



Development of Guided Inquiry-Based E-Module on Class XI Islamic Integrated Human Reproductive System Material

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Abstract

Background: An educator must have expertise in developing teaching materials that can support and assist students in the learning process. One of the teaching materials that educators can develop is in the form of e-modules. This research aims to develop and create a teaching material product in the form of an e-module based on guided inquiry on the Islamic integrated human reproductive system material in class XI for Senior High School/MA. **Method:** The type of research used in this research is in the form of R&D (Research and Development), or what can be called research and development; the development model used is ADDIE. The ADDIE development model has several stages: Analysis, Design, Development, Implementation, and Evaluation. Research data was collected by validating e-module products, observing learning implementation, and using questionnaires from educators' and students' responses. The data from this analysis trial uses descriptive quantitative data. Product trials were conducted using small-scale tests in class XI MIPA 5 MAN Palangka Raya City. **Results:** E-modules developed to obtain material expert validation assessments have 91% results that fall into the "very feasible" criteria, media expert validation has 90.75% results that fall into the "very feasible" criteria, and interpretation expert validation has 78% results that fall into the "feasible criteria." At the same time, the results of the implementation observation were 82.62%, which is included in the "very good" criteria. The data from the educator response questionnaire have results as high as 75%, which falls into the "good" category, and the student response questionnaire has results of 82.16%, which is included in the "very good" category. **Conclusion:** From the data obtained, it can be determined that the guided inquiry-based e-module on the material of the integrated human reproductive system of class XI Islam is suitable for use in the learning process.

Keywords: E-module; Guided inquiry; Human reproductive system; Integrated Islam.

Introduction

Education is a process that students actively carry out. This is done through deliberate and planned efforts to create a learning environment where educational activities are expected to increase social intelligence, purity, and faith. One way to improve education is by developing the curriculum. Educators can also produce innovative and creative concepts in development dynamics over time (Rahayu et al., 2022).

Nowadays, an educator must also develop skills in making teaching materials to help students learn. Apart from that, in individual learning, teaching materials can be used to monitor and organize the process of obtaining information from students. Making modules, which are instructional resources that can be used in the learning process and are intended to help students master learning objectives and provide students with a means of independent study, is one of the responsibilities of an educator (Larasati et al., 2020).



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When developing modules, you must pay attention to characteristics in order to produce module products that can increase learning motivation. The characteristics of the module include self-instruction; that is, the module's teaching materials include all learning objectives, practice questions, and a summary of the material. Self-contained, namely, the module contains all the material that students will need during the learning process, stand-alone or can be called self-contained. This means that teaching materials in the form of modules will not depend on other learning materials; adaptive, the module can adapt to developments over time. And user-friendly (friendly or familiar), namely, that the module can help the user access the module (Daryanto, 2013).

E-modules, presented in electronic form, can usually be accessed via a website or a supporting application. According to Chong et al. (2005), students understand e-module content more easily, especially those related to interactive things, and incorporate multimedia components (Aryawan et al., 2018). The e-module is an interactive and communicative learning medium that can make learning easier for students.

Knowledge in the form of knowledge taken from the Koran is one of the reasons for encouraging progress in the modern era. If there is no guidance from the Koran, the nation will not progress, will not be respected, and will not be dignified. Islamic values in this country can be influenced by the progress and development of the times; thus, moral principles can be instilled in the education system and combined with verses from the Koran to deal with this problem.

Learning oriented towards projects, problems, inquiry, discovery, and creation is the desired learning paradigm. Inquiry can encourage students to develop assumptions in their minds and then be able to think creatively (Putri et al., 2015). To remain under supervision during inquiry-based learning, educators will continue to mentor and direct students.

Hanson (2006), revealed that when carrying out data collection and hypothesis testing activities, which are guided inquiry learning steps, these activities can improve the learning outcomes carried out by students because students will be asked to find the information needed at that time. The results will be obtained through hypothesis testing because the answers are based on student data.

