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The Student Response to Interactive E-Modules to Support Science Literacy in Distance Learning Physics

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Abstract:- Innovative learning is needed in the realization of graduate competencies. The learning process is required to be able to construct the knowledge and skills of students. This study aims to describe student responses to e-modules that support scientific literacy in distance learning physics is developed. The sample in this study were high school students aged 13-15 years, amounting to 29 students. Retrieval of student response data using a response questionnaire. The data obtained were analyzed descriptively qualitatively. The results showed that students gave a positive response to the interactive e-module in Physics learning that had been developed. .

Keywords:- *Student Response, Interactive Module, Online Learning, Science Physics.*

I. INTRODUCTION

The Ministry of Education and Culture of the Republic of Indonesia issued circular letter number 15 of 2020 concerning Guidelines for Organizing Learning from Home in an Emergency Period for the Spread of *Corona Virus Disease (covid-19)* . This study from home policy is carried out in order to fulfill the rights of students to obtain educational services even in the midst of the *COVID-19* pandemic . During learning from home, educators, students, and parents are required to adapt to these policies. For educators, this policy is a challenge to integrate computer technology into the learning system, so that learning can be of higher quality, meaning, and fun. Quality learning is expected to produce intelligent human resources in utilizing technology and able to compete in the era of globalization.

The use of computer technology does not mean replacing the teacher's position as a teacher, but rather to help smooth teaching and learning activities, which use is adjusted to certain conditions. During face-to-face learning, most of the material can be delivered directly. But in distance learning, it is quite difficult to do, especially in physics learning that uses experiments or experiments so that it is necessary to use computer technology to overcome these difficulties.

Physics is a part of science that has a strategic role in the development of science, technology, and the environment. Physics can explain various natural phenomena that occur in life. Educational reforms and the integration of 21st century skills in physics learning need to be continued. For this reason, the government has developed a curriculum to achieve graduate competency standards in accordance with the demands of the world of work and the demands of 21st century skills. Physics teaching needs to shift to what students need to do to study science (Duchl 2008). The education system in Indonesia contained in the education curriculum also seeks to balance the demands of 21st century learning through literacy skills (Zubaidah, 2017). One form of literacy intended in the demands of 21st century learning is scientific literacy. Scientific literacy is one of the six basic literacys set by the *World Economic Forum* in 2015. According to Toharudin, Hendrawati, & Rustaman (2011) students are required to master scientific literacy to understand the environment, health, economy, and problems in society. highly dependent on technology and scientific developments. Scientific literacy is important because scientific literacy can increase knowledge and investigation of natural science, spoken and written vocabulary needed to understand science, the relationship between science, technology, and society (Hernandez, Ikpeze, & Kimaru, 2015).

Physics learning also needs to involve students actively in learning to explore information from experiences and discussions in order to improve students' understanding of the material. In physics learning there are basic concepts that students must understand well. In addition, in this material some of the problems are mathematical so that structured and systematic learning is needed.

Learning in physics subjects requires alternative learning media other than textbooks. Students cannot understand physical material well if they only use printed books. Physics subjects require learning media that must be adapted to the type of physics lesson itself. Physics is not just a collection of knowledge about objects and natural phenomena obtained from the thoughts and investigations of scientists carried out with experimental skills using the scientific method (Januarisman & Ghufron, 2016). This is in line with Sadiman et al. (2003) which says that in physics subjects there are many examples that cannot forever bring students to actual objects, objects, or events or vice versa bring objects, objects, or events to students. The teacher cannot give a direct description, the teacher needs a source to convey the example. Although the teacher can tell at length about the material being taught, the results will certainly be different if students are shown actual examples.

The use of modules as learning resources is part of the components that affect learning. Modules are teaching materials that are made to make it easier for students to

understand the subject matter. Modules can help students learn independently without or with little help from the teacher. In accordance with the benefits of the module, namely to provide opportunities for students to practice independent learning (Ali, 2018). The module needs to be adapted to the conditions of the students and the learning strategies used by the teacher. The use of modules to support learning is not only to improve the effectiveness and quality of learning, but more importantly, to improve students' mastery of the material (Satriawati, 2015).

