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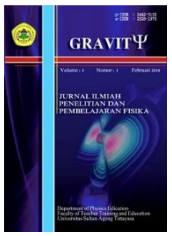

Implementation of sparkol videoscribe physics-based learning media pace to improve students' analytical skills

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ABSTRACT

Learning media can determine the quality of education, one of the digital media revolution with the development era 4.0. So that the required media interesting and appropriate media learning needs. One of the instructional media used is a dynamic learning media and digital nature, i.e., sparkol videoscribe instructional media as media that is flexible. This study aims to determine the ability to analyze the learners after the learning intervention with learning models Project, Activity, Cooperative Learning, Exercise (PACE) class X Mathematics learners SMAN 6 Purworejo. This study used a quasi-experimental design with pre-test and post-test. The results showed that the average value of the pre-test students on the material Enterprises and Energy before the implementation of PACE is learning to use the model of implementation is 46.28 and after 80.75. The highest post-test value of 95 indicated by the attribute aspect. The amount of the lowest post-test that is 72 represented by aspects of organizing the linking indicator of a problem.

Keywords: Ability to analyze, PACE, sparkol videoscribe

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INTRODUCTION

Physics can be categorizing as an inductive science that can be categorized by the science that is built based on the inference of specific events in nature (Saregar, 2016). The physics in physics teaching is not only done in the classroom by introducing concepts of physics but could do with learning laboratory practice. This learning practice phenomenon of life around would be more fun so that learning will be more meaningful. These will help students to be more ready to plunge into the world community to apply the learning in the world of education to the real world. Learning physics is said to be learning meaningful if the lessons learned in the world of concept or theory can be applied to solve everyday problems (Saverinus, 2013).

The ability to think for learners to study physics is developing through meaningful and enjoyable. This capability is essential for further learning or necessary for learning at a higher level with more complex material. Learners are required not only can think low level (lower-order thinking skills) but to the high-level thinking skills (higher-order thinking skills, HOTS) (Istiyono, 2014). Curriculum 2013 has been running for several years, but there has been no significant improvement in the ability of learners in Indonesia to HOTS. There is 2011, Indonesia was ranked 38 out of 42 countries tested, and in 2015 only rose two points to rank 36th out of 49 countries proved. These results were also

obtaining information that the trial participants from Indonesia only mastered standard competency questions; the calculation is pure computing, and the Ability contextual every day. The results of the TIMSS 2016 concluded that participants from Indonesia should strengthen high-level thinking skills that cognitive knowledge competence, ability to process information received, making inferences, and apply their knowledge to a case or other phenomena.

The ability to think is dividing Becomes 2, i.e., the ability to think and ability to think critically, both these capabilities included in the taxonomy raised by Bloom, who has improved and experienced cognitive processes. Lower thinking ability includes high-level thinking skills include the ability to analyze, evaluated, and create (Nurwahidah, 2018). The ability to think Yag raised by Bloom is using in education and many found in the educational curriculum in Indonesia (Gunawan & Palupi, 2016; Scraw & Robinson, 2011). Ability that is using in the success of the ability of learners is the ability to think critically, another reason for this ability is using because it is considering to be above upon ability taxonomy of cognitive abilities Bloom,

Thinking skills needed in learning physics are integrate understanding of concepts so that it will have an impact on the ability to analyze in solving problems encountered. Learning physics with the scientific methods like observation experiment, prepare the concepts, conduct experiments, and make inferences (Pratiwi & Nurhidayati, 2017). Lessons have implemented with the scientific method is expected that learners can resolve the problems faced either with their solutions or procedural solutions (Istiyono, 2014). All of the learning process using the scientific method as a process of stages in developing the ability to analyze learners. Low ability to analyze this happens to learners underclass little experience in learning physics and significantly impede the next grade. These happen in high school N 6 Purworejo because the learning is still conventional and running in one direction with passive learning.

The ability to analyze (analyze) is the ability to sort out integrity into the elements or parts that clear hierarchy and structure (Anderson and Krathwol, 2015). Yuliani and Sunarno (2012) explain that to analyze is solving a problem by separating each part of the problem and seek the relevance of each of these parts and find out how these connections can cause problems. The ability to analyze the kind of ability that a lot is demanded of the learning activity because in learning activities mostly directed learners to be able to distinguish between fact and opinion, lead to the conclusion of supporting information.

The right solution to overcome these problems is by maximizing the application of learning models and or using appropriate learning models, especially for learning physics. The use of learning models have been carried out related to analysis kinds of subjects, number of hours of learning, learners' level of cognitive development, the environment in which to learn, and the facilities available (Ngalimun in Mukra & Nasution, 2016). Learning models that show the process of output or learning outcomes of students one of them is a project-based learning model that produces learning products in the form of learning products or performance, carrying out the process of assessment or research phenomena, as well as the ability to solve problems (Kristanti & Subiki, 2017).

