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Basic Physics Module Based on Religious Moderation Values: Urgency, Validity, Practicality

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ABSTRACT

Religious moderation has a high urgency applied in learning both in universities and schools. The students as agents of change need to be instilled with the religious moderation values so that they have awareness of caring for diversity in Indonesia. The basic physics module based on religious moderation values was developed considering that there are still limited teaching modules in Basic Physics courses that support students' religious moderation values. The aims of the research are: (1) to understand the process of developing the basic physics module based on religious moderation values; and (2) determine validity and practicality level of the basic physics module based on religious moderation values. This research was R & D with 4D model consists of four stages, namely define (curriculum review and needs analysis), design (module design), develop (validation of module with expert validators), and disseminate (testing student and lecturer responses). There are two aspects identified namely validity and practicality. The novelty of the research is integrating religious moderation values into the basic physics module. The assessment results by expert validators show that the basic physics module based on religious moderation values is very valid and very practical to use. Future researchers are advised to involve more subjects from other universities.

1. INTRODUCTION

The rapid development of information technology has influenced the learning process in the 21st century. University students are required to master skills and knowledge in various fields, particularly in their respective areas of study, and to possess good social attitudes and behavior (Gu, Wang, & Lin, 2019). This will help them in the future when entering the workforce and participating in social life (Cahya, 2022). The quality of students must be prepared comprehensively (Nasir & Afkar, 2023) from the beginning of their studies, including for prospective physics teachers (Fausan, 2021).

In addition to mastery of their field of study, students are also expected to be moderate individuals in religious life. Religious moderation can be defined as understanding and applying religious teachings in a balanced and just manner (Harmi, 2022) (Putri, 2022). Religious moderation directs individuals not to be extreme or excessive in practicing their religion and to respect the religious practices of others who hold different beliefs and interpretations (Nurjanah, 2023). Religious moderation is essential because extreme religious attitudes may lead to conflict and intolerance. It also serves as a key to achieving harmony at the global, national, and local levels (Karim, Nensia, Aldeia, & Muslim, 2021). Students, as future agents of change, must be prepared from an early stage to develop awareness and preserve the diversity that exists in Indonesia (Herman, 2023) (Gunawan & Marisa, 2024). They should be instilled with a deep understanding of the urgency of applying religious moderation values in social life (Nasruddin, Anwar, & Islamy, 2024), for instance, by fostering a learning atmosphere based on religious moderation and incorporating its values into teaching modules used in higher education (Nasir, Mawaddah, & Afkar, 2023).

To technically support the implementation of religious moderation values, the Ministry of Religious Affairs of the Republic of Indonesia has established working groups at the national, provincial, and regional levels. The Decree of the Director General of Islamic Education No. 7272 of 2019 has stipulated regulations related to the application of religious moderation in Islamic education (Munawir, Mukaromah, & Firmansyah, 2023), from early childhood to higher education. Religious moderation has a strong foundation (Sari, 2023) and has been practiced by many figures throughout the history of Islamic civilization (Kemenag-RI, 2021). Religious moderation consists of nine values: at-tawassuth (moderation), al-i'tidal (proportionality), at-tasamuh (tolerance), al-ishlah (reform), asy-syura (deliberation), al-qudwah (exemplarity), al-la'unf (nonviolence), al-muwathanah (patriotism), and i'tiraf al-'urf (respect for local culture).

One effective effort to instill the understanding and implementation of religious moderation among students is by incorporating these values into learning media, particularly teaching modules (Putri, 2022). A teaching module serves as a learning tool designed to guide learning activities. It minimally contains essential components, including learning objectives, media used, assessments, and supporting information and references (Billah, 2019). Additional components may be included based on the learning context (Puspita, 2019). The development of teaching modules aims to create or refine learning materials that support the learning process in accordance with the characteristics of the learning environment and the students (Pratiwi, 2020) (Nitriani & Saehana, 2019).

