The Development of Physics Learning Media using *Lectora* Software to Increase Competencies of The Students of SMKN 1 Padang

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Abstract

The use of computer-based instructional media at Vocational High School (SMKN) 1 Padang is still limited to a media presentation using power point. Along with the advancement of information and communication technology (ICT), a lot of software that can be used to create interactive learning media. One innovation that can be done is to use computer-based instructional media with Lectora software. The results of the preliminary survey of the implementation of learning physics at SMKN 1 Padang shows that there are no teachers who use interactive learning media with Lectora software. ICT facilities and infrastructure such as computers, LCD projectors, and internet at SMKN 1 Padang existing one, but have not used optimally. Learning media is one important factor in improving student learning outcomes. The selection of learning media in accordance with the needs and characteristics of students can help students understand the subject matter. This research aims to produce an interactive learning media that valid, practical, and effective to help students to master the subject of Physics. The approach used in this study is research and development by using 4D models of Thiagarajan. Data collection instruments is validation sheet of learning media, observation sheets and practicality questionnaires of learning media, achievement test to determine the effectiveness of learning media. The results showed that the developed interactive learning media that includes in valid categories, based on expert judgment. Practicality of interactive learning media includes a practical categories based on the observation and responses of teachers and students. The effectiveness of interactive learning media includes in effectively categories, based on learning outcomes of students who achieve mastery as much as 87 % and the increased the student's competence of physics were high categories.

Key words: interactive learning media, Lectora software, students' competence.

INTRODUCTION

Development of information and communication technology very quickly have influenced the world of education. Basically education is a process of communication and information from educators to students containing educational information, which has elements of educators as a source of information, media as a means of presenting ideas, ideas, and the subject matter, as well as learners themselves (Oetomo , 2004). Teachers can obtain a variety of information needed to meet the needs of the learning materials on-line. Text, photos, videos, animations, and simulations are some examples of teaching materials and media available on the sites of learning. By taking advantage of the media, educators can present concepts or subject matter in different ways or methods to make students understand a concept. Internet technology makes it easy for learners to obtain information in order to meet the demands competence in learning and enrichment. Thus the development of information and communication technology has the potential to improve the quality of learning.

Expected learning paradigm has shifted from teacher centered into student centered. The learning process is centered on the teacher is not relevant with the rapid development of information and communication technology. Teacher s should provide opportunities for students to conduct exploration by utilizing information and communication technology.

Physics courses at the Vocational School (SMK) is an adaptive subjects, which serves as a support for productive subjects. Students was expected to master the concepts of physics and be able to apply them into productive subjects. The adaptive course serves to students in order to have the basic knowledge to be able to adapt to developments in science and technology (Dit Dikmenjur, 2004). The adaptive courses more focused on providing opportunities for students to master basic concepts and principles of the course so that they can apply them to the technology and life.

According to interviews with teachers of physics at SMKN 1 Padang shows that the learning of physics is carried out using the lectures methods, discussions, and assign tasks to students. Students are less motivated to find a concept that they have learned. This resulted in many students' learning outcomes that have not reached the minimum completeness criteria (KKM). Lectures method with a power point presentation was used because of limited time in learning.

Many factors lead to low learning outcomes of students, among others, low levels of intelligence, lack of motivation to learn, the less effective way of learning, the lack of frequency and amount of learning time, low levels of self-discipline, instructional media or teaching materials are lacking. To achieve a satisfactory learning outcomes required of the efforts supported by technological developments. Multimedia technology has changed the way students learn and acquire information. Multimedia technology also provides an opportunity for teachers to develop teaching methods so as to obtain maximum results. Similarly, for students, with multimedia expected them easier to absorb information quickly and efficiently. Source of information is not focused on the textbook.

To improve students' competency in mastering the concepts of physics, one model of learning that can be used is a computer-assisted instruction with lectora software. Lectora is a form of programming that is used to record all activity on a monitor and can also be inserted sound (TechSmith, 2006). Output the lectora program can be a video avi extension. Instructional media in the form of power point, macromedia flash, video, and audio is packaged in lectora software. Cepi (2003) stated the advantages of instructional media are packaged in the form of software is that students can study independently, does not have to depend on the teachers. Students can start learning at any time and may terminate in accordance with his wishes.

Computer Assisted Instruction (CAI) is a method of learning that provides learning materials with the computer. CAI can assist teachers in the teaching process. According to Arsyad (2002) implementation of the CAI can be a instructional media or instructional design that is integrated with a computer, such as e-learning, learning with interactive media, and web-based learning.

Based on physics learning conditions that described, efforts to implement the teaching of physics that can enhance students' mastery of physics concepts. CAI of physics with a lectora software expected to improve students' competency in mastering the concepts of physics. In this regard then formulated the research problem: How to develop a instructional media of physics with lectora software that can enhance students' competency in mastering the concepts of physics? The research objective was to develop a medium of learning physics with lectora

software that can improve students' competence. We hope this research can be useful to improve the quality of teaching physics at SMK.

METHOD

This study uses the methods of research and development which refers to the four D models of Thiagarajan, with four stages, namely: (1) define, (2) design, (3) development of instructional media, (4) deseminate the instructional media. Activities at the planning stage is to make instructional media the lectora software and develop research instruments. Activities in the development stage is to validate the instructional media and research instruments, try out instructional media and research instruments. Activities in the implementation stage is to provide pre-test, implement the CAI with lectora software, provide post-test, analyze data and interpret the results obtained.

