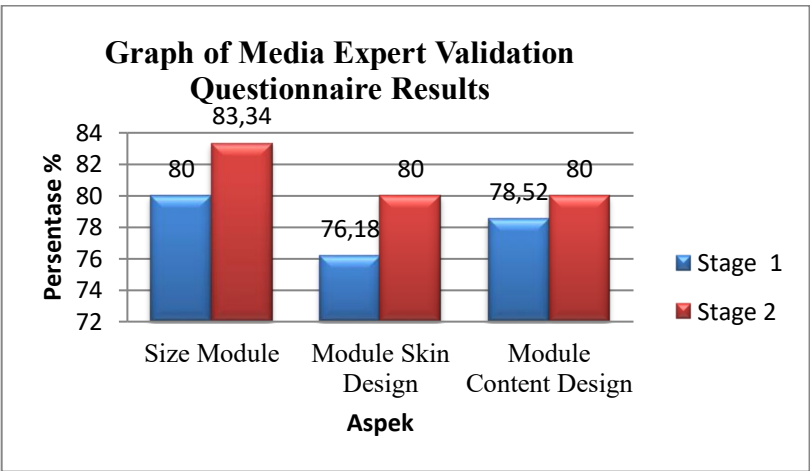


Fig. 2. Graph of Media Expert Validation Questionnaire Results

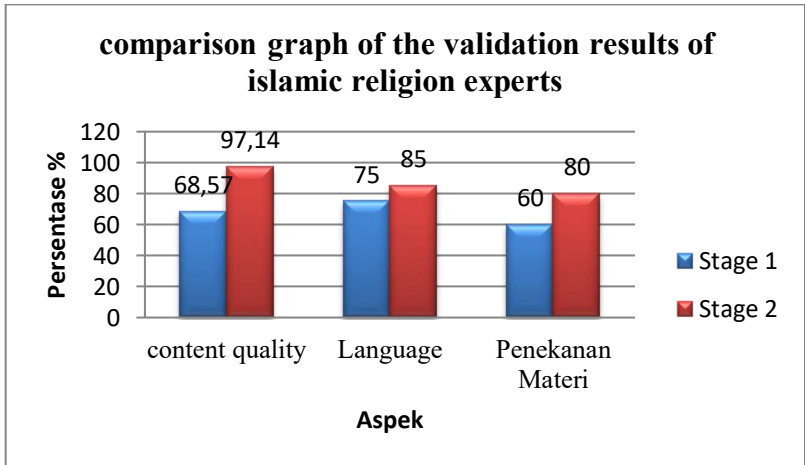


Fig. 3. Graph of Questionnaire Results of the Validation of Religious Experts

After the product has passed the validation step and is eligible to go through the next step, it will then carry out a trial run. The results of the trial regarding attractiveness were carried out by distributing an attractiveness questionnaire for Islamic and environmental statistics e-modules to SMP and MTs students. The trial was carried out 2 times, the first was a small trial and the second was a large trial. The results of the small group trial at MTs obtained an average of 3.56 in the "very interesting" category, in SMP it obtained an average of 3.18 with the "interesting" category. The results of the large group trial at MTs obtained an average of 3.48 in the "very interesting" category and in SMP it obtained an average of 3.43 with the "very interesting" category. The average teacher assessment gets a score of 3.3 in the "very interesting" category. From the results above, the e-module can proceed to the next stage.

3.4 Implementation Stage

In the next stage, namely the effectiveness test, the effectiveness test was carried out in class VIII SMP with a total of 21 students and in class VIII MTs with a total of 26 students. Each class is given the same treatment by teaching using e-module statistics with Islamic

nuances and the developed environment. The results of this effectiveness test were obtained from the results of the pretest and posttest questions given to students, with a score of 0.721 with the "moderate" criteria for SMP and a score of 0.76 with "moderate" criteria for MTs.

3.5 Evaluation Stage

Based on the results of the data analysis above, it can be seen that the average test is in the good category. It can be said that the Islamic and environmental statistics e-module fulfills the criteria of being feasible, attractive and effective to use.

