

**EFFECTIVENESS OF INTERACTIVE DIGITAL MODULE ON ENERGY IN THE LIVING SYSTEM TO IMPROVE STUDENTS LEARNING OUTCOMES**

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**ABSTRACT**

This research aims to describe the effectiveness of the interactive digital module on energy in the living system using *iSpring Suite 8*. The method used in the study was one group pretest-posttest design with 29 students in SMPN 1 Sidoarjo. The effectiveness of the interactive digital module was obtained from the result of student learning outcomes test. The result of student learning outcomes test there was an increase of gain score between pretest and posttest is 0,67 with medium criteria. Concluded that the interactive digital module on energy in the living system is effective for improving learning outcomes.

**Keywords:** interactive digital module, effectiveness, learning outcomes.

**INTRODUCTION**

Learning is all activities the education process in school that have learning goals to be achieved by creating a conducive environment or learning conditions (Sardiman, 2013). One of the education that give attitudes and values in students is science education (science) and technology. The attitudes and values given by science education have the potential to prepare human resources to encounter the globalization and industrialization. This potential will be achieved if science education is oriented towards preparing students to encounter social issues because the application of science and technology.

The progress of information and communication technology has an impact on education. The impact of this progress occurred on the innovation of the development communicative and innovative teaching materials. Internet is very helpful in the process of developing teaching materials as a source of inspiration. There is no denying that the effect of technology in the form of hardware and

software has become one with modern human life.

The low ranking of Indonesia's PISA, the value of the National Examination, and the value of the learning process in SMP Negeri 1 Sidoarjo can not be separated from the influence on the learning process, student motivation, and media or learning resources used during the learning process. The science learning process at SMP Negeri 1 Sidoarjo has begun to implement a student center through discussions in pairs or groups, but these activities have not gone well because students tend to be inactive and only rely on their friends of group. Learning resources used is conventional print teaching materials. The teacher only uses two books, the textbooks and LKS books as student's learning resources. The printed book contains a summary of the material, sample questions and problem exercises. In addition to books, teachers at SMP Negeri 1 Sidoarjo also use learning media of PPT that are displayed with the projector, but the PPT only contains an explanation of the material and contains

questions as practice, there is no animation or material modeling. So it is necessary to develop innovative teaching materials to support the learning process. The teaching materials developed is interactive digital modules with Power Point software and iSpring Suite 8 as innovative teaching materials that are expected to make students more active in the learning process.

According to Daryanto in his book, using learning materials interactively has benefits in the learning process. The use of interactive teaching materials is a solution to improve the quality of learning in the classroom. Interactive digital teaching materials can foster innovation and creativity of educators in designing interactive and communicative learning.

According to Sudjana (2010), learning outcomes are abilities possessed by students after receiving learning experiences. Warsito (in the Ministry of National Education, 2006) argues that the results of learning activities are characterized by a change in behavior towards a relatively permanent positive self in people who study. These changes include in terms of thinking skills, skills, or attitude towards an object.

The purpose of developing this interactive digital module is to improve student learning outcomes so that it shows that the module affects for students. This can be proven the results of relevant research conducted by Dian with the title of the development of ICT-based interactive modules on the subject matter of the wave with a scientific approach that was tested on 29 students after validation with lecturer showed that the interactive module was the student very interesting with that module and effective as teaching material with the results of the percentage of students who completed KKM were 79.31%.

Based on the description above, a development research was conducted aimed to producing interactive digital module on energy in the living system to improve students learning outcomes.

## METHOD

This research used the One Group Pretest-Posttest Design method with 29 students at SMP Negeri 1 Sidoarjo. The results of learning

outcomes are determined through pretest and posttest. These results were analyzed using normalized gain analysis. To determine the value of analyzed gain, use the formula:

$$g = \frac{(Sf) - (Si)}{100 - (Si)} \times 100\%$$

Information:

Sf : posttest score

Si : pretest score

Then the normalized gain is interpreted according to the following criteria:

Table 1. Gain Criteria Normalized

<g>	Criteria
0,70<g≤1,00	High
0,30<g≤0,70	Medium
0,00<g≤0,30	Low

(Riduwan,2013)

Based on these criteria, the interactive digital module was declared to be effective for improving student learning outcomes if student learning outcomes obtained a gain score of >0.3 with medium and high criteria.

## RESULT AND DISCUSSION

The effectiveness of the module is obtained from student learning outcomes based on the value of the pretest and posttest as the learning outcomes cognitive domain. Learning outcomes are abilities possessed by students after receiving their learning experiences(Sudjana, 2014). Student learning outcomes were assessed by giving pretest and posttest questions with 7 multiple choice questions and 4 essay questions with different bloom taxonomic levels.

There are differences in the results of the student's pretest and posttest has changed after learning using interactive digital modules. The module developed is a new thing and more interesting for student learning processes. That are supported by student's positive responses by using student response sheets for interactive digital modules. The new thing that creates a student learning atmosphere is fun so that the material delivered can be well received by students. Student's interest in the learning process through the modules developed is also influenced by the presence of components in the module in the form of text, images, audio, video, animation, and interactive features. According to the theory, 3 levels of experience from Bruner

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in Arsyad (2009), the learning process can be better if students use all their sensory tools. The more sensory devices used in obtaining and managing information, the more likely information in the form of material or concepts is accepted.

