

Preliminary Study In The Learning Book Development Using Inquiry Based Learning Model For Physics Learning Of Senior High School Class X

Esti Aprilia Usman, Asrizal

Abstract: Learning physics should be able to guide the students to identify and apply the principles they learned. The fact found in the field reveals that learning physics isn't optimal and students' comprehension of learning is still weak. This has an effect on competency achievement that is not related to the demands of the 2013 curriculum. The learning resources available are not suitable for generating effective learning. A solution to this problem would be the use of learning resources in the form of study books in school. This research is a descriptive study. The thesis aims to describe the preliminary study of learning books production. The instruments used for the research were questionnaire sheets and interview sheets. Physics teachers and SMAN 2 Padang class X students were the research subjects. The preliminary study findings demonstrate. First, students' competencies in physics of learning are still weak. Second, the teacher does not make optimum use of learning models and approaches that involve direct student activities. The learning books available do not provide the best direction for students in creating and applying concepts. This preliminary study explains the need to create a learning book using Inquiry-based learning model for physics learning of senior high school Class X.

Index Terms: Learning Book, Inquiry Based Learning, Physics Learning

1. INTRODUCTION

Life in the 21st century requires a variety of skills that a person must possess. 21st-century skills demands can be met by implementing education that prepares students to master a variety of skills to become successful individuals. 21st Century skills can think critically and creatively in various fields of Engineering, Science, Art, and Mathematics. These four fields are driving the progress of the nation. This gives the meaning that education is an investment for the progress of the nation through sustainable development. The role of education in nation-building is to educate and develop good mindsets, skills, and personalities in Indonesian people. Undang-Undang Republik Indonesia Nomor 20 tahun 2003 concerning the National Education System Article 3 states that "National Education functions to develop and shape the character and civilization of a civilized nation in the context of educating the life of the nation, to develop the potential of students to become human who have faith and devotion to God Almighty, noble, healthy, knowledgeable, capable, creative, independent, and become citizens who are democratic and responsible" [1]. This resulted in the Indonesian government must make efforts to improve and improve the quality of the education system in Indonesia. The Government of Indonesia has made various efforts to achieve national education goals. One effort that has been made is to make changes to the curriculum, namely the enactment of the 2013 curriculum. The

2013 curriculum is a new curriculum resulting from the development and refinement of the previous curriculum, namely the Education Unit Level Curriculum (KTSP). Also, to further refine the 2013 curriculum currently in force, a revision of the 2013 curriculum was carried out again. The revised action towards the 2013 curriculum itself was carried out in 2017. The 2013 curriculum emphasizes the learning process that is centered on students. Students have the opportunity to be active in building their knowledge [2]. This is supported by the opinion of Asrizal (2017) which states that the activeness of students referred to in the 2013 curriculum demands during the learning process includes: active in observing, asking, trying, reasoning, and communicating [3]. Basically, the 2013 curriculum demands that students be able to achieve the competencies stated in the core competencies. These competencies include attitudes, knowledge, and skills acquired through the implementation of learning.

Curriculum 2013 is implemented in all sessions of school study. Physics is a subject taught at the Senior High School. In physics learning the goal is to develop aspects of the attitudes, knowledge and skills of the students. This is adjusted in the 2013 curriculum according to the Student Competency Requirements [4]. In physics, learning not only focuses on the dimensions of science but also covers the three aspects according to the 2013 Curriculum specifications. According to Asrizal (2018), it is possible to build the three dimensions of student competency in physics learning through core activities [5]. Facts found on the field indicate that the learning physics expectations are not optimum. This illustration was gathered based on the results of interviews with physics class X teachers from SMAN 2 Padang indicating that teachers are still unable to maximize the learning materials used. This is because the learning resources used in learning are restricted to the learning resources which the school has received. There

- Esti Aprilia Usman, Universitas Negeri Padang, Students of physics education post graduate program, Faculty of Mathematics and Natural Sciences. E-mail: estiapriliausman@gmail.com
- Asrizal, Universitas Negeri Padang, Lecturer of physics education post graduate program, Faculty of Mathematics and Natural Science. E-mail: asrizal@fmipa.unp.ac.id