Based on interviews with lecturers of Basic Physics, the head of the Physics Education Department, and several students of the Physics Education Study Program at UIN Ar-Raniry Banda Aceh, important findings were obtained that the Basic Physics course still uses an outdated module. The Physics Education Department does not yet have a teaching module based on religious moderation values. In fact, strengthening religious moderation values is one of the strategic programs of the Ministry of Religious Affairs, including at UIN Ar-Raniry Banda Aceh, which is known as the "jantong hate rakyat Aceh" (the heart of the Acehnese people). A teaching module based on religious moderation values is one of the alternative solutions to this need, in line with UIN Ar-Raniry's vision of forming a moderate, pious, intelligent, and excellent society (Ahmad, 2023) (Jannah, Rijal, & Nasir, 2024).

One of the courses that needs to be integrated with religious moderation values is Basic Physics, as it provides students with a foundational understanding of physics (Hadi, 2021) and is taught in the early semesters. Physics education students are required to have strong fundamental physics skills to analyze and solve complex problems involving various physics concepts (Caesaria, Jannah, & Nasir, 2020) (Pratiwi, 2020). As future educators, they must also possess an adequate understanding of religious moderation values (Hartini, 2020) so that they can contribute to developing students who are excellent, literate, moderate, and capable of addressing national problems (Hoktaviandri, Suatri, & Irawati, 2024).

The objectives of this research are: (1) to identify the process of developing a Basic Physics module based on religious moderation values, and (2) to determine the validity and practicality of the

developed module. The novelty of the research is integrating religious moderation values into the basic physics module.

2. METHODS

This study employed a Research and Development (R&D) design. The research procedure followed the 4D model, which consists of four stages: Define, Design, Development, Disseminate (Suhady, 2020; Marisda, 2021). This research was conducted from March to July 2024 at the Physics Education Department UIN Ar Raniry Banda Aceh. The research subjects consisted of expert validators (material experts, media experts, religious moderation experts, and language experts), lecturers of Basic Physics, the head of the study program, and students of the Physics Education Department UIN Ar Raniry class of 2023 who program Basic Physics. The details of the research stages are explained in Table 1 below.

Table 1. Details of Research Activity Stages

Stages	Activities
Define	a. Conduct a needs analysis of Physics Education students enrolled in the Basic Physics course through a questionnaire. b. Conduct interviews with the Basic Physics lecturer and the Head of the Physics Education Study Program at UIN Ar Raniry Banda Aceh. c. Analyze the Physics Education Study Program curriculum and Basic Physics teaching materials at UIN Ar Raniry Banda Aceh.
Design	Design a Basic Physics module and incorporate religious moderation values.
Develop	a. Validate the draft module with expert validators. b. Conduct revisions.
Disseminate	Conduct small group trials with students enrolled in the Basic Physics course and the lecturer.

The research instruments used consisted of: (1) questionnaires and needs analysis interview sheets, which aimed to obtain initial information from students, lecturers, and heads of study programs regarding the need for developing teaching modules; (2) validation sheets by expert validators, used to obtain validity assessments and input on the draft modules developed from expert validators. These sheets consisted of validation sheets from material experts, media experts, religious moderation experts, and language experts; and (3) student and lecturer response questionnaires, aimed to determine the practicality assessment and responses of students and lecturers to the module.

The data analysis was conducted based on the following stages.

1. Analyze the results of the questionnaire and needs analysis interview sheets related to the development of teaching modules, as well as the analysis of the curriculum and teaching materials related to basic physics lectures.
2. Analyze the module draft validation sheet involving expert validators. The validation results were tabulated and percentages calculated.
3. Analyze the questionnaire responses from students and lecturers to the validated and revised module. These responses were tabulated and percentages calculated using the equation above.
4. Determine the level of validity and practicality categories for the results obtained in points (2) and (3).