One of the fields of science taught in schools is biology. Biology is a science that has concepts about life in nature. One of the learning materials studied in biology is the human reproductive system, which is studied in class XI. Students who study the human reproductive system in class 37 of 2018. According to this argument, students need the ability to analyze material on the human reproductive system, such as the sub-material of spermatogenesis and oogenesis, the menstrual cycle, and abnormalities or disturbances in the human reproductive system because it is a problem that requires investigation to find the necessary answers.

The guided inquiry-based learning e-module will become teaching material for students in the learning process, especially material on the reproductive system in class XI biology subjects until students gain principles and concepts through investigative steps. From interviews with biology subject educators, the results were that they had never used an e-module that was based on or contained guided inquiry steps. Apart from that, according to questionnaire data from the needs analysis of the class, Students also answered that the learning tools often used were printed textbooks or LKS (Student Worksheets), and not all students had independent learning tools. Biology textbooks used by educators and students have never been integrated with Islam or inserted with the values of Al-Qur'an verses because there are no ones that are integrated with Islam.

The above explains the background and problems in this research; therefore, the researcher proposes the development of an e-module based on guided inquiry on human reproductive system material integrated with Islam in class XI. This research aims to develop and create a product in the form of an e-module based on or has guided inquiry stages in it on material on the human reproductive system integrated with Islamic class XI and to determine the implementation and response of educators and students to the e-module generated.

Method

The teaching materials developed are e-module or electronic module teaching materials, as in one of the previous studies by [Isnaini \(2019\)](#) from IAIN Palangka Raya, who also developed a teaching material as a module. The module developed is different from the module that researchers are currently developing. Researcher Rima Isnaini developed a printed module with movement system material in class. This e-module development will use the ADDIE development model. This choice is because, compared to the others, ADDIE has evaluations or revisions at each stage to minimize errors in the product being developed ([Wijayanto, 2022](#)). Apart from that, according to [Kawete et al. \(2022\)](#), the ADDIE model is easy to understand and develop systematically by considering various basic theoretical foundations and designs for learning being developed. This development model has several stages: analysis, design, development, implementation, and evaluation.



Figure 1. ADDIE Development Model ([Sugiyono, 2019](#)).

Data source

The data sources for obtaining e-module product feasibility results are material, media, and interpretation experts. Apart from that, two observers aimed to assess the implementation of the e-module during the learning process and the involvement of 33 people from class XI MIPA 5 and 1 biology subject educator to find out the response to the e-module.

Instrument

The instruments or questionnaires required in this research are validation assessment questionnaires for material experts, media experts, and interpretation experts. Then, there are implementation instruments for observers and response questionnaires for students and educators.

Data Collection Techniques

The techniques used are school observations and interviews with educators who teach biology in class education.

Research procedure

1. Analyze

This stage involves analyzing needs and problems, namely the availability of learning materials to support teaching process activities. This needs analysis is based on the results of field exploration and interviews with MAN biology subject educators in Palangka Raya City. There are several pieces of information, data, and facts about the problem, namely the learning tools educators use for biology learning activities in printed teaching tools such as printed books and LKS (sheets). Student Work) has never used guided inquiry-based or Islamic-integrated biology teaching materials. As many as 91.2% of students feel that the reproductive system is one of the most difficult materials to understand in class XI biology.

Curriculum analysis Based on the results of the analysis, it can be seen that the school that was the research site, namely MAN Palangka Raya City, uses two curricula: the 2013 curriculum, which is applied in classes XI and XII, and the independent curriculum which is applied in class X.

2. Design (Designing)

This e-module product design step adapts learning activities to the 2013 curriculum. The e-module is created using Microsoft Word, PDF, and Book Creator with A4 size, 1.5 paragraph spacing with 12-18 font, and Dreaming Outloud Pro letters, Times New Rowman, and Arabic Traditional. Design by compiling an e-module framework consisting of a cover, organizer, foreword, table of contents, concept map, introduction, e-module instructions, core learning activities, bibliography, and biography.

At this stage, the next stage is to design the instrument and validate the instrument, which will later be used to validate the experts, namely expert validators for learning material, expert validators for learning media, and expert validators for interpretations related to the material. Apart from that, we will also design an implementation questionnaire to see the implementation of the e-module during learning, as well as design a response questionnaire for educators and a response questionnaire for students regarding the e-module.

