

Development of Physics Modules Based on Integrated Concepts of Islamic Values on Particle Dynamics Material

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ABSTRACT

The development of basic physics modules based on the concept of integrated Islamic values was developed because there were not yet available teaching materials that were in line with the needs of students of the Department of Biology TAIN IAIN Kerinci. This study aims to provide an overview of modules that have been validated by a team of experts. This research uses the Plomp development model in the form of preliminary research, development or prototyping phase, and assessment phase. The developed module consists of a cover, preface, instruction for the use of the module, module description, course learning outcomes, lecture material (equipped with sample questions and discussion, concept column, the column of Islamic values that emerge from the module activity), concept understanding, exercise summary, evaluation, feedback, and bibliography. The study only explained about the module description that was generated after the research from the validation team.

Keywords: Modules, Basic Physics, Concepts, Islamic Values

INTRODUCTION

Basic Physics is a compulsory subject for students majoring in Biology at IAIN Kerinci. The position of this basic physics course as a basic foundation for science for students if later given the obligation to teach science subjects. Basic Physics lecture material is not well understood by students. This is proven when asked to solve other problems in the same context but in different forms, students are no longer able to answer properly. students' understanding of physics concepts is still low. The physics material is abstract[1].

Student misunderstanding in Basic Physics courses is much influenced by various factors. The causal factors referred to by researchers have been based on observations made by researchers of students who are the object of research researchers. The factors are a) the basic science of students entering the Tadris Biology major not only from natural science but also from social studies, language,

religion and even vocational, and b) the unavailability of teaching materials that can help students in equating the basic physics concepts that they want to achieve in lectures[2].

Particle dynamics is one of the materials contained in the Basic Physics Semester Learning Plan in the Tadris Biology Department. Particle dynamics have diverse applications in life [3]. Particle dynamics is a part of mechanics that contains many concepts that are the basis of other scientific concepts.

The concepts contained in the material particle dynamics in the form of the concept of mass and weight of objects, the concept of force, Newton's law, and the application of Newton's law in life. Students need to know the difference in mass and weight of objects clearly which has been a misunderstanding in understanding the concept. Students need to understand the direction of each force that might appear in solving the problem of

Newton's law application. Understanding the concept is needed by students in solving the problem of Particle Dynamics.

The complexity of learning requires that an important person can see the characteristics of students from various perspectives such as general skills, environmental factors, as well as perception, and knowledge which all have an important role in each process. Every learning process educators are required to be able to read the most dominant characters that exist in students. Learning style is also one of the causes of the many characteristics that arise in students [4]–[6].

In this case, students must know and understand starting from the process, abilities, and modalities to learning strategies to become effective learning [7], [8]. To support this, we need a teaching material that is suitable and by the characteristics of students.

Teaching material is a set of subject matter that refers to the curriculum used to achieve the learning outcomes to be achieved [9]. Modules are one type of teaching material that can be used in learning physics. Modules are learning facilities in written or printed form that are arranged systematically, containing learning materials, methods, learning objectives based on basic competencies or indicators, competency achievement, instructions for independent learning activities, and provide opportunities for students to test themselves through the exercises presented in the module, the module is an independent study guide that can be made by educators according to the needs of the students they teach [10].

I hope in this Basic Physics course, of course, I would like to present teaching materials that are suitable for students in the Department of Biology, IAIN Kerinci. The teaching material that is intended to be possessed not only adds to the scientific knowledge of the world but also shapes the Islamic character of students through Islamic values that must be instilled in students.

Expected teaching materials can certainly correct students' concepts that are this wrong and provide a correct understanding of concepts in Basic Physics material.

But the reality obtained from the results of observations that researchers do not yet have the availability of teaching materials by expectations. The teaching materials available so far are only a collection of Basic Physics lectures in the form of power points that are not structured and have not been able to accommodate students in obtaining improved concepts or getting concepts correctly. Seeing this gap between expectations and reality, the researcher wants to develop a module that is concept-based and integrated with Islamic values.

The concept to be discussed in the module is the concept of Particle Dynamics which is indeed considered difficult by students. Students have difficulty in understanding the concept of particle dynamics because of the tendency of students to memorize without understanding the concept clearly which has an impact on the difficulty in applying the concept in solving problems. This concept will later be displayed in the form of a concept column that can help students in obtaining reinforcement of the concept easily. At the end of the sub material in the Particle Dynamics material, the concept column will be made exactly [11].

The activities in the module are directed to seventeen indicators of Islamic values referred to in the 2017 IAIN Kerinci Strategic Plan and based on the mandate of the Law on the objectives of national education. Islamic values that are raised are expected to be able to form students with Islamic character.