is a need for learning resources that can improve student competency to overcome this problem of learning. A learning book is one learning resource that can be used. Learning books can be used as a learning tool to help students understand each material. The presence of learning books allows teachers to be more concentrated in directing learners through the learning process. The teacher can use the learning model, in addition to learning materials. Mangal (2009), Subramani (2017) and Asrizal (2018) claimed that the learning model could be defined as a plan that can be used to construct a topic, design learning material and integrate educator activities[6],[7],[8]. In its implementation using models, methods, and learning resources that are tailored to the characteristics of students [9]. This can be done by educators in the physics learning process by using and applying learning models that vary according to the characteristics of students. One learning model that can guide students to be actively involved in developing aspects of attitudes, knowledge, and skills one of them is the Inquiry-Based Learning (IBL) model. This model makes students active in building knowledge-based on their experience in gaining that knowledge. Real-world phenomena become a reference to attract the interest and curiosity of students related to the problem at hand. The use of IBL in learning can create more meaningful and permanent knowledge in students. Students in the IBL model are directly involved in building their knowledge by conducting experiments [10]. The IBL model consists of five phases [11]. First, the orientation phase focuses on attracting students' interest and curiosity related to the problem at hand. Learning topics are introduced based on the environment. Second, the conceptualization phase is the process of understanding the concepts of the problem to produce research questions or hypotheses to be researched based on questions. Third, the investigation phase is the investigation phase to find solutions to problems. Fourth, the conclusion phase is the phase of the conclusions about the findings of inquiry-based learning, responding to research questions or hypotheses. Fifth, the discussion phase consists of sub-phases of communication and reflection. Reflection is often more focused on inquiry-based learning processes and communication focused on the results obtained.

2. METHOD

A descriptive method is employed in this research. Descriptive research is carried out to define, analyze and describe or demonstrate a variable or a condition is [12]. This study aims to get a precise picture of a situation. The data collected is analyzed and then continues by explaining the data obtained. Physics teachers and class X students from SMAN 2 Padang, West Sumatra Province were the subjects of the study. Probability sampling was the sampling method. Sampling with this technique gives every member of the population the equal opportunity to be selected as a sample[13]. The data used in this analysis are primary data collected through questionnaires and interview sheets directly from the survey. The technique of collecting data from questionnaires uses a Likert scale. The Likert scale is used to measure a person's or group's attitudes opinions and perceptions of social. The Likert scale procedure is for evaluating the score in a distributed questionnaire on each question[14]. Respondents' responses were divided into four rating categories: 1 = less; 2 = sufficient; 3 = good; and 4 = very good. The technique used for data analysis is quantitative techniques which use descriptive statistics.

Descriptive statistics are statistics that are used to analyze data by describing data that has been collected[13]. The questionnaire results were obtained by measuring the score provided by the respondent for every indicator. In each indicator the measurement of the value uses a formula:

$$S_k = \frac{\sum x_i}{x_{\max}} \cdot 100\% \quad (1)$$

Where:

S_k : score received

X_i : score of each responder

X_{\max} : maximum score from the questionnaire for each indicator

To find out the score categories of analysis of student characteristics and the needs analysis of each component, use the provisions in Table 1.

Table 1
Categories Analysis Of Student Characteristics And Needs Analysis

No	Category	Value
1	Very good	$90 < V \leq 100$
2	Good	$75 < V \leq 90$
3	Less	$60 < V \leq 75$
4	Enough	≤ 60

3. RESULT AND DISCUSSION

In this preliminary study seeing needs analysis and student characteristics. Student characteristics can be seen from multiple indicators consisting of five indicators, each with many aspects.

3.1 Results of Needs Analysis

The needs analysis conducted includes performance analysis, graduation standard analysis, and analysis of learning difficulties. Performance analysis consists of teacher identification and completeness of facilities and infrastructure. The average results of the analysis of the performance of class X teachers from SMAN 2 Padang can be seen in Figure 1.

4. CONCLUSION

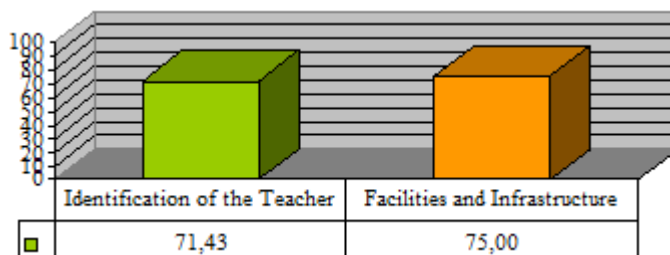


Figure 1. Result of Needs Analysis

Based on Figure 1, in general, the teachers performance has been good in preparing learning tools and by the 2013 curriculum. The 2013 curriculum aims to produce students who are productive, creative, innovative and active through strengthening attitudes, skills, and knowledge [15]. However, teachers are still difficult in implementing learning models and approaches that can activate students in learning. This indicates that the motivation of students in learning is still lacking and the learning books used are considered less

attractive. Facilities and infrastructure in schools for learning physics are good but laboratory activities are not optimally utilized in learning. Next an analysis of graduation standards with aspects of determining attitudes about religious, social, knowledge, and skills.

