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Development of A Teaching Module Containing Islamic Values on the Material of the Human Reproductive System to Strengthen Students' Critical Thinking Abilities in Madrasah Aliyah

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Abstract

The purpose of this research is to develop and implementation of a teaching module containing Islamic values on the human reproductive system material to improve critical thinking. The development research method used ADDIE (Analyze, Design, Development, Implementation, and Evaluation). Data were obtained analysis, questionnaires, and tests (pre-post). The module was analyzed by expert validators. Data analysis techniques used descriptive analysis and statistical analysis. The results of the study showed that the characteristics of the teaching module were interactive. The teaching module was packaged with an attractive visual design and systematic layout, the integration of verses from the Qur'an and Hadith related to the human reproductive system, and the presence of special features such as Islamic Values and Critical Thinking designed to stimulate students' critical thinking skills so that students were interested in reading it. The validity value of the teaching module was declared very valid based on the assessment of media experts at 93.80% and material experts at 97.04%. The practicality value of the teaching module was declared very practical based on the teacher's assessment at 89.24% and the student's assessment at 85.69%. The value of increasing students' critical thinking skills was analyzed through N-Gain analysis per indicator with an average result of 0.85 (high). It can be conclude that the teaching module has interactive characteristics, as well as being valid and practical for use in learning at school.

How to Cite

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INTRODUCTION

A moral crisis is occurring that is very concerning because it impacts children and parents as the nation's next generation (Julkifli & Mardianto, 2022). The moral crisis that occurs is in the form of free association, rampant violence against children and adolescents (human trafficking), crimes against friends, the habit of cheating during study and exams, drugs, pornography, rape, deprivation of rights, and destruction of other people's property rights which are social problems until now have not been completely resolved, conditions like this are one indicator of character formation. The main factor that most contributes to the development of moral and characterful humans is education (Chowdhury, 2018). Education is a systematic approach to developing students' potential. Students' character cannot grow and develop if the school lacks character (Ansori, 2020).

The current Indonesian education system is primarily cognitively oriented and only partially considers affective aspects, empathy, and character traits (Hanurawan et al., 2024). Subjects related to character education (such as morals and religion) are said to focus more on memorization or the obvious. All of this has created a childish, non-creative character. Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System states that the goal of national education is to develop the nation's skills and abilities, civilization and character, which can be used to advance the life of the nation and state. There are several religious schools in the world of education, one of which is Islamic schools. In Islam, the Quran is the holy book for Muslims. In Indonesia, where the majority of the population is Muslim, using the Quran as a source of inspiration for shaping national character is not enough. This is crucial because the Quran has successfully transformed the character of the Arab nation, which was previously considered a society of ignorance, into a civil society.

Madrasah Aliyah is a type of formal education that enhances general education with Islamic religious knowledge in the classroom as a continuation of elementary school, MTS, or other equivalent schools (PP Menteri Agama No. 60, 2016). Based on this description, we can understand that Madrasah Aliyah must provide education that integrates Islamic principles with biological materials based on Islamic teachings, especially the Qur'an and Hadith. The integration of science and religion is necessary so that various branches of science and religion can synergize and work together in overcoming various human problems in various aspects of life (Iis, 2016). The progress of the nation can be implemented through education based on Islamic principles contained in the Qur'an, which can be integrated through the learning process in schools and carried out in various ways, such as reading, connecting them with the material, and applying religious principles in teaching methods. The goal of the learning process is to integrate Islamic principles so that students can understand that science is based on the Qur'an.

Based on the facts in the field, biology learning in Madrasah Aliyah has not shown a learning process that integrates Islamic values into biology materials, especially in the human reproductive system material. This is indicated by the results of interviews with Biology Teachers at MA Salafiyah Syafiiyah Proto Pekalongan Regency, which shows that biology learning, especially in the human reproductive system material, teachers use textbooks and LKS teaching materials. In addition, the textbooks used by students have not shown any integration of Islamic principles into biology materials. This is in line with the findings (Kisworo & Azizah, 2018) regarding the Madrasah Aliyah program, which is a religious-based school but does not identify the Islamic teaching process in each class. The verses of the Quran contribute significantly to the development of moral character (Syafri, 2018).

