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## STUDENT RESPONSE TO DIGITAL MODULE OF WORK AND SIMPLE MACHINES FOR CLASS VIII JUNIOR HIGH SCHOOL

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### *Abstract*

*This research aims to know the student response to digital module of work and simple machine materials for science learning in Junior High School. The module is equipped with images, videos, animations, and audio. The discussion section on sample questions in the module integrates 5 problem-solving indicators from the Robust Assessment Instrument For Student Problem Solving developed by Docktor and Heller, namely useful description, physics approach, specific application of physics, mathematical procedures, and logical progression. The digital module is designed based on the Dick and Carey learning system design. The data obtained from student response questionnaire given to 30 eighth graders after the study using digital module. The student response questionnaire consists of 15 statements. Student responses classified into three aspects, interest, material, and language. The results showed that student responses in the interest aspect get score percentage 90%, material aspect get score percentage 88%, and language aspect get score percentage 94%. The percentage score average for three aspects is 90.6% with very good classification.*

**Keywords:** *Student response, Digital Module, Work and Simple Machine.*

### INTRODUCTION

Technology plays important role in learning natural sciences (IPA). Technology can help teachers as learning facilitator to convey science material which cannot be done hands-on. Technology can displayed by combining text, images, animation,

video, and audio. The proper use of technology can help students achieve the learning objectives. Utilization of technology can be realized by applying learning resources. Learning resources are everything that is intentionally designed (by design) or available (by utilization) and used either individually



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or in group to create or help students learn (Jailani, 2016).

One of learning resources in science learning is information and communication technology (ICT). Learning using ICT demands creativity and self-reliance of students so that it is possible to develop all their potential (Anshori, 2017). In addition, ICT-based technology can also increase efficiency in learning. Thus, educational institutions must develop themselves to be able to independently create and/or use ICT-based learning resources.

Learning resources need to be created in accordance with the learning needs of students. Based on the data obtained through independent analysis of contents of science textbooks and the responses of students in class VIII submitted through open questionnaires, it is found that there were many weaknesses of the science textbooks owned by students. Students have 2 handbooks, namely the enrichment module book and the package book. Each book has its own weaknesses. In general, students stated that the printed books they had were not interesting. Even, some books are visually opaque and colorless, making them unattractive to read and pictures or figures are difficult to see. In addition, student books are also ineffective to carry anywhere because of their size and weight.

Learning resources can be developed to overcome the above problems. One of them are digital modules. Using digital modules in learning can gain benefit. The advantages of the module is designed to be used by students learning because it comes on its own, so with the module students should not rely on the teacher

to be able to achieve the expected competencies by learning activities (Hamid et al., 2017). In addition to the advantages mentioned above, Rusman (2012) in his book states that technology with a combination of texts is quite effective in teaching materials that are applicable, processed, difficult to reach, dangerous if directly practiced, and have a high level of accuracy. Utilization of digital technology is known as the cyber system which make the learning process take place simultaneously without being limited by space and time (Hartanto et al., 2020).

Material of science learning can be presented in the form of digital modules. In this study we choose the materials about work and simple machines. Science learning on work and simple machines generally presents events whose motion are difficult to create in a uniform motion. Work and simple machines are related to the force. The force is related to a constant acceleration where it cannot be created directly. So, it is appropriate if the presentation is through digital technology. On the other hand, the application of ICT can facilitate teachers and students in carrying out scientific skills in science learning such as asking questions, discussing, facilitating, finding information about science learning, and can also convey the results of discussions (Juniati & Jamaluddin, 2020).

Several previous studies have shown good student responses to the use of electronic modules in science learning. Research conducted by Zaharah et al. (2017) with the title of developing an electronic module with a scientific approach to the material of the human circulatory system for

students in class VIII. In the large group trial the student responses were obtained an average score of 3.59 with the criteria of "very good". In addition, research conducted by Artiniasih et al. (2019) entitled Development of Electronic Project-Based Modules for Natural Science Subjects for Junior High School Students in Class VIII, the student response in the field trial was 96.13% with a very good category.

Based on the explanation above, a study was conducted to observe student responses to the use of digital modules for Work and simple machines in science learning in junior high schools. The digital module for Work and simple machines used is a developed module.