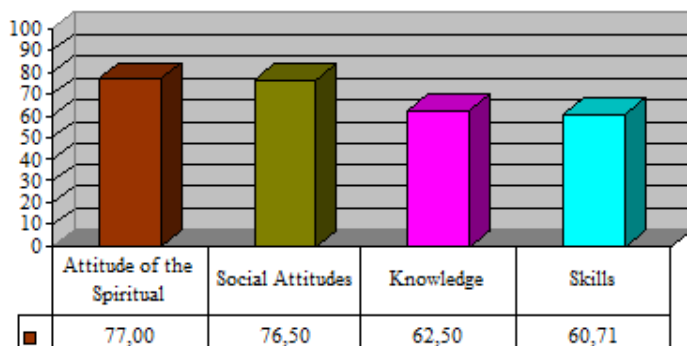


Figure 2. Results of Graduation Standard Analysis

Figure 2 indicates that elements of students' religious and social attitudes are in the good category. Students are well-behaved by their religion's teachings, are engaged in social events, respect diversity and engage in the school. But for knowledge, students are still in the low category. Generally, there is still a lack of conceptual understanding, concepts, and formal comprehension of learning material by the students and difficulties in solving learning problems. The students' skills in the laboratory are still not optimal because learning activities in the laboratory are rarely carried out so that students' understanding of learning is still low. This can be improved if the teacher uses the IBL learning model that can involve students' direct activities to build their knowledge by conducting experiments and can improve students' understanding in line with the opinions of Bayram [10] and Simsek [16]. After that, analysis of learning difficulties with aspects of the assessment of learning resources, learning models, and learning approaches. The results of the analysis of learning difficulties can be seen in Figure 3.

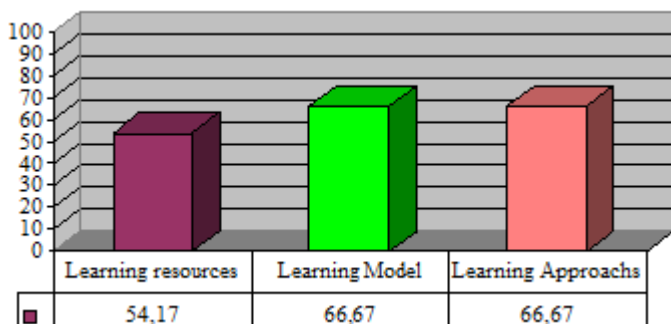


Figure 3. Results of Learning Difficulties

In general, Figure 3 illustrates the learning resources available in schools that have not made it easier for students to understand physics to build their knowledge. After that, the learning model is generally by the recommendations of the 2013 curriculum, but its implementation in the learning process is not optimal. The approach used in learning is a student center, but its implementation often experiences obstacles such as the difficulty of students conducting investigations to solve problems. This causes learning to tend to focus on the teacher in providing knowledge. The direct experience of

students in building their knowledge is lacking so that learning becomes less meaningful.

3.2. Student Analysis Results

The student questionnaire consists of six indicators, namely interest, motivation to learn, learning styles, attitudes, knowledge, and skills. The results of student analysis can be seen in Figure 4.

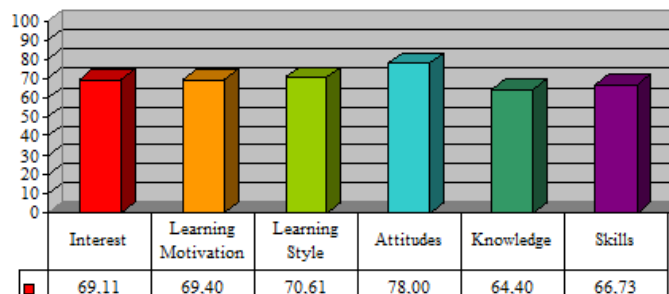


Figure 4. Result of Student Analysis

Based on Figure 4 the following information is obtained. First, students interest and motivation towards learning physics are still lacking. Students are generally already interested and try to be actively involved in participating in learning. The obstacle faced by students is the difficulty in finding solutions in solving problems or assignments given in the learning process. The IBL model influences students' motivation in learning and scientific process skills [16]. Second, the learning style that is preferred by students is to remember the physics of what is seen, this suggests that students belong to the visual learning style. Students can better understand physics with the pictures, text and physics material. Third, spiritual attitude and students are already good. Fourth, students' knowledge is still lacking. The reason is students find it difficult to understand physical material and it is difficult to explain the material again. Learning is not optimal in facilitating students to build their knowledge through direct activities. Fifth, during practicum activities students do not fully understand the steps of the practicum and are less motivated to carry it out.

4. CONCLUSION

Based on the results and discussion in this study it can be concluded that the needs analysis consisting of performance analysis, graduation standard analysis and analysis of learning difficulties shows that knowledge, skills and learning resources are still low. In addition, the analysis of students showed that the attitude towards learning is good, students' knowledge and skills are still low. The teaching materials used have not been able to improve students' knowledge and learning skills and have not encouraged students to find their own knowledge. So the solution of this problem is that one of the efforts that can be done to overcome this is developing Learning books for the development of teaching materials using the inquiry learning model with physics learning in senior high school in class X

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