In accordance with the initial observation of biology teachers at MA Salafiyah Syafiiyah Proto Pekalongan Regency for the 2024/2025 academic year on Monday, January 16, 2025, to realize these efforts, teachers need to make breakthroughs and steps to overcome the problems faced. Teachers are educators with expertise in the field of pedagogy. To carry out this task, a teacher is expected to have extensive knowledge and skills that will be passed on to their students (Arianti, 2019). The existing curriculum aligns with the Independent Curriculum. The curriculum is developed in line with student needs and adheres to established guidelines. The curriculum provided by instructors must be varied. One teaching method that can be used to help teachers solve classroom problems is to develop lesson plans that incorporate religious values. The learning modules mentioned above can be written or unwritten. Learning modules must include relevant facts, concepts, principles, and procedures and be structured according to competency indicators and requirements.

The National Curriculum provides freedom and is student-centered, allowing teachers

and schools the freedom to determine appropriate learning (Independent Curriculum). This has motivated researchers to develop a Human Reproductive System Teaching Module with Islamic Values in the Human Reproductive System Material to strengthen students' critical thinking skills. This Human Reproductive System Teaching Module with Islamic Values contains material along with questions for discussion so that students are more active in carrying out learning activities in the classroom. In addition, it can be used by students to study at home or elsewhere by training students' memory in biology subjects through the questions provided.

Biology learning in class XI MA Salafiyah Syafiiyah Proto Pekalongan Regency, in its delivery, sometimes the teacher only links a little about religious knowledge with science, especially on the material of the human reproductive system, but this is not optimal. This is caused by the teacher's lack of knowledge about Islam, so he has difficulty distinguishing between Islamic knowledge and science. In fact, the material on the human reproductive system is closely related to verses contained in the Qur'an such as, QS. Al-Mu'minun verses 12-14, QS. Ad-Dzariyat verse 49, QS. Al-Isra' verse 32 and QS. Al-Hajj verse 5 (Irwansyah, 2018). Biology education has unique characteristics that distinguish it from other fields of study in terms of its subjects, issues, and methods. Reproductive education encompasses not only information on the anatomy and physiology of the reproductive organs but also information on reproductive health. Schools play a crucial role in providing quality reproductive education. It is crucial to incorporate other materials into reproductive system instruction in schools to uphold moral principles related to reproductive health. According to the National Population and Family Planning Board (BKKBN), the Central Statistics Agency (BPS), and the Ministry of Health (2017), materials such as religious norms, family values, and community values are considered to be materials that can improve the reproductive system in schools.

In biology, the human reproductive system is one of the best topics for developing students' critical thinking skills. Through an approach integrated with Islamic principles, it is hoped that students will not only understand the biological aspects but also develop sensitivity to social issues emerging in various societies. With critical thinking skills grounded in religious values, students are expected to avoid deviant behavior such as promiscuity. To date, critical thinking skills remain a persistent problem in Indonesia. This is evidenced by numerous studies highlighting the need for critical thinking skills and mentoring for students in various schools. This finding is not limited to schools with limited resources, but also occurs in well-resourced schools in major Indonesian cities. The sexual instinct that begins to function during puberty is one of the most prominent characteristics in adolescents, especially high school students. This potential is often unfocused due to a lack of information about their reproductive system. According to research (Chanifudin, 2020), every gift given to humans can be studied scientifically, even within religion. Religion is a fundamental aspect that determines how a person's character is perceived (Raharjo and Rohana, 2018).

In accordance with the initial goal, which is to integrate biology with Islamic concepts, a teaching module with Islamic values is needed. Based on the focus of the problem above, the author is interested in developing a teaching module containing Islamic values on the human reproductive system to strengthen students' critical thinking skills. This product, which is based on Islamic values, is expected to support student learning activities and strengthen critical thinking skills, in accordance with the independent curriculum for learning outcomes in the human reproductive system. The purpose of this research is to develop and implementation of a teaching module containing Islamic values on the human reproductive system material to improve critical thinking. The results of this study also serve as a stimulus for the development of biology teaching modules covering other biology learning materials (discussed in other chapters) that contain Islamic values and are based on the Quran, as an effort to shape students' noble character.