Scientific independent learning in the classroom is a demand for the implementation of the 2013 Curriculum which must be supported by scientific independent learning media as well. One of the learning media that is widely used is the module. Learning activities in the 2013 Curriculum must also take advantage of the role of information and communication technology to improve the efficiency and effectiveness of learning (Permendikbud, 2013).

In the field study conducted is a discussion with physics subject teachers, it is known that in the learning process the teacher conveys learning materials directly with blackboard media assisted by powerpoint presentation media so that the learning process is still teacher-centered, therefore teachers have difficulty in delivering material in the form of multimedia, such as text, image, audio, video, and animation media simultaneously. In physics learning, many students have not mastered the abstract concepts of the material even though they have been taught. So that at the next meeting, it is not uncommon for the teacher to repeat the material that has been explained at the previous meeting, this will certainly hinder in achieving the expected learning objectives.

Supporting the activeness of students in the learning process and responding to challenges to build student skills, an e-physics module that contains scientific literacy can be used. Christiyoda, Widoretno, & Karyanto (2016) in their research stated that literacy-based modules improve critical thinking compared to classes that use school books. Through the use of oriented e-modules, students' critical thinking skills have increased (Suarsana & Mahayukti, 2013). The use of oriented e-modules will lead students to find problem solving independently and this will provide a concrete experience in problem solving so as to grow and train higher-order thinking skills including critical thinking skills (Widiana, 2016).

The Covid-19 constraints made physics learning not run normally so educators designed interactive e-module-based learning including developing interactive learning media. Therefore, in order to support the activeness of students in the physics learning process during the Covid-19 pandemic and answer the challenges of building 21st century skills, especially scientific literacy, e-physics modules that contain scientific literacy can be used.

II. METHOD

This research is a development research that refers to the research model design of Wademan and McKenney (Plomp, 2007) with the steps of problem identification, identification of tentative products and design principles, tentative products and theories, prototyping and assessment of preliminary products and theories, problem resolution-advancing theory. The product developed is an interactive e-module in physics learning. In this article, the focus of reporting is the response of students and teachers to the interactive e-module that has been developed.

The trial subjects of this research product were junior high school students aged 13-15 years, totaling 29 people. The research instrument is a student response questionnaire to an interactive physics learning e-module with indicators of ease of use and navigation, cognition content, knowledge space and information presentation, aesthetics, overall function, and ease of teaching.

To find out the conclusions of teacher and student responses to the developed interactive e-module. The response data obtained were analyzed descriptively qualitatively with the following equation:

$$\text{Percentage} = \frac{\text{total score}}{\text{max score}} \times 100\ \%$$

The data obtained were then consulted in Table 1 below:

Table 1. Student Response Reference

Percentage	Criteria
82% s.d 100%	Very Good
63% s.d 81%	Good
44% s.d 62%	Not Good
22% s.d 41%	Poor

III. DISCUSSION

The e-module implementation activity is carried out online due to the Covid-19 pandemic so that during the trial process of teaching and learning using learning media students are in their respective homes while teachers and researchers are at school. In addition, two applications, namely WhatsApp and Google Classroom, were also used to assist the implementation of learning. During the implementation of learning takes place, researchers help teachers to direct and guide students in using e-learning modules. Researchers also observed the ongoing learning process and provided assistance to students if there were problems accessing the learning e-module or questions regarding the procedures for working on the questions in the learning e-module.