3. Development (Development)

At this stage, the design of the e-module was carried out using Microsoft Word, and it was continued to be made into a PDF. After the e-module is converted into a PDF, it is uploaded to the book creator application. In the book creator application, the e-module will be enhanced by adding learning videos and evaluation questions to explain existing material. The final result of this e-module is a link, which can be used online via cell phone, computer, or laptop. Apart from that, this e-module can be downloaded and accessed in PDF format.

The completed e-module product will then be validated by an expert or expert who will assess the suitability of the e-module. Expert validators consist of 6 validators with two expert validators each. Each expert or expert will fill out a validation questionnaire based on a predetermined statement, which includes fields for providing comments and criticism as improvements. Therefore, from the questionnaire results, a reference was obtained for revising and improving the e-module being developed.

4. Implementation (Implementation)

The implementation stage is carried out after the revision stage has been completed and has been given feasibility by expert validators. After that, the product in the form of an e-module will be tested on a small scale. The test was conducted on a small scale for XI MIPA 5 MAN students in Palangka Raya City. This small-scale trial involved one educator and 33 students in looking at the responses to the e-module.

5. Evaluation (Evaluation)

The final stage is evaluation, namely the final improvement stage for the e-module that has been produced. The intended evaluation is a revision of the previous stage. The results of this stage are obtained from teacher response questionnaires and student responses from input or suggestions on the questionnaire sheet. The aim of this evaluation stage is that the e-module product is based on or contains guided inquiry stages in the integrated Islamic human reproductive system material for class XI and is truly suitable and can be used.

Data analysis technique

This research uses data analysis techniques in the form of quantitative descriptive data analysis, which is used to analyze the data that has been obtained. After the data has been collected from experts to see the feasibility of the product, from observers to see the implementation of the product, and from educators and students to see the response to the product, it can then be calculated using the following formula.

$$\text{Percentage} = \frac{\text{Average of All Aspects}}{\text{Highest Assessment Score}} \times 100\%$$

The results of the assessment are then given the following criteria.

Table 1. Product Feasibility Assessment Criteria

Percentage (%)	Eligibility Criteria
25,00% - 43,75%	Less Eligible
43,76% - 62,50%	Fairly Decent
62,51% - 81,25%	Eligible
81,26% - 100%	Very Eligible

Table 2. Criteria for Product Implementation Assessment

Percentage (%)	Implementation Criteria
25,00% - 43,75%	Poor
43,76% - 62,50%	Fairly Good
62,51% - 81,25%	Good
81,26% - 100%	Excellent

Table 3. Criteria for Educator and Student Response Assessment

Percentage (%)	Response Criteria
25,00% - 43,75%	Poor
43,76% - 62,50%	Fairly Good
62,51% - 81,25%	Good
81,26% - 100%	Excellent

Results and Discussion

The e-module produced in this research is a guided inquiry-based e-module on class XI Islamic integrated human reproductive system material. The core of this E-module contains learning objectives, material descriptions, and practice questions, which can be accessed via a link or pdf via smartphone, laptop, or computer, provided it must be connected to an internet connection because the product is operated online.

Product Feasibility Test Results

Below are the results of the product confidence assessment from validators, material experts, media experts, and interpretation experts.

Table 4. Material Expert Validation Results

Aspects	Phase I		Phase II		Total	Percentage	Criteria
	Validator	Validator	Validator	Validator			
	1	2	1	2			
Material Conformity with Basic Competencies	9	12	11	-	32	89%	Very Eligible
Material Accuracy	9	12	11	-	32	89%	Very Eligible
Material Update	9	12	12	-	33	91,75%	Very Eligible
Linguistic Aspect	12	12	12	-	36	100%	Very Eligible
Presentation Aspects	9	11	10	-	30	83,25%	Very Eligible
Encouraging Curiosity	8	7	8	-	23	95,75%	Very Eligible
Total	56	66	64				
Average	3,29	3,88	3,76				
Overall Average					186		
Overall Average					3,64%		
Percentage					91%		
Criteria					Very Eligible		

The results of this data show that the guided inquiry-based e-module on Islamic integrated human reproductive system material has an average validity of 91%, which is

included in the very feasible criteria, which means that this e-module is very suitable to be tested on students.