The research instruments namely; observation sheet, validation sheet, test, and the questionnaire. Test results of physics concept mastery were analyzed to determine the students' competence of physics. Improve students' competency in mastering the concepts of physics were analyzed by calculating the average of normalized gain score (NG) of the pre-test and post-test scores. Data teacher and students' responses to instructional media were analyzed by comparing the average score of the category scores.

RESULTS AND DISCUSSION

Instructional Media with Lectora Software

Instructional media created with lectora software is packaged in a compact disk (CD) begins with the appearance of the standards of competence, basic competence, indicator (Figure 1) is continued up to material descriptions, and evaluations (Figure 2,3,4).
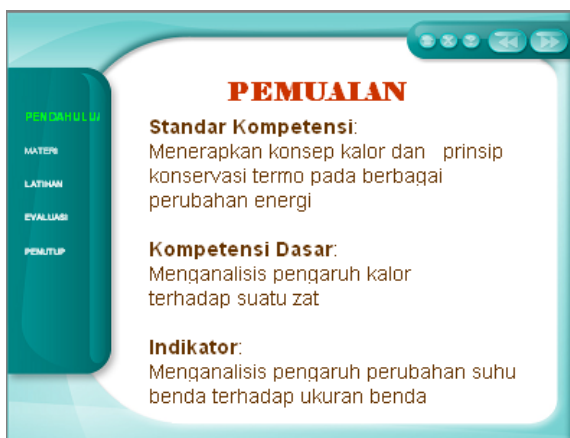

Figure 1. Competence   Figure 2. Material Descriptions
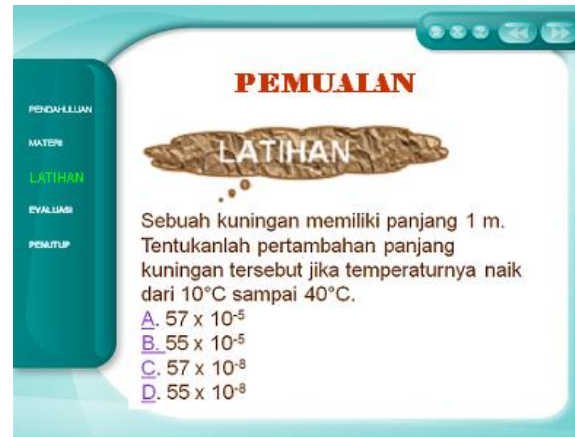
Figure 3. Material Descriptions   Figure 4. Evaluations

Validity of the Instructional Media with Lectora Software

Instructional media with lectora software which has been validated by two media experts and three physics teachers. The results of the validation instructional media with lectora software show that the instructional media have been very valid, the assessment percentage 90.7% (Table 1). Assessment includes three criteria, namely: didactic requirements, construction requirements, and technical terms.

Table 1. Results Validity of Instructional media

Criteria	Experts Judgment				
	HM	YL	IF	YF	FF
Didactic requirements	21	19	24	24	23
Construction requirements	41	45	54	55	51
Technical terms	29	25	29	30	29
The number of values	91	89	107	109	103
Percentage of value	83%	81%	97%	99%	94%

Practicability of the Instructional Media with Lectora Software

Practicability of instructional media obtained from the questionnaire of teachers and students. There are four aspects of practicality that is stated in the questionnaire; easy to operate a instructional media, easy to understand the physics' concepts, easy to use time allocation, and equivalence with the teaching materials. The average response was 95% of teachers and students is 85.5%. Teacher and student responses categorized as very practical.

Effectiveness of the Instructional Media with Software Lectora

Effectiveness of instructional media in improving students ' competence in terms of: (1) the mastery of learning, (2) increase of students' competence, (3) the students' responses of instructional media.

1) The Mastery of Learning

The results of data analysis of students' mastery of physics concept demonstrate that every student has reached minimum mastery criterion (70). All of students have reached the minimum mastery criterion.

2) Increase of Students' Competence

Improvement of students' competence can be determined by calculating the average normalized gain score (NG) of the pre-test and post-test scores. The average of pre-test is 62.33 and the average of post-test is 73.44. Data analysis of pre-test and post-test scores show that, average score NG is 0.65 (including enough category).

3) The Students' Responses of Instructional Media

The data analyzes results of students' responses of instructional media showed that the average score of responses by 78 with a standard deviation of 4.97 and include good categories. Score category of students' responses based on the ideal average score and the ideal standard deviation.

Based on the results of data analysis can be shown that: (1) all of students have reached the minimum mastery criterion, (2) increase of students' competence is enough category, (3) most students assume that the instructional media of physics including good categories. Thus we can conclude that learning by using lectora media effectively to improve students' competence. The study's findings are consistent with research Salim (2011) concluded that constructive learning using macromedia flash effectively to improve student learning outcomes of physics. Cepi (2003) states that interactive media can be used in the teaching because it is effective to improve learning outcomes. Interactive media have the elements that include sound, animation, video, text, and graphics that affect the students' performance. The use of macromedia flash in physics teaching can improve student learning outcomes (Wahyudi, 2009).

CONCLUSION

The research results showed that the instructional media of physics with lectora software has been declared valid, practical, and effective to increase students 'competence, which in terms of: (1) the mastery of student learning, (2) increase students' competence, (3) the responses of teachers and students of instructional media. In this study it was found that; the mastery of student learning reaches 100%, increase students' competence including the enough category. Physics teachers are expected to use this instructional media in teaching physics. Further research is necessary to develop this instructional media on another matter of physics.

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