The results of the research that started from the initial stage were an analysis of the needs of students, it was found that students needed teaching materials that were easily understood by students. This is in line with the opinion of Herawan and Utami [14] teaching materials containing knowledge must be understood by students in order to achieve predetermined competency standards.

Next is the design stage, the e-module is designed with predetermined steps and is made as attractive as possible, using the dominance of green as a symbol of Islam and the environment. After completion, then the e-module is validated by the validator, and revised according to the suggestions of these experts. So that the e-module can be tested for its attractiveness and effectiveness. E-modules are considered more effective in improving student learning outcomes, according to research conducted by [15]. After the expert test, there will be a small trial and a large trial, where the suggestions from the students can also be used to make the e-module even better.

The product implementation stage is an effectiveness test, the results obtained from the pretest and posttest in SMP and MTs namely the e-module statistics with Islamic nuances and the environment are effectively used in the "medium" category.

The findings of researchers during activities in class, students enthusiastically discussed in groups to complete the evaluation contained in the e-module. Because the e-module used is interesting, and this shows the existence of active interactions carried out by students. This supports the results of research [7] that e-modules with Islamic nuances are very interesting to use. Another finding is that the statistical e-module with Islamic and environmental nuances is effectively used, it can be seen from the posttest results of the students which are much better than the pretest results. This is in accordance with research conducted by [16] and [7] which states that e-modules with Islamic nuances are effectively used.

4 Conclusion

Based on the results of the study it can be concluded that the e-module statistics with Islamic nuances and the environment have met the criteria of being feasible, attractive and effective. Thus the developed e-module is feasible to use. The results of the conclusions above can then be followed up by educators or other researchers by making e-modules with Islamic and environmental statistics on other materials. students can also take advantage of e-module statistics with Islamic nuances and the environment as a learning resource.

5 Acknowledgment

This journal article was written based on research that has been done before. The development of this learning media aims to support the process of learning mathematics in junior high school students so that they have new and enjoyable learning experiences.

Reference

1. A. Thahir, K. Komarudin, U. N. Hasanah, and R. Rahmahwaty, *J. Educ. Gift. Young Sci.* **7**, 1120 (2019)
2. I. K. Sudarsana, *J. Penjaminan Mutu* **1**, (2016)
3. F. E, *Prism. Pros. Semin. Nas. Mat.* **1**, 114 (2018)
4. N. Ulfa, *J. Elem.* **3**, 21 (2020)
5. M. Huda and Mutia, *FOKUS J. Kaji. Keislam. Dan Kemasyarakatan* **2**, (2017)
6. B. S. Anggoro, Al-Jabar *J. Pendidik. Mat.* **6**, (2015)
7. T. Ekawati, B. S. Anggoro, and K. Komarudin, *AKSIOMA J. Progr. Stud. Pendidik. Mat.* **8**, 184 (2019)
8. D. N. Oktaviani and M. S. Rokhman, *Cakrawala J. Pendidik.* **8**, 83 (2014)
9. B. M. Sarti and W. A. Bangun, *Pros. Semin. Nas. IKIP Budi Utomo* **2**, (2021)
10. A. A. Setyawan and P. Wahyuni, *J. Penelit. Dan Pembelajaran Mat.* **12**, 94 (2019)
11. F. E. Subekti and L. Akhsani, *AKSIOMA J. Progr. Stud. Pendidik. Mat.* **9**, 530 (2020)
12. Sugiyono, *Metode Penelitian Administrasi* (Alfabeta, Bandung, 2016)
13. A. SAPUTRA, (2021)
14. N. Nuryati, B. S. Anggoro, and R. W. Y. Putra, *AL KHAWARIZMI J. Pendidik. Mat.* **1**, (2021)
15. AD Puspitasari, *J. Pendidik. Fis.* **7**, (2019)
16. M. Diana, N. Netriwati, and F. I. Suri, *Desimal J. Mat.* **1**, (2018)