Judging from the linguistic aspect, the e-module has a percentage of 100% with very appropriate criteria. This percentage is the highest percentage of other aspects because the sentence structure used in this e-module is based on Indonesian grammar rules; apart from that, the spelling included is also based on the EYD (Enhanced Spelling) guide, and the terms in the e-module also consistent between sections in the e-module.

The lowest percentage obtained in material expert validation was in the presentation aspect. The presentation aspect obtained a percentage of 83%, and this is because the presentation of practice questions and answer keys is still in the form of a Google form, knowing that the Google form can only be accessed by one user.

Table 5. Media Expert Validation Results

Aspect	Phase I		Phase II		Total	Percentage	Criteria
	Validator		Validator				
	1	2	1	2			
E-Module Size	7	8	7	-	22	91,75%	Very Eligible
E-Module Cover Design	25	28	26	-	79	94,00%	Very Eligible
E-Module Content Design	59	67	56	-	182	89,25%	Very Eligible
Total	91	103	89	-			
Average	3,5	3,96	3,42	-			
Overall Average					283		
Overall Average					3,63		
Percentage					90,75%		
Criteria					Very Eligible		

The data from the overall results of this research are valid as stated by media expert validators with a percentage result of 90.75% with the criteria "very feasible", which is assessed based on three aspects, namely the size of the e-module, the design of the e-module cover, and the design of the e-content. -module.

The e-module cover design aspect has the highest percentage among the other aspects, namely 94%, while the lowest percentage is in the e-module content design aspect, with a percentage of 89%. According to Prastowo (2015), good learning material design requires careful consideration of the design format, including writing style, design elements, and layout that can be modified to meet the reader's needs. Apart from that, according to Sihombing (2001), readability and clarity must be considered when designing a product (Salasiah, 2019).

Table 6. Validation Results of Interpretation Experts

Aspects	Phase I		Phase II		Total	Percentage	Criteria
	Validator		Validator				
	1	2	1	2			
Material Conformity with Proposition	6	4	8	7	25	78,00%	Eligible
Conformity of Integration with Proposition	6	5	6	7	24	75,00%	Eligible
Accuracy of Writing Verses or Hadiths	7	8	12	10	37	77,00%	Eligible
Accuracy in Writing Interpretation of Paragraphs	6	4	6	6	22	68,75%	Eligible
Letter Consistency in Paragraph	6	6	8	8	28	87,50%	Very Eligible
Benefits of Proposition	3	3	4	4	14	87,50%	Very Eligible
Total	34	30	44	42			
Average	2,83	2,5	3,67	3,5			
Overall Average					150		
Overall Average					3,12		
Percentage					78%		
Criteria					Eligible		

The results of the expert interpretation validation of the e-module developed obtained a percentage of 78% with the "feasible" criteria. Judging from two aspects, namely the aspect of consistency in writing the interpretation of the verse and the aspect of the usefulness of the argument, these two aspects have a high percentage, namely 88%. Meanwhile, the aspect of accuracy in writing verse interpretations has the lowest percentage, namely 69%. According to [Salsaliah \(2019\)](#), when material with an Islamic theme is created, verses from the Koran must be chosen in a way that is appropriate to the topic and has the right interpretation. This is also in line with [Bella's \(2018\)](#) opinion. Suppose the contents of the Al-Qur'an verses and interpretations are correct. In that case, the Islamic material is complete, and there are many problems related to teaching materials. If Islamic materials are consistent with the teaching materials being developed, then the product of Islamic integration obtains high validity ([Salasiah, 2019](#)).

Product Performance Test Results

The implementation of learning in the e-module in this research will be observed by two observers, namely an IAIN Palangka Raya student.