METHOD

Research Design

This study employed a Research and Development (R&D) approach using the ADDIE model, which consists of Analysis, Design, Development, Implementation, and Evaluation, to produce an Islamic-values-based teaching module on the human reproductive system aimed at strengthening students' critical thinking skills. Analysis involved a preliminary needs assessment through curriculum, student, and subject analyses. Curriculum analysis examined the Independent Curriculum at the Madrasah Aliyah level, which emphasizes knowledge mastery, skills development, and critical thinking. Student and subject analyses, conducted through interviews

with biology teachers and students, revealed the limited availability of teaching modules integrating Islamic values, the reliance on supplementary textbooks with minimal visual support, and the absence of learning materials that promote critical thinking alongside moral and spiritual development.

Design focused on planning the structure and specifications of the Islamic-based teaching module. This stage included determining learning objectives, indicators, and content for the reproductive system, analyzing learning resources and student characteristics, scheduling implementation activities, and designing the module layout and learning activities to support critical thinking skills. Development involved producing the teaching module based on the design stage. This phase included module creation and editing, followed by expert validation involving material experts, media experts, and integration experts. Revisions were conducted based on expert feedback as part of formative evaluation to improve the validity and quality of the developed product.

Implementation consisted of applying the revised module in real classroom settings. The module was implemented through small-group trials and large-group trials involving Madrasah Aliyah students. During this stage, students completed questionnaires to assess readability, usability, and the module's ability to engage critical thinking and reinforce Islamic values. Evaluation aimed to assess the effectiveness of the developed module in strengthening students' critical thinking skills. The implementation of the developed learning media employed a pre-experimental design using a one-group pretest–posttest approach. Implementation used quasi-experimental design (Creswell, 2018). The implementation was conducted in classes XI MIPA 1 and XI MIPA 3 at MA Salafiyah Syafiiyah Proto, Pekalongan Regency. Students were administered a pretest prior to the use of the learning media, followed by learning activities utilizing the developed product, and subsequently given a posttest to measure changes in learning outcomes after the intervention.

Evaluation was conducted using pretest–posttest instruments and student response data to measure cognitive and affective outcomes. The results of this stage served as the basis for determining the module's validity, feasibility, and effectiveness as an integrated learning resource combining scientific concepts and Islamic values.

Data Analysis

The analysis of the characteristics of the learning media for teaching modules containing Islamic values on the Reproductive System material was carried out using descriptive qualitative analysis. Data analysis consists of grouping, selection, synthesis, and finding results (Moleong, 2016). In this study, media characteristics analysis was obtained by comparing the results of data analysis from the initial stage of interviews with teachers and students, the observation stage, the validity of the learning media, the results of the analysis of student and teacher response questionnaires, as well as the results of tests and observation sheets for the questionnaire on increasing students' religious values (Liu, et al., 2023; Selvi & Özge, 2023; Winkler & Berenbon, 2021). The feasibility of this learning media, in the form of a teaching module, was analyzed through validation by experts. According to Sugiyono (2016), the validity of an instrument refers to the ability of the measuring tool to accurately represent the aspects or constructs it is designed to measure. Validation assessment was analyzed by calculating the percentage using the formula (Sudijono, 2009).

$$\text{Validity Value} = \frac{Score\ obtained}{Overall\ score} \text{ x } 100\ \%$$

The criteria for testing the validity of learning media qualitatively have a percentage range according to (Sugiyono, 2016) in Table 1.

Table 1. Criteria for Validity Value of Learning Media

Score Range (%)	Criteria
$81.25 < P \leq 100$	Very valid
$62.5 < P \leq 81.25$	Valid
$43.75 < P \leq 62.5$	Less valid
$25 < P \leq 43.75$	Invalid

The practicality of the developed media was analyzed using questionnaire data from student and teacher responses to biology learning on the Reproductive System using a teaching module containing Islamic values. The results were analyzed using the following formula.

$$P = \frac{f}{N} \text{ x } 100\ \%$$

Description:
P: percentage of scores obtained
f : total scores obtained
N: maximum number of scores

The criteria for testing the practicality of learning media qualitatively have a percentage range according to (Sugiyono, 2016) in Table 2.

