Developing of Physics Modules Interrelation of Quran and Science in the Material of Vibration and Waves

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Abstract. This study aims to produce a physics module that is interrelated with the Quran and science in vibration and wave material that is valid, practical, and effective. The type of research is research and development using the ADDIE model. The subjects of the trial were 21 students in class VIII at one of the junior high schools in Banjarmasin. Data were obtained using module validation sheets, observations with lesson plan implementation sheets, and learning outcomes tests. Research with results that show modules in the valid category, the implementation of lesson plans in very practical categories, and student learning outcomes with effective categories. The conclusion is that the physics module of the interrelation of the Quran and science, in the material of vibration and waves, is appropriate to be used for learning in the classroom.

1. Introduction

National education functions to realize students who have noble character and loyalty to God from deeds and behavior [1]. The purpose of national education can be understood that Indonesian citizens must have spiritual strength, faith, dedication, and noble character. This goal can be achieved through lessons and understanding of religious education, especially towards the Qur'an, which is intensive and useful for students. Learning that is integrated with the Al-Qur'an makes progress in a nation by using school education based on the Al-Qur'an [2]. The learning process by integrating the Qur'an provides new knowledge to students [3].

Procurement modules that connect education with religious knowledge need to be developed, so students get experience about Islam that teaches a lot about the message of morality, faith, and loyalty [4]. As well as providing knowledge that science and science contained in the Qur'an do not occur separation. Modules are one example of teaching materials that can support the achievement of the objectives of learning. Modules can be used by students to study independently so that they fit the level of knowledge of each student [5]. The problem now is the lack of textbooks, modules, or print learning media connects verses of the Qur'an with science outside the main content of the book [6].

The results of an interview with one of the Science Teachers in one of the state junior high schools in Banjarmasin found that: (1) the teacher only occasionally delivered science materials related to the Al-Qur’an, due to the lack of teacher references in this matter. This results in general knowledge, and religious knowledge is taught in schools as a life apart and not in accordance with the school's vision based on faith and piety, (2) worksheet used by students in the school, only from specific publishers that are less attractive to students, and (3) class VIII student learning outcomes, with a percentage of
completeness of 43%. Teachers are required to be more innovative in any learning activities to stimulate students' thinking skills [7].

It is necessary to develop a physics module that contains Qur'anic verses relating to vibrations and wave material to overcome this problem. When the concept of physics is associated with verses from the Qur'an, students feel attracted because they get new things that have never been obtained [8]. The idea of integration of Islam and science in learning can be a solution to instill spiritual values in students. Students are very enthusiastic about learning and become even more curious about other concepts of physics that can be linked to verses of the Qur'an [6]. The existence of verses of the Qur'an as supporting explanations of the material is expected to be able to motivate students to increase their faith, loyalty, gratitude, and understanding of the equipment described [2]. The benefit of this module is that students are encouraged to study independently using modules. Modules as learning media were created to help students and teachers achieve learning goals. The purpose of the module preparation is to motivate students to be able to learn independently so that they can make the stated learning goals, measure the level of mastery of the material, and practice honesty [9]. Previous studies have stated that physics material can be connected to Qur'anic verses [8], [9], [10]. The module integrates the effective verses of the Quran used in the learning process while also being able to train the character of students. However, there has been no research on the content of vibrations and waves. So this study aims is describing the validity, practicality, and describing the effectiveness of the Qur'an interrelation physics module and science on the material of vibration and waves.

2. Method

This research is a type of development and research. The development model used in the development of physics modules is ADDIE. The ADDIE model consists of five components or steps, namely: a) Analysis, b) Design, c) Developing, d) Implementing, and e) Evaluating. Research subjects in the development of physics modules were 21 students of class VIII, one of the state junior high schools in the city of Banjarmasin. Validation instruments include module content validation sheets, module display validation sheets, and learning achievement test validation sheets. Validation was carried out by three validators, consisting of academics and practitioners. The scores obtained are adjusted to the validation criteria [11]. The practicality of the module is measured based on the observation sheet implementing the lesson plan. The value obtained is adjusted to the practicality criteria [11]. Module effectiveness is measured using a learning achievement test. Then analyzed using N gain and adjusted for effectiveness criteria [12].

3. Results and Discussion

The development of physics modules on vibration and wave material aims to support the teaching and learning process at the junior high level. The physics module was developed with the linkages of the Qur'an and science. Natural science, especially physics, has a connection with the verses of the Qur'an, so it becomes a necessity when studying physics accompanied by the study of verses of the Qur'an that underlie it. This means that the Qur'an is a source of knowledge. Humans, when acting, behaving, and acting, must always make the Qur'an as a guide [13]. To function the Qur'an, Muslims are required to practice the Qur'an in their daily lives, in addition to knowing and understanding it. Modules are systematically designed teaching materials that are created for students to understand the learning objectives in detail better. The module contains learning objectives, learning materials, and evaluation of learning, where students can learn with their abilities [14]. From the explanation above, it can be concluded that a module is a form of teaching material that is packaged as a whole and systematically, containing everything needed in the learning process so that students can learn independently and per their abilities. Modules are used to make it easier for students to understand the material presented [15].

