Development of physics module SMA/MA integrated character values based on discovery learning models with approach science process skills

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Abstract. The development of this physics module was motivated by the absence of teaching materials in schools that can support the independent learning process so that the learning process becomes ineffective. Based on the results of performance analysis, it was found that teachers had difficulties in allocating learning time because students had no preparation at home to receive lessons so that teachers should explain from the beginning the lesson that makes learning time ineffective. The low understanding of the concept of learners is also due to the absence of teaching materials in accordance with the characteristics of student, it can be seen from the low learning outcomes of student who have not reached the completeness of classical. For that reason required a learning module in accordance with the characteristics of the student. Based on the results of the analysis of the characteristics of student obtained the results that the student enjoy learning by finding the physics concept. For that reason we need an integrated module with the appropriate learning models. One of the learning models that can be used is discovery learning. With this model the student will directed to become researchers by experiments. In the process of experiment the student also trained to have the skills as a researcher. So in order to optimize the skills, the approach used must be integrated into the learning module and the approach that can be used is the approach of science process skills. The use of instructional materials at school must be integrated with character education as stated by the curriculum 2013. For that purpose, this study aims to develop a physics module integrated character values based discovery learning models with approach science process skills with a valid and practical and effective category in improving the competence of students. The type of this research was research and development using Plomp model consisting of preliminary research, prototyping phase, and assessment phase. The instrument of this research consisted of analysis, validation, and practicalities sheets, essay tests, attitudes and skills observation sheets. Data were analyzed using descriptive percentages. The results showed that Physic’s Module SMA/MA Integrated Character Values Based Discover Learning Models with Approach Science Process Skills are valid with value (85,3%), very practical according to the teachers (92.25%), very practical according to the students (87.33%), and effective in enhancing the competence of student includes competency attitude (87.79%), the competence of knowledge (92%) and competence skills (87.68%).

1. Introduction

The vision of national education as stipulated in Law Number 20 of 2003 that the national education function to develop the ability and form the character and civilization of a dignified nation in order to educate the nation's life. The goal is to develop the potential of student to become human beings who are faithful and devoted to God Almighty, having a noble character, healthy, knowledgeable, capable,
creative, independent, and become a democratic and responsible citizen. The formulation of the national education objective becomes a reference for the development of education in Indonesia to increase the achievement of graduate competence as well as character formation. In the process of its formation it certainly can not be separated from character education.

Character education aims to develop the potential of student to become human beings who believe and piety to God Almighty, have a noble character, healthy, knowledgeable, capable, creative, independent, and become citizens of a democratic and responsible (Sisdiknas, 2003). Character education is an education of values, character, morals and character that aims to develop the ability of learners in making good decisions bad, maintain what is good and realize the goodness in daily life with a vengeance (Depdiknas, 2011: 1). With the Curriculum 2013 based on competence as well as character-based, students are expected to be able to increase knowledge and can explore the values of goodness that exist in self-learners so that can be realized in everyday life.

The Government has made various efforts and efforts to realize human resources that have character values. One of the government's efforts is the development of curriculum 2013 which is held to form the character, build knowledge, attitudes and habits to produce the next generation of believers, productive, creative, innovative, and affective and able to contribute to the life of society, nation, state, and world civilization.

The application of character values can be integrated through the material and the learning process one of them is on the subject of physics. According to the Curriculum 2013 the objectives of Physics High School are as (1) enhancement of the faith of the students, (2) showing scientific behavior, (3) appreciating the work of individuals and groups in daily activities as a form of implementation of conducting experiments and reporting experimental results, (4) fostering a scientific attitude, (5) developing experiences to use scientific methods in formulating problems, submitting and testing hypotheses through experiments, designing and assembling experimental instruments, collecting, processing and interpreting data, and communicating experimental results both verbally and in writing, (6) develops reasoning ability in thinking of inductive and deductive analysis using physics concepts and principles to explain natural events and solve problems both qualitatively and quantitatively, (7) to master the concepts and principles of physics and have the skills to develop knowledge, as a provision for mela nj education at higher levels and develop science and technology.

The goal of physics learning can be achieved maximally when supported by teaching materials in accordance with the character of learners as well as in accordance with the principles of Curriculum 2013. Teaching materials are an important part in the implementation of learning. Through teacher teaching materials will be easier in implementing learning and learners will be more helpful and easy in learning [1]. Quality teaching materials are teaching materials whose material can answer the problems of learners to achieve the purpose of learning means to provide knowledge, skills and attitudes that must be learned learners to achieve a predetermined standard of competence. Among the teaching materials that can be used to achieve the learning objectives of teaching materials in the form of modules.