Table 2. Criteria for Module Validity, Practicality, and Effectivenes

Percentage (%)	Practicality Level	Effectiveness Level
81-100	Very Practical	Very Effective
61-80	Practical	Effective
41-60	Fairly Practical	Fairly Effective
21-40	Less Practical	Less Effective
0-20	Not Practical	Not Effective

(Puspita, 2019)

3. RESULT AND DISCUSSION

The research conducted adheres to the principles of research and development (R&D) to produce a specific product. This study uses a 4D model consisting of four stages: define, design, develop, and disseminate. This study identified two aspects related to the developed module: validity and practicality (Nurjanah, 2023). The module's validity was assessed through assessments by expert validators, consisting of material experts, media experts, language experts, and religious moderation experts. Meanwhile, the module's practicality was assessed through responses from students taking the basic physics course and from lecturers teaching basic physics. Module development consisted of four stages, which can be explained as follows.

3.1 Define

The development of this basic physics learning module based on religious moderation values began with the definition stage. This stage involved several important activities, as described below. First, a needs analysis was conducted among Physics Education students currently programming the Basic Physics course through a questionnaire. Researchers distributed a questionnaire to students in the Physics Education Study Program at UIN Ar-Raniry Banda Aceh to obtain information on which courses require teaching modules.

The results of this questionnaire indicated that the current Basic Physics teaching module does not support students' understanding of the values of religious moderation; in fact, 70% of students lacked knowledge related to religious moderation. Furthermore, all students surveyed agreed that students must understand the values of religious moderation and that the Basic Physics module would be more complete if it were based on these values. Therefore, the analysis of this questionnaire indicates that students in the Physics Education Study Program at UIN Ar-Raniry Banda Aceh need a basic physics teaching module based on the values of religious moderation.

Second, interviews were conducted with the lecturer in charge of Basic Physics and the Head of the Physics Education Study Program. These interviews revealed that the current teaching module for Basic Physics courses still uses the old edition. Furthermore, the study program requires a teaching module oriented towards the values of religious moderation. This is crucial to support the university's vision of creating moderate students and a society.

Third, an analysis of the Physics Education Study Program curriculum at UIN Ar-Raniry Banda Aceh and the teaching materials for the Basic Physics course was conducted. Considering time efficiency and results, the development of this module will focus on the first part of the Basic Physics course (Basic Physics I). The curriculum analysis revealed that the Basic Physics I course consists of three credits and is completed by students in the first semester. Furthermore, the study program has established Course Learning Outcomes (CPMK) for Basic Physics I, namely students are able to understand theoretical concepts in physics related to measurement and scientific notation; and students are able to master

theoretical concepts in physics related to particle kinematics, particle dynamics, work and energy, momentum and impulse, fluid mechanics; and heat energy.

3.2 Design

This stage aims to create a module design based on the values of religious moderation. This stage utilizes Canva and Microsoft Word 2016, guided by the Core Curriculum (CPMK) and sub-CPMK for the Basic Physics I course, as presented in Table 4 above. The module is designed on B5 paper, portrait orientation, 3-3-3-2.5 cm margins, Open Sans 11 font, and 1.15 spacing. The first page of the module features a black cover with silhouettes of physics notations. Next, there is a foreword outlining the initial idea for the module, its characteristics, and acknowledgments to those involved in the writing process. A table of contents is provided to help module users find the pages of the topics to be studied. A description and instructions for using the module are provided to facilitate user interaction. The module's presentation consists of six chapters, each of which includes: measurement and scientific notation, kinematics of motion, dynamics of motion, work and energy, momentum and impulse, fluids, and heat. Each chapter includes sample questions and exercises that users can use to gauge their understanding of the material.

Each topic is linked to the values of religious moderation related to the concepts contained within the material. These values are at-tawassuth (meditation), al-i'tidal (uprightness and proportion), at-tasamuh (tolerance), al-ishlah (improvement), asy-shura (deliberation), al-qudwah (pioneering), al-la'unf (non-violence), al-muwathanah (love of the homeland), and i'tiraf al-'urf (friendly to local culture). The distribution of religious moderation values in each CPMK is shown in Table 2 below.

