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Development of Self-Based Competency Test Application Based On Microsoft Excel To Improve Self-Efficacy of High School Students

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ABSTRACT

This study aims to analyze the computer-based Independent Competency Test (ICT) program that was developed to improve students' self-efficacy in physics subjects and to analyze the computer-based Independent Competency Test (ICT) program that was developed effectively used in increasing student self-efficacy used by participants students and teachers. This research uses the Research and Development (R&D) method which includes stages: (i) Identification of Potential and Problems; (ii) Analysis of Needs and Data Collection; (iii) System Design; (iv) System Implementation; (v) System Validation; (vi) System Revision; (vii) System Testing; and (viii) Final Systems. The subjects of this study were MAN 1 Medan students. The instrument used was testing aspects of functionality, usability, and student self-efficacy questionnaires. Based on the results of expert validation on the functionality test, it is obtained a percentage of 100% with very good criteria and has met the aspects of functionality. The results of expert validation on the usability test obtained a percentage of 93.15% with very high criteria and have met the usability aspect. Furthermore, the percentage obtained from the student questionnaire / self-efficacy questionnaire was 81% with very high criteria.

Keywords: competency test, curriculum, competency

INTRODUCTION

Physics has an important meaning in technological development. Physics concepts are used by scientists to develop technology so that it is beneficial for human welfare. Advances in communication technology especially computers have a wide impact on all aspects of human life. This progress has brought humans to a new civilization and way of life. Advances in information technology also have an impact on the world of education. Munir (2012) believes that multimedia has the potential to offer learning opportunities in new ways. The use of computers in learning can actively involve students and provide feedback on the learning process.

The use of computers in multimedia technology enables students to explore and utilize computers and the Internet as learning resources (Suminto, 2012). The development of computer technology also brings changes in the way of learning for students, because teachers are not the only source of learning for students.

Centeno and Sompong (2012) state that learners in the 21st century are strongly influenced by their ability to use various variations of information and

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communication technology. This opinion implies that the way students learn today is strongly influenced by their ability to master information technology.

One of the use of computers in the field of assessment in the world of education is known as the CBT (Computer Based Testing). CBT is defined as a series of computer-based tests or assessments, both involving computers offline or online and most questions use a multiple choice form (Jimoh, 2012). The questions presented in the written test can be converted into digital tests and accessed by students through a computer. This model is suitable for independent student competency test exercises. This model is in line with our learning habits where at the end of learning, the teacher provides contextual.

The CBT in the open model is modified by giving 'students' authority to independently test their competencies. A CBT application that adopts an open model and can be used by students to independently test competence is called the Independent Competency Test (ICT) program. The development of ICT aims to help students understand learning material through independent self-assessment. The rationale referred to is that human beings are capable of organizing and organizing themselves. Bandura (1997) states that humans can think and regulate their own behavior. Humans have the ability to think so that with that ability humans can interact and manipulate the environment.

From the ICT statement above, it is necessary to develop an ICT program because of the preliminary study results that the implementation of the competency test at the time of the examination at MAN 1 Medan school conducted by students has so far been very ineffective and inefficient. The process of student competency testing carried out to get good results quickly and accurately is not an easy thing. This is because the teacher has not innovated in making test designs. The teacher designs and processes the test results manually, so the process of processing the test results requires a relatively long time. The teacher also conducts the competency test manually without any innovation in carrying it out, such as helping students to improve their competency test. Therefore, it is not enough to do it manually, but we need a computer program to support the implementation and processing of the test results.

ICT is stated to be able to provide opportunities for students to independently test their competencies. With the choice of assistance that can be arranged by the students themselves and the choice of the level of difficulty of the questions, it is expected to be able to measure expectations in their self-efficacy in order to obtain optimal learning achievement results. The subject that is developed in ICT is physics material for Senior High School (SMA) in class X, namely Motion on a Straight Track. The choice of wife is based on several considerations.

ICT is made using the Microsoft Excel program, where students will only work on competency tests independently by using computers in the Ms. program. Excel. This program not only helps students become independent and improve students' self-efficacy in the implementation of competency tests, but also helps teachers in processing the value of student competency test results. This program has two types of programs namely teacher and student programs. Where the teacher program is used for teachers to fill in questions and answers as many as 20 questions and the cumulative results of the student competency test scores which will automatically link to the teacher program and the teacher can also directly

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print a list of students' cumulative scores. In the student program, students will be able to work on as many as 20 exam questions, biased randomly or in sequence and students can immediately see the results / test scores that he has carried out after he has completed all of the questions. This program can also benefit schools, because it can be used as school archives and can also be used by teachers in other fields of study.

According to Bandura (1997) students with strong self-efficacy, will have awareness and willingly accept challenges in assignments, and be determined to solve them (Cubillos, 2013). Four factors that affect self-efficacy according to Bandura (1997) are (1) experience of past success, (2) vicarius experience, (3) social persuation and (4) emotional state (Ekici, 2012).