The limitation used in this study is in the form of material constraints which are only focused on material urgency that is felt difficult by students, namely the Particle Dynamics material. The purpose of this research is to obtain a description of the module developed.

Relevant research that has been studied by researchers before is a) Development of

Basic Physics E-Module I Particle Dynamics Material Based on Kvisoft Flipbook Maker, this module is in electronic form in .exe format designed for Basic Physics lectures 1 [1], b) Model Development Concept-Based Learning, Drawing and Drill Method to Improve Students' Ability to Understand Concepts and Higher-Level Thinking in Animal Development Subjects, this study uses learning using concept maps accompanied by systematic training and aims to improve higher-order thinking skills [12].

RESEARCH METHODS

This research is included in the type of development research. The development model used by researchers is the Plomp development model which consists of 3 phases

- a) Preliminary research; at this stage the researcher examines needs and literature. The field needs related to teaching materials needed by students as well as reviewing relevant research and references supporting basic physics modules based on the integrated concept of Islamic values.
- b) Development or prototyping phase (Development Phase); at this stage researchers began to develop modules based on literature studies that have been obtained. Developing this module is based on the material concept of particle dynamics, the concept of a module, and the Islamic values in question. After developing the module, the researcher then develops a validation sheet of a team of experts who can later get a picture of the validity of the module in providing appropriate concepts to students and in shaping the Islamic character of students.
- c) Assessment phase; at this stage the researcher asked for validation research from two validator teams who were competent in physics and learning physics. The assessment will be used as a module refinement material later to obtain a valid

module that is fit for use at the study site intended by the researcher [13].

In this study, researchers will only discuss the module description. The module assessment section will be discussed in further research.

RESULTS AND DISCUSSION

Based on the research objectives and development models used, the results and discussion of this study include a description of basic physics modules based on integrated concepts of Islamic values. Basic Physics Modules based on integrated concepts of Islamic values have parts in the form of covers, preface, instructions for use of modules, lists content, module description, course learning outcomes, lecture material (supplemented with sample questions and discussion, concept column, the column of Islamic values that emerge from the module activities), concept understanding exercises, summary, evaluation, feedback, and bibliography. The cover identifies the researcher, the logo of the ministry of religion and other details, the year the module was made, and the images that support the concept of Particle Dynamics The cover's appearance is shown in Figure 1.

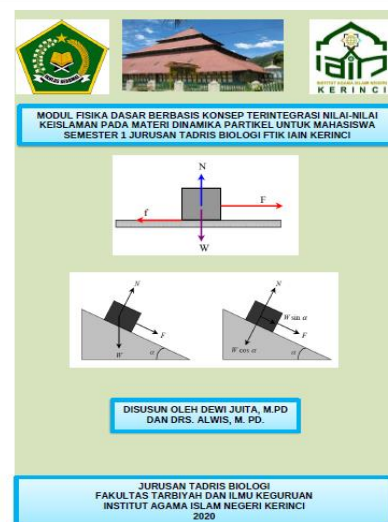


Figure 1. Display Cover

Furthermore, in the foreword section, an improvement is obtained in the form of an improved word editor by the validator team.

Improvements from the validator team can be seen in Figure 2.

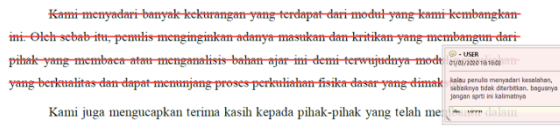


Figure 2. Improvements of the Preface by the Validator Team

Improvements provided in the form of eliminating sentences that express weaknesses from this module. Then the appearance of the preface that has been corrected can be seen in Figure 3.

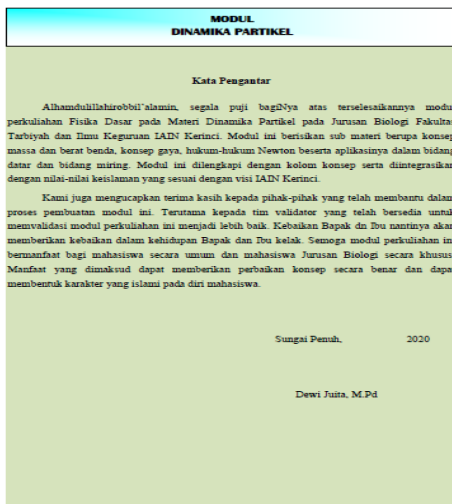


Figure 3. Display Foreword

The instruction section for the use of the module is conveyed to students as the user and the lecturer as a guide to using the module. Directions for using the module can be seen in Figure 4.