Table 2. Criteria for the practicality of learning media

Score Range (%)	Criteria
$81.25 < P \leq 100$	Very practical
$62.5 < P \leq 81.25$	Practical
$43.75 < P \leq 62.5$	Less practical
$25 < P \leq 43.75$	Not practical

The effectiveness analysis of this Islamic value-based teaching module is used to measure the improvement of students' critical thinking skills using pretest and posttest testing activities. After the pretest and posttest results were analyzed, the N-Gain calculation was performed. The N-Gain test was conducted to determine the results of students' critical thinking skills before and after treatment. The g factor (N-Gain) formula according to (Hake, 1999):

$$g = \frac{Skor\ Posttest - Skor\ Pretest}{Skor\ Maks - Skor\ Pretest} \times 100\%$$

Interpretation of the standard gain (g) values is presented in the criteria in Table 3.

Table 3. Interpretation criteria for Gain value

Value g	Criteria
$g \geq 0.7$	High
$0.7 > g \geq 0.3$	Medium
$0.3 > g \geq 0.0$	Low

If the N-Gain value is greater than or equal to 0.7, the improvement in students' critical thinking skills is considered high. If the N-Gain value is less than 0.7 or less than 0.3, the improvement in students' critical thinking skills is considered moderate. If the N-Gain value is less than 0.3, the improvement in students' critical thinking skills is considered low.

RESULT AND DISCUSSION

The sections of teaching module containing Islamic values in reproductive system material include: title page, content page containing (learning achievements, achievement indicators, material map, human reproductive system material equipped with interesting pictures, verses of the Qur'an related to human reproductive system material, biological information related to Islamic values that can be practiced in everyday life (Islamic Value), and critical thinking to broaden students' insight and critical thinking skills, practice questions, bibliography, answer key, glossary and profiles of media developers.

Modules are components that play a crucial role in the learning process (Arine, et al., 2025). The availability of modules can help students understand and process their own learning materials, enabling them to learn independently without teacher assistance (Setiyadi, et al., 2017).

This rubric concludes with a summary, conclusions, or ideas expressed through group discussions, thereby enhancing students' critical thinking skills. Critical thinking skills are crucial for students because they can enhance their analytical skills and enhance their critical thinking skills (Susilawati et al., 2020). Therefore, critical thinking must be consistently applied to each student, making it a crucial step in the learning process (Indah et al., 2019; Sutiani, 2021).

Media validation by experts serves as validation and input to improve and enhance the quality of this Islamic-based teaching module, thus determining its suitability for use in biology teaching on the human reproductive system. The media validation assessment for this teaching module was adapted from the National Education Standards Agency, which comprises assessment components for module appearance and material presentation (Astuti, et al., 2020). The Islamic-based teaching module on the human reproductive system was assessed by expert.

Table 4. Media Validation Results Assessment

Assessment Aspects	Average (%)	Criteria
Appearance	97.22	Very valid
Presentation material	90.38	Very valid
Average	93.80	Very valid

This module provides space for students to learn actively, think critically, and creatively, and solve problems they face in real life (Arianti, 2022). Furthermore, this module also helps teachers deliver relevant, enjoyable, and contextual learning, ensuring education truly becomes a path to preparing a generation ready to face the challenges of the times with confidence and wisdom. Validation assessment by media experts shows that the validation results from raters were 93.80% so that it has valid for use.

Table 5. Media Validation Results Assessment

Assessment Aspects	Average (%)	Criteria
Material	97.50	Very valid
Presentation	98.61	Very valid
Language	95	Very valid
Average	97.04	Very valid

Validation of teaching module materials containing Islamic values was carried out to determine the suitability of the materials applied in the teaching modules that refer to the Independent Curriculum (Suparjo, et al., 2021). Validation assessment by material experts shows that the validation results from validators obtained an average result of each aspect of the rater agreement assessment of 97.04% so that it has a valid for use.