## **METHODS**

The digital module is designed based on the Dick and Carey learning system design model by following these stages: (1) *access needs to identify goals*, (2) *conduct instructional analysis*, (3) *analyze learners and contexts*, (4) *write performance objectives*, (5) *develop assesment instruments*, (6) *develop instructional strategy*, (7) *develop and select instructional materials*, (8) *design and conduct formative evaluation of instruction*, (9) *revise instruction*, (10) *design and conduct summative evaluation of instruction* (Gustafon, 2002). The digital module contains science material, namely Work and simple machines for junior high school students in class VIII. Stimulus is presented through presentation of apperception, discussion material, case modeling, and discussion of examples arranged using steps that can guide students to understand cases independently.

Module writing structure According to the Ministry of National Education, the module is structured into three parts, namely opening, core and closing. The opening section contains the title, introduction, table of contents, module operating instructions, study instructions, concept maps, basic competencies (KD), and learning objectives. The main part is the discussion of the material, sample questions, practice questions/ assignments, and summaries.

Presentation of the material is equipped with images, videos, animations, and audio. Preparation of the discussion section on integrating 5 problem-solving indicators from *Robust Assessment Instrument For Student Problem Solving* which developed by Docktor and Heller, *useful description, physics approach, specific application of physics, mathematical procedures, dan logical progression*. The closing section contains a glossary, evaluation questions, bibliography and author profile.

Modules are presented in digital form. At first the module was created using Microsoft word, which was later converted into PDF format. Furthermore, the module with PDF format is converted into digital form using 3D Pageflip Professional software so that it produces output in EXE format that can only be accessed by computers. Through the 3D Pageflip Professional software, the module is filled with animation, video, and audio.

The population in this study were 108 students of class VIII Junior High School Sugiyopranoto Sanggau. The sample consisted of 30 students

selected by purposive sampling technique. Purposive sampling is a sampling technique for data sources with certain considerations (Sugiyono, 2017). The data collection technique used is a questionnaire. Questionnaire is a data collection technique where participants/respondents fill out questions or statements then after being filled out completely return them to the researcher (Sugiyono, 2017). The instrument used is a closed questionnaire that has been validated by 2 validators, namely 1 physics education lecturer and 1 junior high

school science teacher, with validation results that the instrument is feasible to use. The questionnaire consists of 3 aspects, namely interest, material, and language, with 15 statements. The questionnaire was given to students after carrying out learning in field trials. Field trials are part of the design and conduct formative evaluation of instruction stage. Students will fill out a questionnaire by giving a score for each statement item. The score given is based on the Likert scale with categories as in Table 1.

Table 1. Likert scale category

Category	Score
Strongly Agree	5
Agree	4
Somewhat Agree	3
Disagree	2
Strongly disagree	1

The data obtained was then analyzed to determine the magnitude of the response that students had regarding the use of digital modules for Work and simple machines in science learning in junior high schools. The steps taken to determine student responses are as follows:

- a) Calculate the percentage of student responses with the formula:

$$SR = \frac{\text{Score obtained}}{\text{Score maximall}} \times 100\%$$

where:

SR = Student Response

- b) Draw conclusions by referring to the classification table adapted from Widoyoko (Widoyoko, 2018). Classification table can be seen in Table 2.

Table 2. Classification of student responses

Average Answer Score	Response Classification
Student Response > 80.2%	Very Good
60.4% < Student Response ≤ 80.2%	Good
40.6% < Student Response ≤ 60.4%	Less Good
20.8% < Student Response ≤ 40.6%	Not Good
Student Response ≤ 20.8%	Not Very Good

## RESULTS AND DISCUSSION

Digital module is applied by each student using computer at school. Teacher facilitates the learning process by using a projector. Student response questionnaires are given after students

finish the learning process. The results of analysis of student responses to digital module were examined in three aspects, namely interest, material and language. The assessment of interest aspect is presented in Table 3.

Table 3. Percentage of student responses on interest aspects

Grading Points	Score					$\bar{r}$	%
	5	4	3	2	1		
1. Appearance of this IPA module is interesting	20	9	1			4.63	92.6%
2. IPA Module makes me more excited	22	6	2			4.67	93.4%
3. With this module, learning IPA is not boring	16	11	3			4.4	88%
4. This module support me to master material work and simple machines	17	11	2			4.5	90%
5. Word motivation in IPA module affect in attitude and learning habit	11	18	1			4.3	86%
6. Illustration gives motivation to study the topic	16	13	1			4.5	90%
Averages						4.5	90%

Based on Table 3, it can be seen that the percentage of student responses in the interest aspect obtained an average of 90% with a very good response classification.