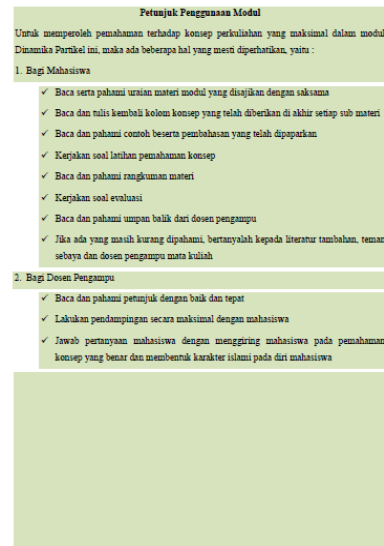


Figure 4. Display Module Usage Instructions

The module description addresses a brief review of the contents of the module and the core parts of the module. The module description section can be seen in Figure 5.

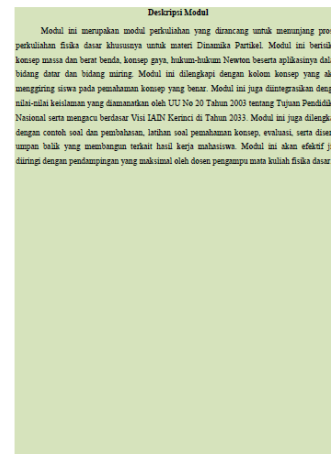


Figure 5. Display Module Description

Part of the course learning outcomes is obtained from the Semester Learning Plan that researchers use. Learning Achievement for culinary eyes can be seen in Figure 6.

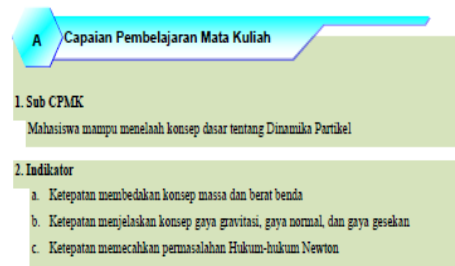
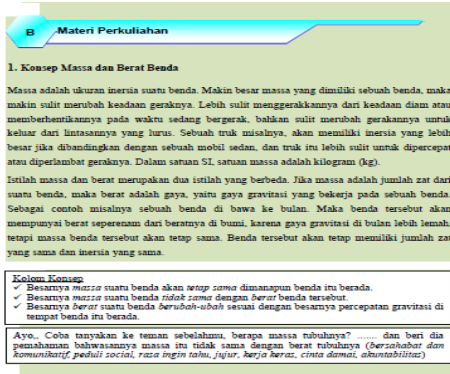


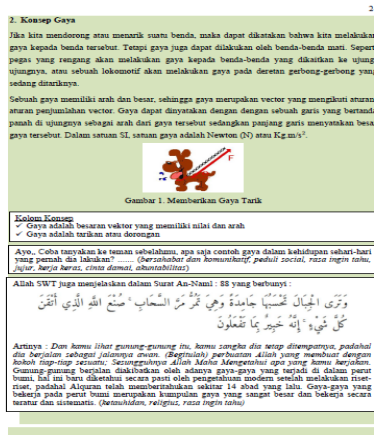
Figure 6. Display Learning Outcomes

Furthermore, the lecture material presented is

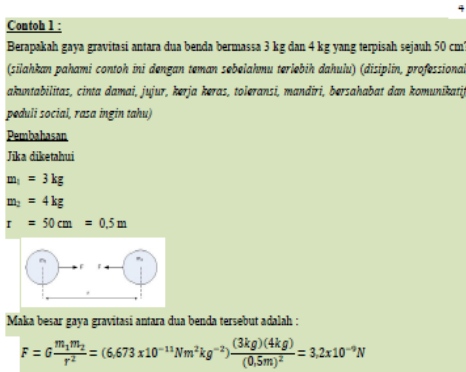
completed with a column of concepts and activities that support the emergence of Islamic values and is equipped with examples of questions and discussion. Display lecture material can be seen in Figure 7 below.



(a)



(b)



(c)

Figure 7(a), (b), and (c) Display Lecture Material

Improvements provided by the validator team in the lecture material section in the form of improved word editors and writing the sound of the Qur'anic verses. A snippet of comments from the validation team can be seen in Figure 8.

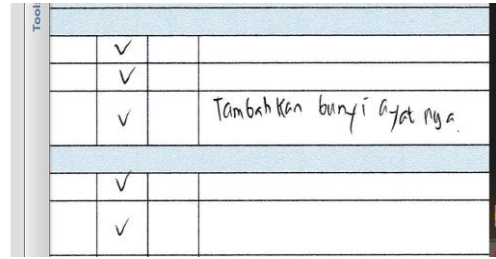


Figure 8. Display Improvements from the Validator Team

Next, the concept of the understanding exercise was developed based on the concept understanding indicator taken from Anderson (2010) which explains seven indicators of conceptual understanding in the form of:

1. Interpreting, students can change information from one form to another.
2. Exemplifying, students can provide examples of concepts.
3. Classifying, students know that something (a particular example or event) falls into a certain category (eg concepts or principles).
4. Summarizing, students can express one sentence that represents the concept in general.
5. Inferring, learners can find patterns in a series of examples or events.
6. Comparing, learners can involve the process of detecting similarities and differences between two or more objects, events, ideas, problems, or situations.
7. Explaining, students can build and use a causal model of a system.

