SETS-Based Electronic Module Innovation: Analysis of Students Responses on Waves and Sound Materials

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Abstract: Technological evolution had a big impact on the world of education, one of them is the progress of teaching materials used in learning. The electronic module (e-Module) is one of the teaching stuff evolution using technological assistance. Electronic modules require innovation in order to have appeal by being integrated into the SETS (Science, Environment, Technology, and Society) learning model. The research aims to describe students responses to the developed electronic module. The research method used is descriptive quantitative research method with the aim of analysis of students responses to the SETS-based e-Module innovation. The response test subjects consisted of 61 students of class VIII C and VIII D of SMP Negeri 2 Depok. The research results of the developed SETS (Science, Environment, Technology, and Society)-based electronic module obtained an average student response test score of 75.16% in the very good category which indicates that the developed electronic module obtained a very good response from students.

Keywords: Electronic Module; SETS; Response Students

Introduction

The evolution of information technology has contributed greatly to the learning process. One of the impacts of the evolution of information technology is the growing development of varied and innovative teaching materials for learning. If teaching materials tend to be monotonous and not interactive, students will become bored and not motivated to learn. Good teaching materials must be able to improve students cognitive, affective, and psychomotor abilities. Good teaching stuff can provide students with a broad understanding of the concepts of material to be presented and their application (Tamimiya, Ghani, Putra, 2017). In terms of cost, printed teaching stuff are more expensive than electronic teaching materials. In terms of the effectiveness of its use, electronic teaching stuff are easier to access anywhere and anytime by students.

The module is an example of developing teaching stuff. Learning modules are structured based on module development principles, including necessary analysis, module design cultivation, implementation, valuation, evaluation and validation, as well as quality assurance. With module, students can learn more directly and systematically to master learning competencies (Yasa, 2018). The module contains materials, methods, limitations, and ways of evaluating that are designed systematically and attractively to help students master learning material and achieve the expected competencies (Depdiknas, 2008). However, most of the modules among students are printed modules which tend to be informative, have simple illustrations and only contain practice questions.

Electronic modules (e-Modules) are electronic teaching materials modified from simple teaching materials using technological assistance to make them attractive and interactive (Firtiani & Indriaturrahmi, 2020; Sutama et al., 2021). E-Module is one of the systematic teaching stuff and contains planned learning activities, made to help students master certain graduate achievements (Daryono & Rochmadi, 2020). The content in the e-Module creates more learning impression for

students. The learning activities contained in the e-Module can activate and develop students' thinking skills. The developed e-Module can be accessed anywhere and anytime without space and time limitations (Hidayati et al., 2019).

The electronic module (e-Module) must be attractive and interactive, therefore the module is given an innovation that is integrated with the SETS (Science, Environment, Technology, and Society) model. The study results show that learning with the SETS approach has several advantages (Sutipnyo and Mosik, 2018). The advantages of the SETS learning model are: It can train students to carry out scientific work methods, improve students' ability to communicate, make learning fun, help students know and understand science and technology and the negative impacts that can be caused in everyday life (Wahdah et al., 2017).

Interesting learning makes it easier for students to absorb knowledge which can be seen through students' responses. Student responses are reactions that students raise in response to influences or stimuli from situations carried out by other people (Maharani and Widhiasih, 2016). Responses can be either positive or negative responses. As a teacher, it is very important to know the student's response in teaching and learning activities as an evaluation for the teacher. Based on the problem description, this study will analyze student responses to SETS-based module electronic innovation on waves and sound material. This study aimed to analyze and describe student responses to using the SETS-based e-Module innovation on waves and sound material.

Method

This research uses qualitative research methods. This study uses a descriptive research type to analyze students' responses to using the e-Module. The research instrument was a student response questionnaire. Respondents in this study were 61 students of class VIII C and VIII D of SMP Negeri 2 Depok. Data collection techniques by distributing questionnaires. A questionnaire/questionnaire is a data collection method that gives respondents a set of questions or written statements to answer (Sugiyono, 2017). The data analysis technique used is based on the Likert scale in Table 1.