According to Depdiknas (2008), the module is a teaching material that contains materials, methods, limitations, and how to evaluate systematically designed and interesting to achieve the expected competence. The use of modules in learning helps learners to explore their knowledge through problems in everyday life so that the mindset of learners will be more developed. A good learning module should be used appropriately and varied, such as to improve motivation, passion and develop the ability to interact directly with the environment. According Purwanto, et al (2007: 10), the selection of learning module aims to learners can master the competence demanded by the learning activities that followed and can provide learning instructions for learners during independent learning activities. [2]

The result of performance analysis on teacher identification aspect and interview with physics teacher at MAN 2 Koto Baru Solok found the result that the teacher had difficulties in the allocation of time ie the allocation of time provided sometimes not sufficient to deliver the existing learning materials. This is because students do not prepare before learning begins, so teachers spend a lot of time to convey learning information to learners. The results of the analysis of facilities and supporting facilities also explained that the teaching materials available in the library is not sufficient for the
needs of each learner. The available teaching material is only a textbook with material that is difficult for the learners to understand in a limited number.

Based on the results of questionnaires, the analysis of learners on the attitude aspect shows that the low results of curiosity indicators, collaboration, discipline, responsibility and communicative learners that should be all important to build the character of learners. This is because the teaching materials used have not implanted the character values in them. Moreover learners tend not to learn the material to be learned at the next meeting at home. This is because learners do not have teaching materials to be able to learn independently so that learners are not ready to receive learning and teachers must first explain the material learned that makes the learning time becomes ineffective. Students 'unpreparedness in accepting learning indirectly also affects students' physics learning outcomes. Based on the observation, it is known that there are still many students who have not reached the Minimum Exhaustiveness Criteria (KKM) as shown in the table 1.

Table 1. Percentage Completion of Odd Semester Examination Physics X Class MIA MAN 2 Koto Baru Solok at 2017/2018

| Class X | Student | KKM | Physics | Pass | Quantity | KKM |
|---------|---------|-----|---------|------|----------|-----|
|         |         |     |         |      |          |     |
| MIA1    | 25      | 80  | Physics | 7    | 28.0     | 18  |
| MIA2    | 28      | 80  |         | 8    | 28.5     | 20  |
| MIA3    | 31      | 80  | Not Pass| 10   | 32.2     | 26  |

Based on Table 1 it can be seen that the achievement of students' learning outcomes is still relatively low, not one of the three classes that achieved 50% classical completeness. In class X MIA1 only 7 people from 25 students who reach KKM, in class X MIA2 only 8 people from 28 students who reach KKM, and in class XI MIA3 only 10 people from 31 learners reaching KKM. Therefore, the creativity of teachers is needed here to facilitate learners with learning resources that can support the learners' self-learning, so that learners can prepare from home.

Based on the results of the needs analysis found that schools have not used a learning module that can support independent learning of learners, so that learners can not prepare from home. In school learning only use LKS sold in the market and conventional textbooks contained in the library and the amount is very limited. So it is necessary for educators to design a module that fits the characteristics of the learner as an independent teaching material.

In designing a module not only analyzes the characteristics of learners but also needs to be based on analyzed material being studied. It aims to find a method or model of learning in accordance with the material to be studied. Based on the material analysis obtained that on the material of straight motion and circular motion there are facts, concepts and principles that require more understanding. This material also contains the types of procedures to be performed for the achievement of indicators of achievement of competence and learning objectives. However, learners still have difficulties in understanding the concepts and remembering the lesson material that has been learned and difficulty to focus on during the learning process as seen in the results of the analysis of learning difficulties. This is because teaching materials that do not support to maximize the understanding of learners' concepts and help learners focus on the learning process takes place.