The result of pretest and posttest score can be seen in Table 2.

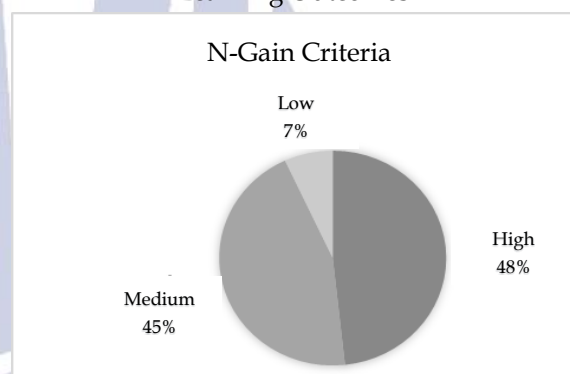
Table 2. Analysis Pretest-Posttest Score

Student	Score		N-Gain	Criteria
	Pretest	Posttest		
1	19	82	0.78	High
2	31	76	0.65	Medium
3	28	48	0.28	Low
4	40	57	0.28	Low
5	61	94	0.85	High
6	19	48	0.36	Medium
7	19	76	0.70	High
8	61	94	0.85	High
9	19	94	0.93	High
10	35	80	0.69	Medium
11	11	86	0.84	High
12	31	77	0.67	Medium
13	50	81	0.62	Medium
14	37	80	0.68	Medium
15	50	98	0.96	High
16	63	77	0.38	Medium
17	44	85	0.73	High
18	59	94	0.85	High
19	19	72	0.65	Medium
20	11	78	0.75	High
21	54	82	0.61	Medium
22	61	94	0.85	High
23	81	91	0.53	Medium
24	59	94	0.85	High
25	59	87	0.68	Medium
26	31	80	0.71	High
27	74	82	0.31	Medium
28	19	78	0.73	High
29	78	91	0.59	Medium
<b>Rata-rata</b>	42.17	81.24	0.67	Medium

There are three categories of interpretations of gain score. The effectiveness of interactive digital modules based on student learning

outcomes through gain score. The effectiveness of the module to be achieved if the score gain  $>0.3$  with the criteria of medium and high. Based on the results of the pretest and posttest of 29 students, 14 students had high gain criteria, 13 students had medium criteria, and 2 students had low criteria. The average gain value of students is 0.67 with the gain interpretation criteria proposed by Hake (1999) included in the medium criteria. It shows that all students have achieved the goal of improving learning outcomes in knowledge competencies. This increase in learning outcomes is supported by research conducted by Ferit (2017) which in her research shows that interactive multimedia can improve student learning outcomes.

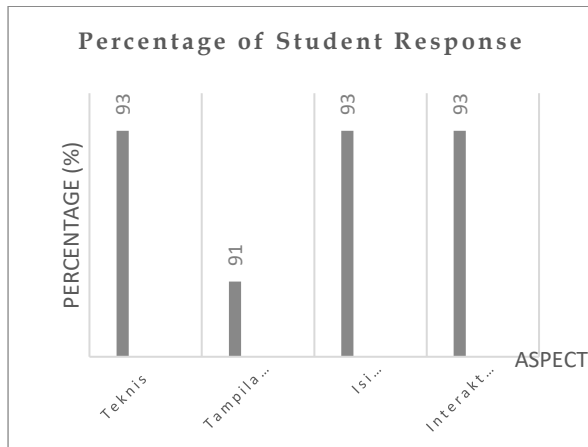
Graph 1. Criteria for Increasing Student Learning Outcomes



The increase in student learning outcomes with this medium criteria shows that by using this interactive digital module students can increase the low pretest value to a high posttest. It declared that the module developed has the effectiveness to improve learning outcomes. Improving student learning outcomes is also supported by student responses, each of which shows a positive response with a score  $>90\%$  with very good categories that shown in the following graph.



Graph 2. Percentage of Student Response  
Questionnaire



According to Danu et al., the positive response of students can be used as a benchmark that students feel more comfortable using interactive digital module in the learning process. Most of the student's attention will be focused on the learning process because student's interest in the module and students will not feel bored with the learning process so that student learning outcomes can increase. In addition, according to the research conducted by Dian et al., it declared that interactive modules are very interesting for students and effective as teaching materials with the percentage of students who complete KKM as much as 79.31%.

## CONCLUSION

### Conclusion

Based on the result of the study, it can be concluded that the interactive digital module on energy in the living system is effective for improving learning outcomes by getting a gain score 0,67 with medium criteria. The student learning outcomes was also supported by the student response results obtained  $\geq 90\%$  percentage of value with very good criteria.

### Suggestion

Based on the research that has been conducted, it is necessary to suggest the following:

1. For all developer, who want to develop products again, it can be adding other materials so that the products produced are more comprehensive.

2. Further developers can add features of competency test scores are done by students can enter the program that is operated by the teacher so they can know the progress of learning outcomes student more valid.

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