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Preliminary studies to develop the instructional media in work and energy used ICT based-on contextual learning for senior high school

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Abstract. Physics learning in schools should be applied in a scientific activity. The learning also use instructional media which is appropriate so that can be improve competence of students with intact. The purpose of this study was to develop instructional media based Contextual Teaching and Learning and exercising students competence to problem solving on senior high school class X in work and energy topic. Implementation of physics learning to have not been as expected. Students of Senior High Schools have not been used instructional media which is appropriate with scientific activities, contextual, and support by ICT. The type of research used in this study is Research and Development. The preliminary study was conduct. The research data collected where questionnaire sheet physics learning. There are two result from this study. First, the implementation scientific activities have not been appropriate with the average value of the scientific activities of 52%. Second, the available instructional media have not yet fully meet the needs of adequate with the average value of the needs media of 65%.

1. Introduction

In today's era of globalization, the mastery of competencies is very important. Mastery of competencies needed in the era of globalization can be done through school, community and family education. In this case, school education has a great responsibility in shaping the required competencies, without high and adequate competence in global life, one will find it difficult to adapt to its environment. Every person is required to have the power to form these competencies, with the ability to form the competence that humans can adapt well in the era of globalization.

The 21 century education now advances in technology and human resources is growing very rapidly. Countries in the world continue to race to win the country in various aspects, such as advances in technology, natural resources, human resources and so forth. One of the tough competition in the current era of globalization between countries is the progress in the field of education. Where progress in the field of education is one of the containers in increasing the mastery of competence.

Education is essentially a process to form a whole person in order to be able to develop all the potential that is in them. For a nation education is needed to prepare young people who have the ability, personality, and skills according to the demands and development of the times. Thus, it can be said to advance a nation then it must begin by improving the quality of education.

Various efforts have been made by the government to improve the quality of human resources and competence for the improvement of education quality. Efforts are made to improve the quality of

education such as the improvement of Competency-Based Curriculum to Curriculum Level of Education Unit until now become Curriculum 2013, conducting training for teachers such as conducting PLPG training that discusses the rational need of Physics for high school students.

Physics is one branch of natural science that studies about the symptoms or behavior that occurs in the universe, and is a science that was born and developed through the steps of observation, problem formulation, hypothesis preparation, hypothesis testing through experiments, drawing conclusions, and the discovery a theory or concept. Physics deals with various events occurring in nature, whether naturally occurring or due to human engineering. It can be said that the subject of physics studies is inherent in the context of everyday life and technology. Physical knowledge builds on the results of physicist investigations, drawing on existing knowledge, empirical data, mathematical and statistical studies, and technology use.

So physics is the scientific work of physicists. Therefore, physics has three characteristics, namely scientific, contextual, and evolving along with technological advances. Physical learning must go on like a working physicist. In other words, the study of physics should be a miniature scientific investigation. Learning with a scientific approach is also a curriculum mandate that is currently applicable to secondary school level throughout Indonesia.

It takes media and teaching materials that facilitate and motivate students in physics learning. Contextual based learning media with scientific activities will be effective and interesting when using ICT. Observations have been conducted in eight schools in West Sumatra to find out whether the implementation of scientific activities in physics learning at high school runs in accordance with the demands of the 2013 curriculum and whether media and teaching materials are available in accordance with the needs of physics learning. The results show that the implementation of scientific activities demanded by the 2013 curriculum has not been implemented optimally with an average score of 52% and the availability of instructional media has not fully received sufficient fulfillment facilities. From the result of filling the questionnaire sheet by physic's teacher in eight SMA obtained 65% data. The media and teaching materials used in high school physics learning to do not currently use ICT optimally. One of the lesson material that has not been supported by media and teaching materials using ICT is work and energy.

2. Research Method

The type of this research is qualitative descriptive research conducted in June and July 2018. Data collection techniques used in the form of sheet questionnaire analysis of high school physics learning that contains the implementation of scientific activities in the learning of physics and available media, resources and teaching materials for high school physics to physic teachers class X, XI and XII. Samples were taken from sheet questionnaires in eight SMA in West Sumatera, consisting of SMA N 6 Padang, SMA N 1 Lembah Gumanti, SMA N 1 Lubuk Alung, SMA N 2 Bukit Tinggi, SMA N 1 X Koto, SMA N 1 Lubuk Basung, SMA Pembangunan Laboratorium UNP, SMA N 1 Gunung Talang. Data were analyzed using descriptive qualitative from percentage of questionnaire given to physics teacher divided by 100% weighted score.

3. Results and Discussion

3.1 Results

Media needs analysis was conducted to physic teachers in several schools in West Sumatra. Media analysis given to physics subject teachers contains about the implementation of scientific activities of every basic competence of physics learning and media, resources and teaching materials related to the scientific activities of every basic competence in class X, XI and XII.

The results of media need analysis conducted in eight schools in West Sumatra indicate that in general schools have provided internet facilities that can be used by teachers and students in learning. In these schools have also implemented the 2013 curriculum in learning. Learners are also good

enough in information and communication technology. Teachers in schools are generally certified as professional teachers and most of these schools have computer labs.

From the results of the sheet questionnaire analysis, obtained several problems. First, the implementation of scientific activities in the process of physics learning has not been done optimally. Where the percentage obtained from the activities of scientific activity on the learning of physics is 52%. Secondly, the availability of media, resources, and teaching materials that have not fully received adequate facilities to meet the needs. Where the results of filling sheet questionnaire by physic's teacher class X, XI and XII in eight SMA obtained data 65%.

3.2 Discussion

To achieve the objectives of learning, it takes several aspects, including teachers, students, learning models, learning strategies, learning media, learning resources, teaching materials etc. In accordance with the development of science and technology on globalization's era now need a continuous renewal in using ICT-based learning media to improve student motivation in learning. ICT-based physics learning can make learners more motivated in learning and give a positive effect. Students are invited to directly connect the learning of physics interactively in the learning process. This makes learning more active and motivates learners to enhance students' full competence in Physics learning. The intact competence formed in the students will be very useful to face various problems in the world of work and in adapting to the surrounding environment.

In this discussion will be explained the results obtained from the analysis of questionnaires conducted by physics teachers in eight schools in West Sumatra, and the constraints and limitations encountered, as well as several alternative solutions to overcome these constraints and limitations. Based on the results of the analysis of scientific activities that must be done in the process of physics learning based on basic competencies in the 2013 curriculum has not been implemented optimally. This is due to some damage to the supporting tools of the implementation of such scientific activities. In addition to damage, scientific activities cannot be done properly because the supporting tools are not yet available in schools.

The results of media availability, source, and resource analysis also show low numbers. This is because some learning media are not available in schools and some tools available are damaged. Physics is one of the learning that is carried out contextually. To support the learning of physics in a contextual, learning requires the use of ICT in learning. The author will develop learning media and physics teaching materials using ICT based on contextual learning.

4. Conclusion

Based on preliminary studies that have been done, it is found that the implementation of scientific activities in physics learning is not optimally implemented in schools and the availability of insufficient media, resources, and teaching materials. Therefore, it is necessary to develop of instructional media contextual used ICT based on contextual learning.

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