The right learning model is expecting to have an impact on physics learning to implement real learning so that students can directly capture the natural phenomena that are studied (Ministry of National Education, 2006; Sugiana et al., 2017). PACE makes learning more learner-centered so that the learning more meaningful, and the results will be etched longer. PACE approach facilitates students to understand abstract concepts of physics, becomes more apparent, and will stress the analytical process to search for and find their answers to a problem (Lester, 2018).

PACE learning model for integrating with digital learning media Sparkol videoscribe. Learning media is a tool that can help the learning process and serves to clarify the meaning of the message delivered to achieve the learning objectives with better and perfect

(Savila, Astra & Muliyati, 2018). Sparkol videoscribe a learning Media in the form of software to create animated whiteboard automatically (Sari Dewi, 2019). It is expecting that the PACE learning model using Sparkol videoscribe learning media can train higher-order thinking skills in students, especially the ability to analyze.

RESEARCH METHODS

the design study is a quasi-experimental design in the form of a non-equivalent pre-test post-test group design. This design is using to compare the progress of learners before and after learning the experimental class. Shamsuddin and Damayanti. (2011).

$$O_1 \; X \; O_2$$

Where, O_1 is the pre-test (before treatment); X is treatment; O_2 is the post-test (after treatment)

PACE learning is using a model consisting of four components, namely the project, activity, cooperative learning, and exercise (Rahman and Yunita, 2018; Lester, 2018). Project, implemented in these components inquiry learning in the learning teams by choosing a theme that fits the material study. Projects carried sought completion, and the results reported in the form of a project report. Activity in this component aims to introduce information or new concepts. The activities carried out in the form of a task activity that is representing in the LKA (Worksheet Activity). Cooperative Learning, this component is a component of social constructivism learning. Learning to apply teamwork and mutual responsibility in the team by learning together. Exercise, The activity aims to reinforce the concepts that have construct on the activity and cooperative learning component in the form of a resolution. A form of exercise that is given in the deepening of the material to be better than ever.

Data were collecting through observation and test observation. Implementation observation data is the data of learning from an early start learning until closing — tests such as the ability to analyze problems corresponding in Table 1. The problem is design to measure the ability to analyze learners. Ability to analyze learners, according to Wilson (2016), can be seen in the table below.

Table 1. Analyzing the Cognitive Process Capability

Cognitive Process and Indicators
1. Distinguish a. focusing problems b. Find the equation of the problem
2. Organizing a. Connecting a problem b. Outline the problem
3. Attribute a. describe the problem b. Determine the intent of a problem

The effectiveness of the test data analysis was performing using statistical analysis of the research data with n-gain test to determine the increase between pre-test to post-test. The magnitude of the increase is calculating by N-Gain normalized umus(Meltzer, 2002) that is:

$$g = \frac{s_f - s_i}{100 - s_i} \qquad (1)$$

g is gain normalized; s_f is post-test scores; s_i is pre-test scores; 100 is ideal score

N-gain calculation results then interpreted normalized using the categories as in Table 2.

Table 2. Category of normalized gain score

Criteria	Conclusion
g>0.7	High
0.3 <g ≤ 0.7	Medium
$g \leq 0.3$	low

The interpretation category of N-gain effectiveness in the form of a percentage (%) (Hake, 1999) is guided by Table 3 below.

Table 3. Category Score N-gain in percentage

Percentage (%)	Interpretation
<40	Ineffective
41-55	Less effective
56-75	Effective enough
> 76	Effective

RESULTS AND DISCUSSION

Learning physics using PACE-based learning media does improve the ability to analyze material and energy businesses. Some components of the PACE adopted in this study can see in the image below. Implementation of PACE learning to apply in videoscribe sparkol based teaching media to enhance the ability to analyze learners. Three aspects measured the ability to analyze learners in this study: differentiating, organizing aspect, and attribute. The third aspect of the ability to analyze can be translating into six indicators that focus on the problem, find the equation of the problem, connect a problem, outline the problem, describing the problem, determine the intent of a problem — ability to analyze a section of higher- order thinking abilities (HOT).