Table 1. Criteria based on the Likert scale

Answer	Code	Score Value
Strongly agree	SA	4
Agree	S	3
Don't agree	DA	2
Strongly Disagree	SD	1

Source: (Sugiyono, 2019)

The results of the responses from students will be known from the questionnaire data then analyzed and the average value is sought using the Equation 1:

$$R_S = \frac{Jumlah\ Respon\ Siswa}{Banyak\ Aspek} \times 100\% \tag{1}$$

These results can be concluded by looking at the student response criteria in Table 2.

Table 2. Criteria for student responses to SETS-based E-Module Innovations

Student Response Score (%)	Category
$75 < R_S < 100$	Very good
$50 < R_S < 75$	Good
$25 < R_S < 50$	Pretty good
$0 < R_S < 25$	Not good

Result and Discussion

Responses or student responses are needed to determine the feasibility of the SETS-Based Innovative e-module (Science, Environment, Technology, Society). The trial was carried out in classes VIII C and VIII D of SMP Negeri 2 Depok with 61 students as respondents. The research was conducted by distributing the Google Form link to students which contained several questions regarding the feasibility of developing the SETS (Science, Environment, Technology, and Society)-based Innovative e-Module that had been developed. There are 5 aspects which will then be divided into several student response indicators, namely Usage, Appearance, Beauty, Benefits, and Visual Communication. The results of the analysis of student responses can be seen in Table 3.

Table 3. Results of the Analysis of Student's Responses to SETS-based E-Module Innovations

No.	Statement	Index	Criteria
Use			
1.	SETS-based e-modules are easy to use in learning	62.70%	Good
2.	The SETS based e-Module is very easy to operate on my smartphone	59.83%	Good
Appearance			
3.	The grammar used in the SETS-based e-Module is easy for me to understand	79.50%	Very good
4.	The learning steps in the SETS-based e-Module are sequential and easy for me to understand	66.80%	Good

No.	Statement	Index	Criteria
Beauty			
5.	SETS-based e-Module layout is neat	81.96%	Very good
6.	The overall appearance of the SETS-based e-Module is attractive and beautiful	83.19%	Very good
Benefit			
7.	I can use SETS-based e-modules anywhere and anytime to study	79.09%	Very good
8.	SETS-based e-Modules make it easier for me to understand learning material	80.73%	Very good
Visual Communication			
9.	Selection of type and size of writing, good and easy to read	77.45%	Very good
10.	Interesting and good quality pictures and videos in SETS based e-Modules	80.32%	Very good
Average		75.16%	Very good

Based on Table 3, it shows that the indicator for the first statement The SETS-based e-Module is easy to use in learning to get a score of 62.70% in the good category. This is because students can easily access the module without using difficult steps. Then on the second indicator, namely the SETS-based e-Module which is very easy to operate on a smartphone, I get a value of 59.83% in the good category. On the third indicator, the grammar used in the SETS-based e-Module is easy for me to understand, I get a score of 79.50% in the very good category. In the fourth category, the learning steps in the SETS-based e-Module are sequential and easy to understand, I got a score of 66.80% in the good category.