Table 6. Results of Practicality Data

Assessment Aspects	Average (%)	Criteria
Interest	86.17	Very valid
Material	85.42	Very valid
Language	85.49	Very valid
Average	85.69	Very valid

The practicality test of the teaching module containing Islamic values on student responses was assessed using a student response questionnaire of class XI Interest A.1 with a total of 25 students and XI Interest A.3 with a total of 29 students of MA Salafiyah Syafiiyah Proto, Pekalongan Regency, which consisted of three assessment aspects, namely the interest, material and language aspects. The practicality test data for the teaching module showed an average practicality percentage based on student response assessment of 85.69%. The criteria for student responses indicate a very practical category. Woodcock et al. (2012) noted that student responses play a crucial role in the development of academic knowledge. Therefore, the practicality of a teaching material is measured not only by the presentation of the material or the learning structure, but also by the extent to which it motivates and engages students in the learning process (Al Mamun & Laurie, 2023; Yuliono et al., 2018). Student responses may be one factor used to assess the effectiveness and cost of a particular course or teaching method (Hartatiana & Wardani, 2021; Utami et al., 2020; Mukti & Makmur, 2025).

The Islamic value-laden teaching module, after being declared valid by the validator at the development stage, was then implemented in the learning process. The implementation of the Islamic value-laden teaching module on the human reproductive system in biology learning was carried out to determine its effectiveness in improving students' critical thinking skills after learning, which can be determined based on the results of the learning evaluation using a pretest-posttest. The pretest-posttest questions were aimed at students of grades XI Interest A.1 and XI Interest A.3 at MA Salafiyah Syafiiyah Proto, Pekalongan Regency. The pretest-posttest questions were designed to determine the improvement in students' critical thinking skills so that from the results of the analysis of these questions, the results for each indicator of students' critical thinking skills were obtained. The pretest-posttest consisted of 20 multiple-choice questions and 5 essay questions. The pretest-posttest data used in the study were analyzed using N-Gain (Pertiwi, 2022).

Table 7. Results of Analysis of Students' Critical Thinking Skills

Indicator	Grade Average			Criteria
	Pretest	Posttest	N-Gain	
Summarizing	38.33	90.74	0.85	High
Providing simple explanations	35.19	88.62	0.82	High
Building basic skills	33.13	89.30	0.84	High
Setting strategies and tactics	29.86	89.68	0.85	High
Providing further explanations	37.50	91.90	0.87	High
Average			0.85	High

Overall, there was a significant increase in each indicator of students' critical thinking skills, with N-Gain values ranging from 0.82 to 0.87, which is in the high category (Arikunto, 2012). The average posttest score for students showed an achievement of more than 83 on all indicators, compared to pretest scores that ranged from 39 to 47. In line with Ennis's (1996) theory of critical thinking, which states that critical thinking skills encompass analysis, assessment, and drawing conclusions based on evidence, all indicators studied represent these components, and successful student improvement can be associated with learning strategies that facilitate exploration, reflective dialogue, and the reinforcement of values. Thus, the implementation of this Islamic-values-based teaching module has proven effective in improving students' critical thinking skills (Nasron, 2025; Aisyah, et al., 2024; Kosim, 2024). The consistent improvement across all indicators demonstrates that the learning approach used not only supports understanding of the material but also hones students' higher-order thinking skills comprehensively (Hubers, 2022; Elvira, et al., 2025).

CONCLUSION

The conclusion based on the results and discussion of this research and development is, the developed teaching module is a learning media product containing Islamic values, in the form of printed teaching materials adapted to the learning material in the Independent Curriculum on the human reproductive system. The teaching module containing Islamic values was declared very suitable for use. The validation results were very valid, with an average assessment from media experts of 93.80% and from material experts of 97.04%. The practicality test was categorized as very practical, with a response from teacher assessments of 89.24% and a response from student assessments of 85.69%. Teaching modules containing Islamic values can strengthen students' critical thinking skills with an average N-Gain value based on critical thinking skills indicators of 0.85. In future research, the number of test items used to measure critical thinking skills should be increased to meet all indicators equally. It is recommended to conduct a pilot study on different materials as a comparison in implementing Islamic values-based teaching modules.

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