The response questionnaire was filled out by 29 students which included benefits, efficiency, and convenience. The results of the analysis of student response questionnaires that have been analyzed can be obtained as follows:

Table 2 Results of Student Response Questionnaires

Assessment Aspect	Percentage (%)	Criteria
Ease of Use and Navigation	73	Good
Cognition Content	72	Good
Scope of Knowledge and Presentation of Information	70	Good
Aesthetics	72	Good
Overall Function	69	Good
Ease of Learning	71	Good
Average	71.16	Good

Tabel 2 is the results of the questionnaire responses of students to interactive e-modules in physics learning are in good criteria. The results of the student response questionnaire to the learning media e-module showed practical criteria with a percentage of 71% while the teacher's response to learning media also showed practical criteria with a percentage of 81%. Based on the responses from students and teachers to the learning media, it can be concluded that the interactive e-module in physics learning can be said to be good. This is in line with research showing that students' responses to physics learning e-modules with interactive e-modules received a positive response. Damayanti, Krisdiana, & Setyansah (2019) who said that if it meets the criteria of 70%, it can be concluded that the response to e-module-based learning is positive, so it meets the criteria well. This interactive e-module is also known to increase students' motivation and interest in learning. This is in accordance with the results of student responses which show that 70% of students feel motivated in learning and 69% of students find it helpful in increasing interest in learning. This is reinforced by research conducted by Sutarman (2016) which shows students have an interest in computer-based learning in physics subjects and demands motivation from within students to master the subject matter.

The results of the response questionnaire Table 2 shows that the practicality of the simple harmonic motion e-module developed is in the good category. These results indicate that the developed e-module is practically used in the learning process.

Response assessment is reviewed through aspects of benefits, aspects of efficiency, and aspects of convenience. The benefit aspect relates to the extent to which the developed e-module can facilitate students in learning. The efficiency aspect relates to the extent to which the developed e-module can streamline learning time. The ease of use aspect relates to the practicality of the e-module to increase ease of use.

The assessment of the benefit aspect contains a statement about the ease that students get while using e-modules in learning. Based on Table 2, the results of calculating the average score of students' assessments of the aspects of the benefits of e-modules are in the good category. Most students find it helpful in learning by using this e-module. The use of this e-module makes students more motivated to learn and makes the atmosphere in the learning process not boring. This is because the e-module is equipped with some additional information related to physics. This is in line with the opinion of Saputra and Purnama (2012) that in a more innovative and interactive learning system, teachers will always be required to be creative and innovative in finding learning breakthroughs that are able to combine text, images, audio, music, animated images or videos in a single unit. that support each other in order to achieve learning objectives are able to create a sense of pleasure during the teaching and learning process. This will increase the motivation of students during the learning process to obtain maximum learning objectives. So that after using this e-module, students can solve physics problems completely and systematically with the stages of problem solving.

The evaluation of the efficiency aspect contains a statement regarding how efficient the use of e-modules is with learning time. Based on the results of the calculations in Table 4.2, the average score for the efficiency aspect is still in the quite practical category. This shows that this e-module is quite efficient to use in learning. The assessment of the convenience aspect contains a statement regarding the content of the e-module that makes it easier for students to use it. Based on the results of the calculations in Table 2, the average score for the assessment of the convenience aspect is in the good category. This developed e-module uses language, words, sentences, and paragraphs that make it easier for students to understand the content of the material. The size and type of font used also does not make it difficult for students to use this e-module. This e-module is also equipped with media that can make it easier for students to understand the learning material. E-modules are presented in web format making it easier for students to access them anytime and anywhere. This is in line with research conducted by Shah, Suhailiezana, Kob, and Khairudin (2019) that the use of *Mobile Learning* has had a tremendous impact on the learning process. Advances in mobile device technology have enabled schools and students to learn and obtain information flexibly regardless of time and location constraints.

Based on the results of the calculations in Table 2, it shows that overall the developed e-modules are included in the good category and can be used in learning. This is in accordance with the results of research by Ulandari, Wahyuni, and Bachtiar (2018) that based on the data from the student response questionnaires from the indicators of ease, use of time, and attractiveness, it shows that the category of practicality of the module developed is very practical and can be used in the learning process. learning. E-modules can be said to have high practicality if the product is practical, easy to understand in the implementation of learning (Widoyoko, 2016).

IV. CONCLUSION

Based on the results of the research and discussion, it can be concluded that learning physics using interactive e-modules has met the good criteria.

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