On the fifth indicator, the display arrangement of the SETS-based e-Module is neat, getting a score of 81.96%. On the sixth indicator, the overall appearance of the SETS-based e-Module is attractive and beautiful, getting a score of 83.19%. On the seventh indicator, I can use the SETS-based e-Module anywhere and anytime to learn to get a score of 79.09%. The eighth indicator, the SETS-based e-Module, made it easier for me to understand the learning material, getting a score of 80.73%. On the ninth indicator, namely the choice of type and size of writing, good and easy to read, got a score of 77.45%. The tenth indicator, namely interesting and good quality images and videos in the SETS-based e-Module scores 80.32%. Based on the analysis results, the average value of student responses to the SETS-based electronic module innovation was 75.16% in the very good category. Based on the table above, it can be seen the order of the percentage of student response indicators to the E-module from the highest to the lowest through the Figure 1.
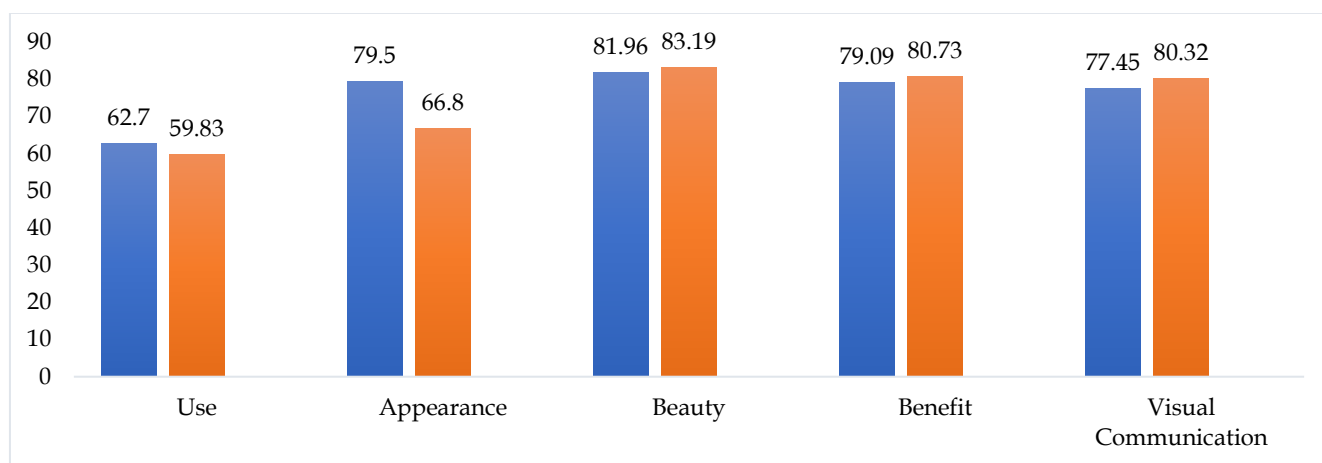

Figure 1. The results of the analysis of student responses to SETS-based E-module innovations based on diagrams

Student responses to the development of teaching materials in the form of E-modules can be assessed through student response tests. The test was completed by filling out a student response questionnaire comprising 10 assessment indicators. Student response tests were conducted to determine student responses to the teaching materials developed. Someone can respond to an object if the object is able to attract attention (Ardianti, 2019). The experience factor gained as well as the learning process that has been carried out can influence the emergence of responses. The form of the response can be stated logically. Responses can be in the form of positive or negative attitudes after observing the teaching materials developed. The written responses given by students to the SETS-based E-module innovations can be seen in Table 4.

Table 4. Student responses to SETS-based E-module innovations

Respondents	Answer
Respondent 1	The e-Module is very good and interesting, the language is easy for children my age to understand, the videos are interesting, and it really helps/makes it easy for me to learn anywhere
Respondent 2	E-Module are very helpful in learning science
Respondent 3	The SETS-based e-Module that have been made are good and understandable, it is suggested that more explanations be given
Respondent 4	I like reading material using the SETS-based E-Module, because in my opinion learning will not be boring, it is fun to see interesting pictures and videos, the material is also easier to understand.
Respondent 5	The e-Module is complete, but the material can be explained again
Respondent 6	It's good but it's too difficult to access because it uses a quota

Based on the results of responses in the form of student comments, on average students really liked and were interested in this SETS-based E-module innovation. This is because the SETS-based e-Module is supported by learning videos taken from problems in the community so that students can easily understand the material properly. Students also really like the appearance of this SETS-based e-Module, because it uses bright colors and interesting characters. However, some students experience problems in using this E-module. Some of the obstacles such as the internet network and mobile phones that are used do not support it.

The teaching materials developed are in the form of electronic modules on waves and sound based on SETS (Science, Environment, Technology, and Society). The developed electronic module is different from the printed module based on storage space/shape and design. The advantage of the first developed electronic module is that it uses the SETS (Science, Environment, Technology, and Society) model in the learning steps. The distinctive feature of learning using the SETS model is that learning materials are directly related to science, technology, environment and society. Learning in the electronic module uses SETS steps which can improve students critical thinking skills.