Moreover, based on the analysis of learning models found the result that teachers also rarely use learning models that provide conceptual understanding to learners. Understanding the concept can be done by optimizing the liveliness of learners in the learning process that is by way of learners find themselves the concept of physics learned. For that required the appropriate learning model and able to direct learners in constructing their own knowledge in finding physics concepts studied to be more trace and durable in the memory of learners. Then the learning model that can be applied is discovery learning model.
The discovery learning model is a learning model that allows the learner to become a problem solver, a scientist, and an expert. Through the steps of this model learners will be able to master, apply, and find things that are useful in the material. Balim (2009) states that the application of discovery learning model, in which learners are active and guided by educators, can improve the success of learners. Kamel (2014) says discovery learning helps to recruit activities in which learners learn for themselves and apply what they know in new situations so as to create effective learning.

The discovery learning model is also translated into modules. Through this module based discovery learning model, students are expected to be able to improve the scientific and inductive with the scientific method. But to improve the side of the need an approach in the learning process that can optimize this discovery learning model. Based on the results of knowledge and skills analysis found that learners rarely perform activities such as observing, asking questions, searching the literature, processing data, preparing hypotheses, experimenting, and presenting the results of experiments because teachers do not approach the appropriate. This needs to be done to improve the scientific side of the learners. For that we need an approach in learning that can solve all these problems. One approach that can be used is to use the scheme of science process approach.

The approach to science process skills is an approach that focuses on active and creative student involvement in the learning process (Conny, 1992). Scientific process skills are a set of skills that scientists use in conducting scientific investigations [3]. According to Rustaman (2005), science process skills need to be developed through direct experiences as learning experiences. Through direct experience one can better appreciate the process or activities that are being done. By using the approach of science process skills are expected to improve and improve the scientific side and skills aspects of learners.[4]

In accordance with the above description, it is necessary a physics learning module that integrates discovery learning-based character values with the approach of science process skills so that later can develop the character behavior of learners. With this module is expected to stimulate the learner's activity. Activity learners are trained with research activities in learning to find the right solution in problem solving. Research activities on the subject of physics is very potential to develop the character of learners, especially related to the values, attitudes, and positive habits that can be integrated learners while doing research. Therefore, the authors are interested in conducting research with the title Development of Physics Learning Module SMA / MA Integrated Values Character Based Discovery Learning Model with approach Skills Process Science In Material Physics Class X.

2. Research Method
The type of research conducted is research and development (Research and Development). The development of this module follows the development procedures put forward by Plomp. So this study using a model developed by Plomp is a general model, in other words can be used for the development of learning models and for modules. The development steps proposed by Plomp (2013: 19) include preliminary research, development or prototyping phase, and assessment phase. In the preliminary research step, needs analysis, context analysis, literature review, conceptual or theoretical framework for research are developed. Further development or prototyping phase, cyclical and sequential design process in the form of a more macro research process and use formative evaluation to improve and improve the intervention model. The third step, the assessment phase, is done semi-summative evaluation to conclude whether the solution or intervention is in accordance with the desired and proposed development recommendations [5].

3. Result and Discussion
This process is based on the Plomp development model consisting of 3 steps including preliminary research, development or prototyping phase, and assessment phase. Trials were conducted on the students of class X MIA 1 MAN 2 Koto Baru Solok. After collecting research data, the results of data collection are described. The results of module validation is shown in table 2 and results of student’s outcomes as shown in table 3.
Table 2. Results of Module Validation

| No. | Validator   | Validation’s Value | Criteria       |
|-----|-------------|--------------------|----------------|
| 1   | Validator 1 |                    |                |
| 2   | Validator 3 | 88.83%             | Very Valid     |
| 3   | Validator 3 |                    |                |

Table 3. Results of Student Outcomes

| Meeting | Lowest Value | Highest Value | Individual Pass | Classical Pass (%) |
|---------|--------------|---------------|-----------------|--------------------|
| Fisrt   | 58           | 90            |                 |                    |
| Second  | 50           | 87            | 23              | 92 %               |
| Third   | 80           | 100           |                 |                    |

4. Conclusion
Based on the validation and result of student outcome the average of total value was 88.83 on very valid criteria. It can be concluded that the Physics Learning Module SMA / MA Integrated Values Character Based Discovery Learning Model with approach Skills Process Science In Material Physics Class X was valid. And based on result of student outcomes the classical pass was 92% and thats mean Physics Learning Module SMA / MA Integrated Values Character Based Discovery Learning Model with approach Skills Process Science In Material Physics Class X was effective to increase the student values. As the result, it is suggested that the module of this research can be made as consideration of lecturers in developing learning module to improve learning outcomes, students’ comprehension and students’ ability in solving problem.

5. References
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