Furthermore, the results of analysis of student response questionnaires on the material aspects are presented in Table 4.

Table 4. Percentage of student responses on material aspects

Grading Points	Score					$\bar{r}$	%
	5	4	3	2	1		
1. Delivery of material in this science module is related to everyday life	19	11				4.63	92.6%
2. The material presented in this module is easy for me to understand	16	12	2			4.46	89.2%
3. In this science module there are several sections for me to find my own concept	17	10	2	1		4.43	88.6%
4. Presentation of material in this science module encourages me to discuss with other friends	16	12		1		4.33	86.6%
5. This science module encourages me to think independently	10	16	4			4.2	84%
6. This module contains evaluation to test how far my understanding of work and simple machines	9	20	1			4.26	85.2%
Averages						4.4	88%

Based on Table 4, it can be seen that the percentage of student responses to the material aspect obtained an average of 88% with a very

good response classification. Next, the results of analysis of student response questionnaires on the language aspect are presented in Table 5.

Table 5. Percentage of student responses on language aspects

Grading Points	Score					$\bar{r}$	%
	5	4	3	2	1		
1. The sentences and paragraphs used in this module are clear and easy to understand	21	7	2			4.63	92.6%
2. The language used in this IPA module is simple and easy to understand	21	8	1			4.67	93.4%
3. The letters used are simple and easy to read	25	4	1			4.8	96%
Averages						4.7	94%

Based on Table 5, it can be seen that the percentage of student responses in the language aspect obtained an average of 94%. The percentage indicates a very good response classification.

In the interest aspect, the average percentage gain of 90% shows a very good response. Of the six available statements, students chose strongly agree category with the highest on the second statement item. A total of 22 students strongly agreed with the statement "This science module makes me more excited". Some students wrote comments directly in the questionnaire. They stated that learning using digital media change the learning atmosphere. Digital modules provide learning materials which rarely obtain in classroom learning. Digital module presents different learning materials than student's handbooks. It is because the material explanation is supported by simulation videos, animations, and music. It is obvious that digital modules have high appeal to students. Attractiveness can arise because of uniqueness or characteristic and convenience in

using or understanding something (Wardani et al., 2018). The use of digital modules as learning resource and learning medium is felt by students as new nuance in learning. Hamalik et al. (2018) stated that the use of teaching media in the teaching and learning process can generate new desires and interests, generate motivation and stimulation of learning activities, and even bring psychological effects on students. In addition to the things stated above, students also stated that learning was more enthusiastic because the module involved them directly to operate it, and not only by the teacher. Learning that emphasizes more on student centered, where the teacher as facilitator provides opportunities for students to learn in rhythm with the abilities possessed by each student will form active, creative, effective and fun learning. According to Sulthon (2016), active learning will rise good brain work process so that it requires creative work to trying yourself, asking question, analyzing and so on while effective begins from

using regularity principle and accuracy in learn.

In addition to the positive things described above regarding the aspect of interest in the module, there were three students who stated that they did not agree with the statement "using this module, learning IPA is not boring". Through written comments in the questionnaire, there were students stated that the writing structure of this module was the same as the student handbook they had been using so that it seemed boring.

The digital module writing structure uses the module writing structure according to the Ministry of Education. The structure of the module writing consists of the title, table of contents, information map, list of learning objectives, introduction/overview of the material, relationships with other materials or lessons, material descriptions, assignments, summaries, glossaries and final tests. Student handbooks similar to digital module in writing structure. The student's comments above show that the student feels bored while reading the long descriptions about the explanation of the material. This shows that students' learning styles in the class are various. Learning styles is the individual ways used by learners to process information and new concepts or methods that organize information using them (Rahimi et al., 2017). Learning styles consist of three types, namely visual, auditory, and kinesthetic. The three students described above tend to dislike visual learning styles. Visual learning style is a learning style by seeing,

observing, looking and so on (Adawiyah et al., 2020). Therefore, teachers must recognize and understand the characteristics of student learning styles so that they can present a description of the material on the module with more interesting writing in terms of coloring, shape and location. Writing interesting material descriptions can also improve student literacy. The development research conducted by Budiono et al. (2021) concluded that the development of literacy-based modules obtain the results of field trials that followed a large class of 34 students at 89.7%.