Table 3. Distribution of religious moderation values in each CPMK

Number of CPMK	Religious moderation values
1	At-tasamuh (tolerance), i'tiraf al-urf (culturally friendly), al-ishlah (improvement)
2	Al-muwathanah (nationalism), al-qudwah (pioneering), at-tasamuh (tolerance)
3	Al-qudwah (pioneering), at-tasamuh (tolerance)
4	Al-qudwah (pioneering), asy-syura (deliberation), al-la'unf (anti-violence)
5	al-la'unf (anti-violence), al-qudwah (pioneering), at-tasamuh (tolerance)
6	Al-i'tidal (be proportional), al-muwathanah (nationalism)
7	Al-i'tidal (be proportional), at-tasamuh (tolerance)

An example of inserting religious moderation values into the module can be presented in Figure 1 below.

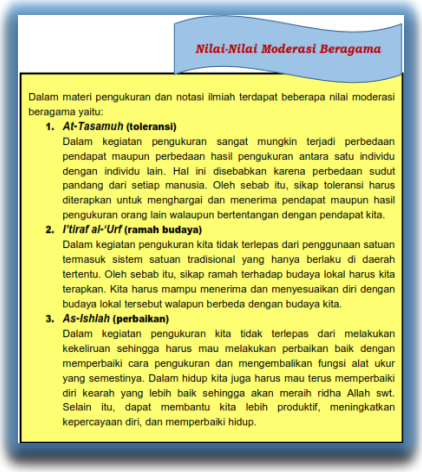

Figure 1. example of inserting religious moderation values into the module

In addition, the module design is also equipped with evaluation questions that users can use to comprehensively evaluate and measure their understanding of the module material. The final two sections of the module are the glossary and bibliography. The glossary consists of several important terms used in the module, along with explanations of each term. Meanwhile, the bibliography contains textbooks commonly used at the university level.

3.3 Develop

The designed module was tested for validity by expert validators to obtain constructive feedback and suggestions for module development. The validators who tested the module's validity consisted of two lecturers specializing in media, two lecturers specializing in content, two lecturers specializing in religious moderation, and two lecturers specializing in language. Based on the analysis of the module validation assessment data by the validators specializing in content, media, religious moderation, and language, the results were as shown in Figure 2 below.

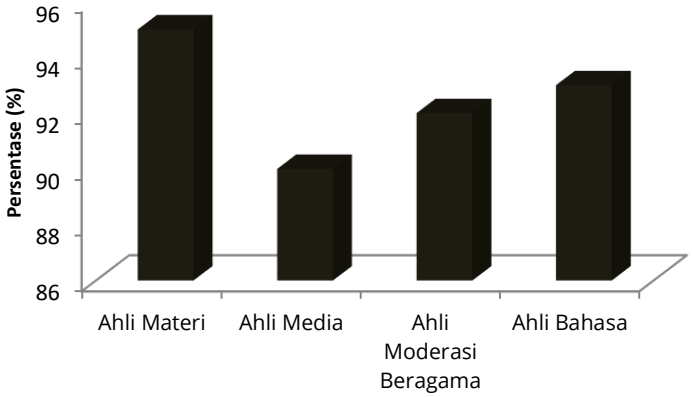

Figure 2. Results of module validity assessment

Based on Figure 2, it can be seen that the assessment by the material expert obtained the highest score, namely 95% (very valid), followed by the assessment by the linguist with a score of 93% (very valid), the assessment by the religious moderation expert with a score of 92% (very valid), and the assessment by the media expert with a score of 90% (very valid). The results of the overall feasibility

validation by the expert validator can be obtained by adding up all the assessment scores by each expert validator and then dividing by the maximum score, resulting in 92% with a very valid category. These results are similar to Ramadhan's (2020) research which developed a basic physics e-module based on independent learning using the 4D model. Data collection was carried out through a needs questionnaire, product validation by experts, and assessing e-module users (students and lecturers). The material expert validator gave a score of 90% (very valid) while the media expert gave a score of 82% (very valid). The results of the product user assessment obtained a score of 4.24 (very good). Marisda (2021) also conducted the design and validation of a Mathematical Physics module using a 4D model and found that the module on systems of linear equations and matrices was categorized as very suitable for use with a score of 80.5. The indicator with the highest score from expert validators was adaptive (90), and the lowest was self-contained (70).