The module contains cover, preface, content standards including competency standards, essential competencies, indicators and learning objectives, module usage instructions, table of contents, concept maps, keywords, Qur'anic verses and translations, science info, materials, summaries, sample questions, student worksheets, competency tests, answer keys and glossary. The difference between the modules
developed and teaching materials in schools, are 1) having indicators of the relevance of the Qur’an and science, 2) each meeting has vibration and wave material integrated with Qur’anic verses, 3) student worksheets using cooperative learning methods as support in learning. The use of learning modules can be used by students independently, which causes them to have different techniques in solving problems from their knowledge [5]. The modules are arranged so that the objectives are clear, specific, and students are directed to achieving them. The novelty of the modules developed is compared with existing books, namely 1) learning objectives that integrate the Qur’an and science 2) instructions for the use of modules that are equipped with explanations to facilitate students in using the modules developed, 3) verses Al-Qur’an verses and their translations are in accordance with the concepts of physics used, 4) scientific information and scientific figures found on the module side, and 5) student worksheets that contain questions about the relationship of the Qur’an and science.

![Figure 1. Display modules that have animated concept images](image)

### 3.1. The validity of the module developed

The science module on physics material that was developed is the Qur’an and vibration interrelation modules. The module consists of cover, preface, content standards including competency standards, basic competencies, learning indicators and learning objectives, instructions for using the module, table of contents, concept maps, keywords, verses of the Qur’an along with translations, materials, science info, summaries, sample questions, student worksheets, competency tests, answer keys, glossary or glossary. The validation results can be seen in Table 1 and Table 2.

| No. | Aspect          | Average |
|-----|----------------|---------|
| 1.  | Quality contents| 3.30    |
| 2.  | Organization   | 3.50    |
| 3.  | Language       | 3.25    |
| 4.  | Evaluation     | 3.33    |
|     | Category       | Valid   |

| No. | Aspect                              | Average |
|-----|------------------------------------|---------|
| 1.  | Consistency                        | 3.44    |
| 2.  | Format                             | 3.17    |
| 3.  | Attraction                         | 3.00    |
| 4.  | The Shape and size of letters     | 3.56    |
| 5.  | Language                           | 3.00    |
|     | Category                           | Valid   |
The results of this validity show that the module developed is valid and can be used at a later stage. Modules are created to create effective learning so that they meet the requirements in doing modules, namely: format, attractiveness, organization, shape, and size of letters, the language of writing modules, and also consistency [14].

The learning process is essential. The learning process that teaches us the progress of religion and elevates human degrees. The first commandment of God to humans is learning [16]. Science as a means to develop individual attitudes and values, for example, ethical and religious values. Knowing all knowledge from science enables us to promote products, understand all phenomena, and develop science and technology [16]. So it can be interpreted as science is a science that is obtained by using scientific research methods based on the facts found.

Science serves as a method and approach in the teaching and learning process that teachers use to students. Science can also make the learning process fun, and students can be active and make their thinking creative [17].

3.2. The practicality of modules developed

The module practicality assessment is carried out with a sheet on the implementation of the lesson plan [18]. The results of the practicality of the module can be seen in Table 3.

| No. | Learning Activities | Score |
|-----|---------------------|-------|
| 1.  | First meeting       | 3.74  |
| 2.  | Second meeting      | 3.89  |
| 3.  | Third meeting       | 3.89  |
|     | Category            | Very practical |

The category is very practical because the modules developed are designed to be easy to use through scenarios created in the learning implementation plan. The lesson plan is described in detail and clearly, in order to make it easier for teachers to manage the use of the device for the teacher himself or for students, such as the use of modules and student activity sheets contained in the module with effective and efficient time.

The practicality of the module, as one of the benchmark modules developed, can be easily used in learning [13]. Modules are said to be practical if the results of the practicality assessment of the modules obtained practical categories so that it can be said that the Qur'anic interrelation physics module and the vibration and wave material science are easy to use during the learning process.

3.3. The practicality of modules developed

The effectiveness of the modules developed is reviewed from the cognitive realm of students. Modules must be effective in achieving the objectives of teaching and learning activities [19] The modules developed are also cited from various sources to supplement the students’ incomplete teaching materials and with clear, easy-to-understand instructions for using the module. The information that adds students' insights than the material in the module is integrated with verses of the Qur’an. Learning becomes more effective, interesting, and fun that can make students eager to learn this module either independently or with teacher guidance. This is reinforced by the theory of [20]. The module is used in the learning process, namely providing basic information to students, providing instructional materials for students, and also providing complementary knowledge, as well as being an effective teaching guide. From the cognitive results of students, namely pre-test scores and even post-test results can be seen the effectiveness of learning, which can determine the effectiveness of the modules that are developed [21]. The results of the effectiveness of the developed modules can be seen in table 4.
Table 4. The effectiveness of the developed modules

|       | Average pretest | Average posttest | N-gain   |
|-------|----------------|------------------|----------|
|       | 4.04           | 70.48            | 0.69     |

The results of the effectiveness of the developed module are categorized as effective and in accordance with the objectives of the study. This is in line, according to Mardayani, the development of physics teaching materials that are filled with the values of the Qur'anic verses can make student learning outcomes increase [9]. This happens because the learning process that is correlated with the Qur'an provides a contextual impression on learning so that students can easily understand the material on what is learned. This is consistent with the results of research that the use of modules by integrating the verses of the Qur'an can make learning more interesting so students can easily understand the contents of the modules [15], [22]. The effectiveness of the modules developed is categorized as effective. This is because when learning activities using modules that are developed, take place active students in following the learning path that makes students understand and comprehend the material described in the module. So that the material can be conveyed thoroughly, and finally, the learning objectives in this module can be achieved properly.

4. Conclusion
The interrelated physics module of the Qur'an and science in the material of vibrations and waves are suitable for use in the learning process. With data that supports, namely (a) the module validity with the validity category is valid; (b) practicality modules with practicality categories are very practical; and (c) module effectiveness in the effectiveness category is effective.

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