In the aspect of the assessment of the material, the percentage score of 88% indicates a very good response. The material in the module is developed with reference to the characteristics of good teaching materials. According to the Ministry of Education, the characteristics of good teaching materials are accumulation substances from core competencies and basic competencies contained in the curriculum, easy to understand, attractive, and easy to read (Arsanti, 2018).

In Table 4, it can be seen that the acquisition of the highest percentage score is in the first statement item at 92.6%. A total of 19 students strongly agreed and 11 students agreed with the statement "delivery of material in this science module is related to everyday life". Thus, it appears that students find it easier to understand learning material if it is presented through contextual events. Contextual learning is a learning concept that helps teachers relate the material they

teach to students' real-world situations and encourages students to make connections between their knowledge and application in everyday life (Afriani, 2018). The preparation of this digital module is based on constructivism learning theory. Constructivism is a view based on the acquisition of knowledge or construction (formation) of people who are learning that begins with the occurrence of cognitive conflict which at the end of the learning process of knowledge will be built by through experience from the results of interaction with the environment (Muhajirah, 2020). The presentation of the material through the contextual events mentioned above supports the principle of learning in constructivism theory, namely students build their own knowledge. The students build their knowledge based on their experience (Fadhilah, 2017). Therefore, the presentation of learning materials through everyday events can help students to independently build knowledge.

Furthermore, in the material aspect, the lowest score percentage is on the fifth statement item at 84%. There were four students who stated that they did not agree with the statement in the fifth item, "This science module encourages me to think independently". It can be seen that the students are not encouraged to think independently, although in the module there are several discourses that invite students to conduct independent analysis of an event. The discourse should be able to encourage students to think, but on the other hand the discourse cannot trigger the

enthusiasm of the four students to think independently. After further analysis of the identity of the students who filled out the questionnaire and by looking at the answers to other statement items on the material aspect, it turned out that two of four students also disagreed with the statement "in this science module there are several parts for me to find my own concept", and the statement "presenting the material in this science module encourages me to discuss with other friends". Similar to the discourse for independent thinking, the module has also provided a discourse that invites students to discuss with friends, and a video has been provided whose content aims to guide students to think and find concepts independently. This shows that the success of a learning is also influenced by internal factors of students. Internal factors come from within the students themselves. There are three internal factors, interest, talent, motivation, and intelligence (Haqiqi, 2018). If it is seen from the score of the four students' learning outcomes, all of them did not reach the completeness score. This shows an indication that students' internal factors have an effect on learning. Therefore, after learning ends, the teacher must evaluate learning. Learning evaluation is carried out to determine the progress of student achievement, the extent to which the efficiency of methods, media, teachers, materials that will be mastered by students and to find out students with learning difficulties (Sumantri, 2016).



In the assessment of the last aspect, which is about language, the acquisition of percentage score of 94% shows a very good response. Of the three available statements, all of them obtained a percentage score above 90%. This shows that the language used in the module can help students learn well. This good response indicates that students carry out scientific literacy well. According to Wahyu et al. (2016), scientific literacy is a very important pillar in improving the ability of human resources, especially in the world of education, improving students' scientific literacy abilities and skills has become a must so that students can compete in the era of globalization.

In addition to what was stated above regarding student responses from the language aspect, in the response questionnaire there were several students who commented that they felt strange to a word, namely "catut". From the student's opinion, it should be noted that in writing the content of the module it is necessary to pay attention to the terms that will be used. The use of verbal language should be done through word choices adjusted to the field of study, specifications or peculiarities of messages/materials/teaching materials, depth based on the level of the education unit, availability/concreteness, the ability of learners to digest, and socio-cultural conditions (Wicaksono, 2016).

## **CONCLUSION AND RECOMMENDATION**

Based on the results, it can be concluded that the student response to the digital module of work and simple machines in science learning in junior high school is very good with a percentage score of 90.6%. Aspects that affect the acquisition of the score are aspects of interest in the module, the material presented, and the language used.

Research also can be conducted to determine student responses to the use of digital modules in a larger sample.

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