3.4 Disseminate

At this stage, the module was distributed to students and lecturers to obtain information regarding the module's practicality. The practicality of a module can be assessed from several aspects, namely ease of use, attractiveness, and ease of interpretation by users. To identify this practicality, a limited trial was conducted with 16 students of the Physics Education Study Program at UIN Ar Raniry Banda Aceh and two lecturers teaching the Basic Physics I course. The results of the assessment of student and lecturer responses to the Basic Physics I module based on religious moderation values are shown in Figure 3 below.

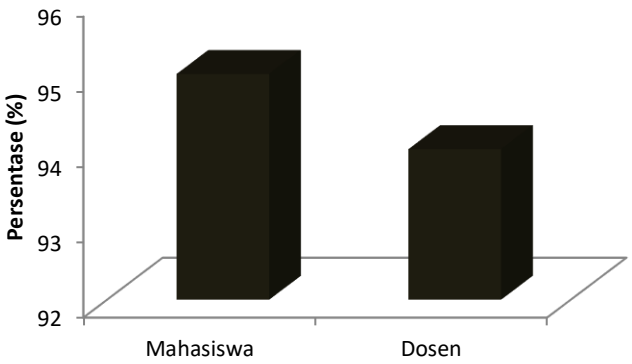

Figure 3. Results of module practicality assessment by students and lecturers

Figure 3 shows that the responses from the lecturer and students were 94% (very practical) and 95% (very practical), respectively. These results indicate that the Basic Physics I module based on religious moderation values is highly practical for use in lectures. This aligns with research conducted by Nitriani and Saehana (2019) on the development of a Modern Physics teaching module at Tadulako University. The developed teaching module was suitable for use. The average score obtained from the material validator was 3.4 (very good), the score from the media validator was 3.4 (very good), and student responses from the limited trial yielded a score of 75.6% (high). Pratiwi (2019) also developed a linear algebra teaching module based on Islamic values, which received student feedback that the linear algebra module was very good.

Religious moderation is a crucial aspect today in preventing conflict and intolerance in community life at the local, national, and global levels. Understanding religious moderation must be understood contextually, not just textually (Fahri & Zainuri, 2019).. Students, who are future agents of change, need to be prepared early on to be aware of and maintain existing diversity (Herman, 2023). Students must understand that the essence of religious moderation in Indonesia does not mean a

moderated state, but rather a moderate understanding of religion (Jailani, 2024). The values of religious moderation are highly urgent to be integrated into every learning experience, both in schools and universities (Arifinsyah, Andy, & Damanik, 2020) (Riyawi, 2023). The presence of this module based on the values of religious moderation is expected to be an appropriate learning reference for physics education students to be able to understand basic physics more comprehensively without forgetting the principles of religious moderation. Ultimately, students will be able to contribute to fostering students and the community to become superior, moderate citizens, and participate in finding solutions to help resolve the nation's problems.

4. CONCLUSION

Based on the data analysis, this study concludes that the development of a basic physics module based on religious moderation values was successfully carried out using the 4D R&D model, which includes the stages of define, design, develop, and disseminate. The define stage involved needs analysis and curriculum review, followed by module design at the design stage, expert validation during the development stage, and testing student and lecturer responses at the dissemination stage. The results indicate that the developed module meets very high criteria of validity and practicality. Validation results showed scores of 95% from material experts, 90% from media experts, 92% from religious moderation experts, and 93% from language experts, all categorized as very valid. In addition, student responses indicated a practicality level of 95%, while lecturer responses reached 94%, both categorized as very practical. These findings demonstrate that the module is suitable for use in basic physics learning.

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