Second, the modules developed are electronic in that they contain pictures, videos, quizzes or competency tests using interactive liveworksheets. The product is equipped with video links to adapt to offline learning. The video link on the module can be clicked directly by users, both teachers and students. Third, students can study independently because the electronic module is equipped with learning instructions, makes it easy to access the module, is equipped with answer keys, scoring guidelines, attitude assessment so that it can make it easier for students to assess their own learning outcomes. The electronic module is equipped with product collection links, practicum, presentations to make it easier for teachers to assess students' psychomotor skills.

The first step of SETS is the invitation stage where students are faced with problems that exist in the everyday/contextual environment in order to improve students conceptual understanding and critical thinking skills. The second step is the exploratory stage which begins with organizing students to learn by forming heterogeneous groups to discuss cases given at the invitation stage. The teacher helps students in finding solutions to cases, namely guiding and directing student activities. The next step is the solution stage where students are guided to find solutions to existing problems. The next step is an application where students apply their knowledge by designing an experiment related to the case at the invitation stage. The last step is feedback, namely students discuss and present the results of their discussions in front of the class. Then the teacher will provide feedback after the presentation by each group has been completed.

Aspects that get the highest average score consist of: The overall appearance of the SETS-based e-Module is attractive and beautiful, namely 83.19% with very good criteria. Students are interested when they see an electronic module that has a beautiful design, so that it will attract these students to read the electronic module. This is in accordance with research conducted by Nuraini and Supriadi (2018), namely the relevance of interest in obtaining the highest response because the multimedia developed is able to attract students' interest in learning physics.

Based on the response test given, the electronic module makes it easier for students to understand learning. This is in accordance with its function that the module is made with the aim that students can learn independently without or with teacher guidance. Electronic modules as teaching materials must describe the basic competencies to be achieved and presented using good, interesting language, accompanied by clear and not confusing illustrations (Danang & Fausih, 2014). The electronic module can be used independently because the module has been equipped with learning steps using the SETS model, study guides for teachers and students, as well as scoring guidelines for students so that students can study and assess their own abilities in understanding the concepts in the electronic module being developed. The examples used use cases that occur in the surrounding environment (conceptual),

because students will more easily understand the material if the examples used are in the real world compared to abstract examples. The SETS model used in the electronic module also helps improve students' mastery of concept abilities. According to Juita (2021) that SETS can improve students' mastery of concepts with classical mastery of 51.72% and 93.10%.

The small average score obtained on the results of the student response test was 59.83% but was still classified as a good category in aspects The SETS based e-Module is very easy to operate on my smartphone. This is because some students experience slow cell phone problems due to memory fullness and some also have signal problems. Students hope this can be facilitated even better so that learning can run well without obstacles. This research is supported by previous research regarding the development of learning e-modules which obtained a response with a percentage of 72.21% in the good category (Anggereini, 2017). In addition, Efendi et al. (2021) research showed positive student response results of 81.33% in the aspects of using and reacting to using media. This response indicates that learning e-modules can motivate students to learn so that they get optimal learning results (Diantari et al., 2018).

Conclusion

Based on the results of the study, it can be concluded that student responses when using the SETS (Science, Environment, Technology, and Society) based e-Module innovation on waves and sound materials obtained very good responses with an average percentage of 75.16%. This shows that the SETS (Science, Environment, Technology, and Society) based e-Module innovation on waves and sound material can be used in physics learning. As for suggestions for future researchers, they can make improvements to the e-Module that has been developed by creating an e-Module that can be used in various types of mobile operating systems. In addition, future researchers can make new innovations that can be applied to electronic modules with other materials.

Author Contributions
Jaridatul Muniroh: Conceptualization, methodology, writing original draft preparation, formal analysis, investigation, and visualization. Septania Pratiwi: The research doing together. Ariswan, Jumadi, Insih Wilujeng: Guide and validation.

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