Table 7. Product Implementation Results

Meeting	Observer	Total	Average	Percentage	Criteria
I	FI	43	39	75%	Good
	Z	35			
II	FI	48	47	90,25%	Very Good
	Z	46			
Percentage				82,62%	Very Good

The observer will observe students in the ongoing learning process using the e-module. This observation will be carried out during two learning meetings. The results of the implementation of this e-module obtained a percentage of 82.62%, including the "very good" criteria. The implementation of the learning process with the e-module that has been produced can be concluded to be very good if it can guide students to be actively involved and able to learn independently.

Educator and Student Response Results

Table 8. Educator Response Results

Respondents	Total	Average	Percentage	Criteria
ERS	39	3	75%	Baik

Teacher responses were collected from questionnaires or instruments given to class XI biology educators. The results of the educators' responses aim to see how educators respond to the e-module. The data from educators' responses obtained a percentage of 75%, which fell into the "good" criteria and was assessed based on several aspects: interest, material, and language. This is supported by the advantages obtained from educators' responses, namely the existence of learning videos included in the e-module so that they can facilitate students' understanding and increase the clarity of the material, and are also related to the existence of letters in the Al-Qur'an which are integrated into a material so that it can increase students' piety.

Table 9. Student Response Results

Respondents	Total	Average	Percentage	Criteria
AFMZ	40	3,64	90,91%	Very Good
ANS	34	3,09	77,27%	Good
A	39	3,55	88,64%	Very Good
AIS	34	3,09	77,27%	Good
AOAA	33	3,00	75,00%	Good
AN	38	3,45	86,36%	Very Good
AFM	33	3,00	75,00%	Good

ARH	39	3,55	88,64%	Very Good
BN	32	2,91	72,73%	Good
DPP	36	3,27	81,82%	Very Good
DFN	37	3,36	84,09%	Very Good
FNA	34	3,09	77,27%	Very Good
GIF	30	2,73	68,18%	Good
HW	31	2,82	70,45%	Very Good
HH	38	3,45	86,36%	Very Good
HH	36	3,27	81,82%	Very Good
IM	33	3,00	75,00%	Good
IM	38	3,45	86,36%	Very Good
KK	34	3,09	77,27%	Good
MCAR	41	3,73	93,18%	Very Good
MFN	39	3,55	88,64%	Very Good
MS	40	3,64	90,91%	Very Good
NNU	43	3,91	97,73%	Very Good
NAS	43	3,91	97,73%	Very Good
NUA	34	3,09	77,27%	Good
RM	33	3,00	75,00%	Good
RCK	36	3,27	81,82%	Very Good
RMA	44	4,00	100%	Very Good
SRNKS	33	3,00	75,00%	Good
SCW	37	3,36	84,09%	Very Good
YNA	32	2,91	72,73%	Good
ZSF	33	3,00	75,00%	Good
ZFR	36	3,27	81,82%	Very Good
Student Response Results			82,16%	Very Good

Student Response 82.16% Very Good

The results of these student responses aim to see how students respond to the e-module. The resulting data from student responses has obtained an overall percentage of 82.16% for the "very good" criteria. This is assessed based on several aspects, namely interest, material, and language. Because previously students used printed teaching materials in their daily learning process, it can be seen from the results of the response data from educators and students that the e-module developed has a good response, the e-module is also practical to use in the learning process, apart from that The e-module can also be used as independent teaching material for students, and also because there is additional material in the form of learning videos and is supported by Islamic integration contained in the e-module, it can add learning information along with explanations regarding the Islamic religion, which is a school. Islam or Madrasah Aliyah.

The research that has been carried out shows that this e-module product has advantages, namely that it includes learning videos that aim to support or help provide further explanation of existing material. It is also attractive, and this e-module is easy to use. The weakness of this e-module is that the e-module must have an internet connection to complete practice questions and play learning videos.

Conclusions

The results of the validation carried out by material experts, media experts, and interpretation experts stated that the teaching materials in the form of guided inquiry-based e-modules on the Islamic integrated human reproductive system material for class XI received the "very feasible" category with an average percentage of 86.58 %. The results of student responses based on aspects of interest, material, and language obtained an overall percentage of 82.16%, with the criteria "very good." Therefore, the developed e-module teaching materials have fulfilled all assessment aspects so that this e-module can be used in the learning process.

Declaration statement

The authors reported no potential conflict of interest.

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