Concept understanding exercises given 12 questions in the form of essays. The display of the concept of understanding exercise can be seen in Figure 9.

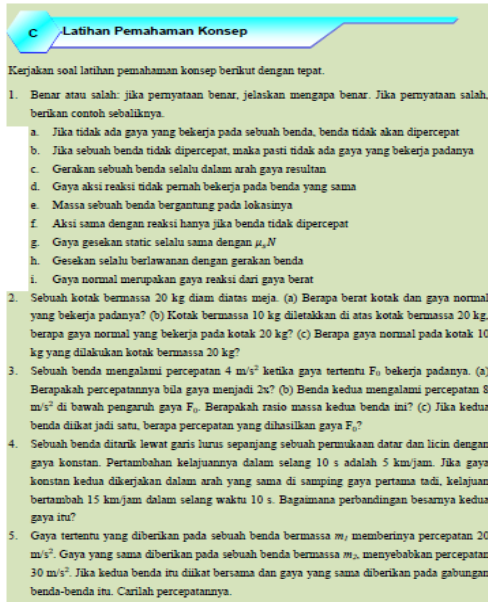


Figure 9. Tampilan Latihan Pemahaman Konsep

In the concept understanding exercise section, instructions on the exercise questions are given. Work instructions given to students are suggestions for improvement from the validator team. Improvements from the validator team can be seen in Figure 10 below.

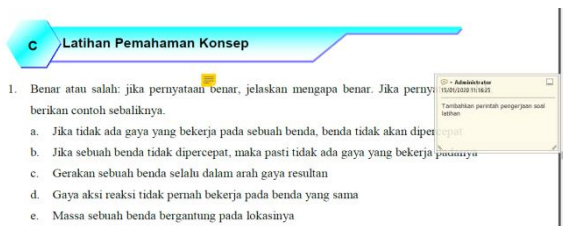


Figure 10. Improvements from the Validator Team in the Concept Understanding Exercise Section

The summary of the lecture material is filled in by three points. The contents of the summary refer to the achievements of the subjects presented at the beginning. Summary Display can be seen in Figure 11.

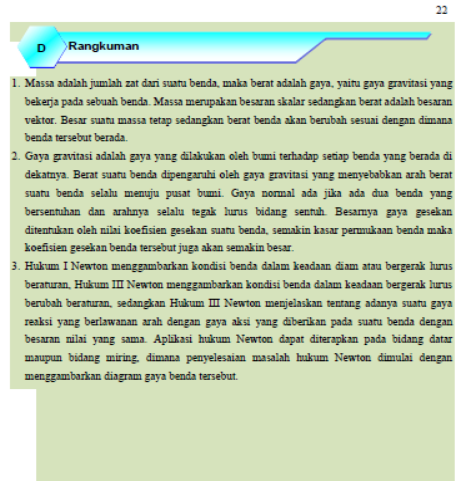
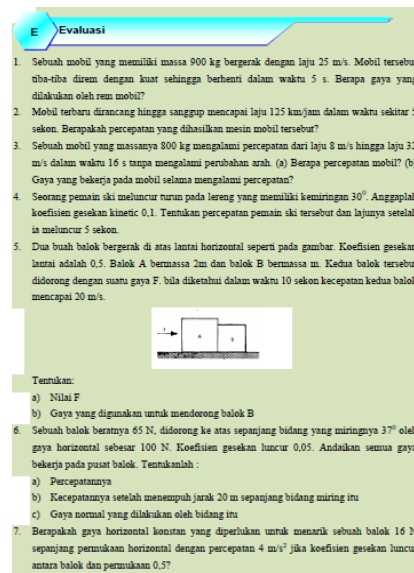


Figure 11. Summary of Lecture Material

The evaluation will be done by the students as a whole and given constructive feedback. The feedback section is given a rather space so that the instructor lecturer can provide feedback on the answers to the evaluation questions that have been done by students as well as feedback on the lecture process that has been carried out by students during the use of this module. The appearance of the evaluation and feedback section is shown in Figure 12.



(a)



(b)

Figure 12 (a) and (b). Evaluation and Feedback Display

CONCLUSION

The basic physics module description based on the integrated concept of Islamic values has a display in the form of a cover, preface, instructions for using the module, module description, course learning outcomes, lecture material, concept understanding exercises, evaluation, and summary.

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