Based on the understanding of the above study, the formulation of the problems raised in this study are: (a) Can the computer-based Independent Competency Test (ICT) developed improve student self-efficacy in physics? (b) Is the computer-based Independent Competency Test (ICT) developed effectively used in improving student self-efficacy in physics.

METHODS

The method used in this research is research and development. This development step was dimabil Sugiyono (2015), research and development methods are the processes or methods used to validate and develop products.

This preliminary study was carried out three stages until an initial draft of the product was obtained including: (1) a literature study, (2) a field survey and (3) preparation of a product draft. The development phase is carried out twice to test the validity and practicality of the product. Validity test is carried out by experts who are appointed and practicality testing is done by testing the products on limited respondents.

Validity test using functionality aspect analysis is done by using descriptive analysis techniques, namely analyzing the percentage of test results for each function performed by experts. The testing phase is carried out after the ICT product development result is declared valid and meets practicality. Try to use the design of the One group pretest-posttest test (Emzir, 2012: 97).

The assessment is done by (1) a preliminary study questionnaire, (2) a multimedia product validation sheet, (3) a teacher's response sheet to the use of the product and (4) a student's self-efficacy questionnaire. The data analysis techniques used are: (1) the validity of students' self-efficacy instruments using construct validity, (2) The functionality aspect uses descriptive analysis techniques and (3) the Usability aspect using a Likert scale.

RESULT & DISCUSSION

The findings in the preliminary phase are used as a basis for drafting the initial ICT products. The development steps taken are: (1) creating an ICT program with Ms. Excel, (2) makes ICT program scenarios, (3) sets out material and topics in learning to be made ICT, (6) packaging ICT into an application program that can be used on every computer.

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The initial draft of an ICT development product was tested three times to test the validity and practicality using the aspect of functionality. The result of functionality testing shows that the percentage of success is 100% (very good).

Data on the usability aspect test results obtained a percentage of 93.15%. (very high). Based on the results of usability testing, Ms. based competency test information system Excel is easily understood by the teacher and the teacher understands the symbols that are in the program. The teacher also feels helped in carrying out the competency test to see the results of student achievement and evaluate learning that has not been achieved as a follow up.

Based on the results of the questionnaire / student self-efficacy questionnaire towards Ms. based self-competency test Excel, it can be seen the percentage of student self-efficacy in the implementation of the independent competency test in writing from 40 students at 57.35% (enough). Furthermore, the results of the questionnaire / questionnaire, can be known the percentage of student self-efficacy in the implementation of computer-based independent competency tests of 40 students by 81% (very high).

Table 1 Average Percentage of Test / Assessment Results

No	Category	Persentase	Criteria
1.	Functionality	100%	Very good
2.	Teacher Usability	93,15%	Very high
3.	Efficacy Questionnaire Results Before Treatment	57,35%	Enough
4.	Results of Questionnaire Efficacy After Treatment	81%	Very high
	Average	81,87%	Good and Very High

The following are some of the reasons that can be put forward why student self-efficacy can be increased through the use of ICT. First, the use of ICT in learning can provide a good psychological impact for students. It can be understood that students are now included in the category of digital generations or also called the New Millennium Learner. As stated by Kang (2010) that the New Millennium Learner has a learning style that relies on the ability to use information and communication technology. The suitability of learning styles caused by the use of ICT makes the psychological condition of students in good condition.

Second, ICT provides opportunities for students to experience greater past success. As it is known in ICT there is a choice of questions according to the level of difficulty which is easy, moderate and difficult. Students have personal authority to choose workmanship based on the level of difficulty of the problem.

Third, problem solving in ICT becomes one of the factors that fosters student confidence. This is in accordance with the opinion of Kolb (2012) which states that strengthening self-efficacy of a student can occur if he has the ability to solve problems.

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Fourth, ICT programs encourage more vicarious experiences. Vikarius experience is an experience seeing the success of others (peers). As social beings students have a tendency to group and discuss with their friends. These social interactions that make use of ICT in learning, provide opportunities for students to see more vicarius experiences.

Fifth, ICT makes students experience real justification in social persuasion. Social persuasion is a general assumption or norm that is considered true by a community. The studies above show that student self-efficacy can be improved through certain treatments. In this study self-efficacy was enhanced through multimedia learning called ICT.

CONCLUSION

Based on the research results and discussion of the results of research on the development of Ms. competency based application development. Excel to improve the self-efficacy of high school students produces a computer-based independent competency test system. The resulting information system can serve to assist teachers in the process of carrying out the independent competency test, processing the value of the results of the independent competency test, and helping students improve students' self-efficacy of physics with the results of a questionnaire / student's self-efficacy questionnaire obtained by a percentage of 81% (very high). So the teacher can know things that must be evaluated as a follow up. Suggestions for future researchers are to add other features that can help in the process of processing student grades and validating items, such as more automatic export and import data.

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