Flow diagram PACE based learning component can be seeing in Figure 1 below

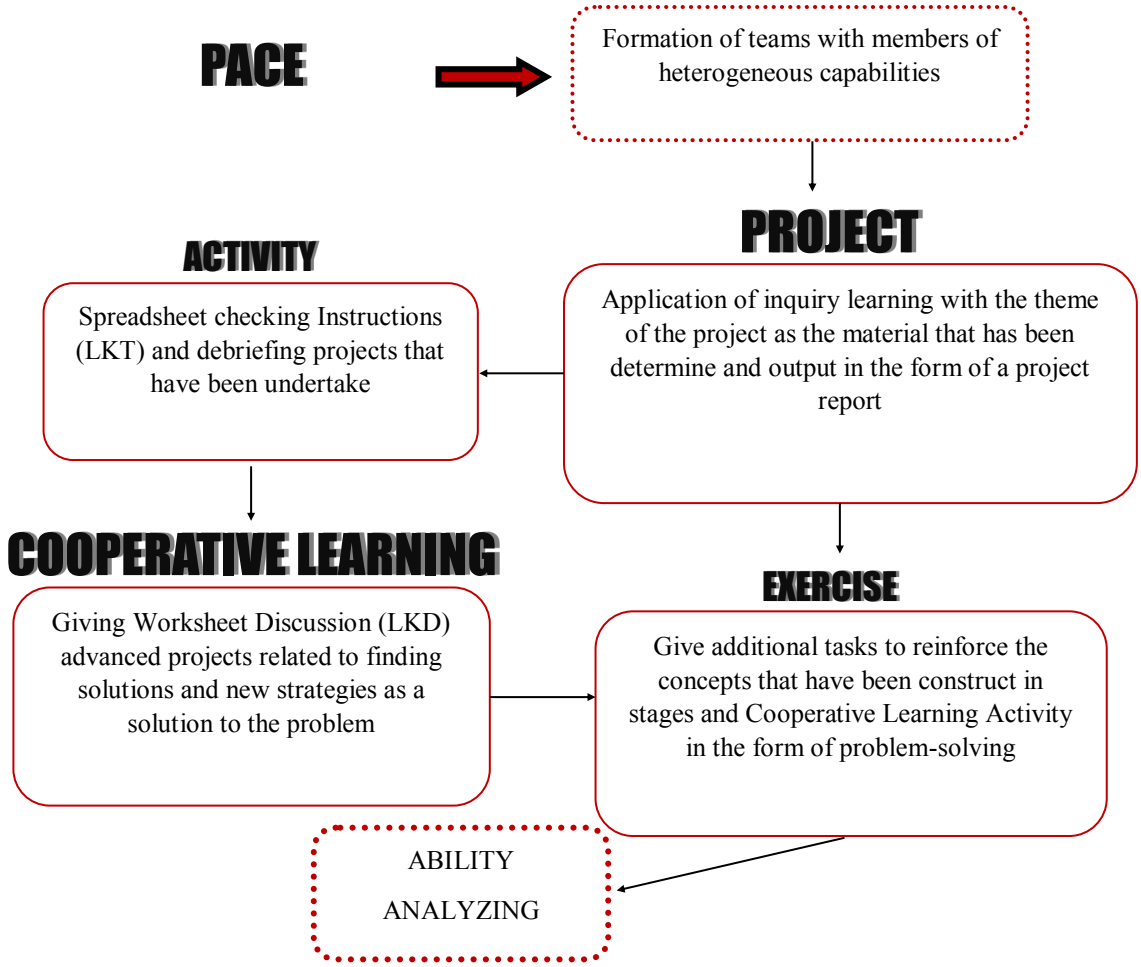

Figure 1. Learning component PACE (Project, Activity, Cooperative Learning, and Exercise)

Data analysis skills for pre-test and post-test were conducted on 36 students to determine the increase in students' ability to analyze. The results of analyzing the ability of learners can be seen in Table 4.

Table 4. demonstrate the ability to analyze assessment results using instructional media-based learning sparkol videoscribe PACE. The results showed that the lowest score pre-test on all five indicators, namely, the ability to describe a big problem score was 23.00. Learners experience difficulty in describing problems encountered. Describe the problem is in the completion stage, determine the model of the solution. The initial challenges experienced by learners occur in a matter of application forms about the story. The highest pre-test value indicator-6 is the ability to

Table 4. Score indicator Analyzing Ability Pre-test and post-test

test Ratings	Analyzing Capability Indicators Score						Average
	Distinguish		Organize		attribute		
	1	2	3	4	5	6	
Pre-test	28.00	61,00	27.00	51.00	23.00	85.00	46.28
Post-test	74.00	85.00	72.00	83.00	73.00	95.00	80.75

determine the intent of a problem at 85.00. In these six indicators, all learners helped the questions listed in the matter explicitly.

In this 6th indicator, students are helping by the questions listed in the problem explicitly. While the post-test score, the highest value on the 6th indicator was 95.00 as the ability to determine the intent of a problem, and the lowest score on the 3rd indicator was 72.00, namely the ability to connect a problem with a solution. Figure 2 below is increasing scores ability analyzes for pre-test and post-test.

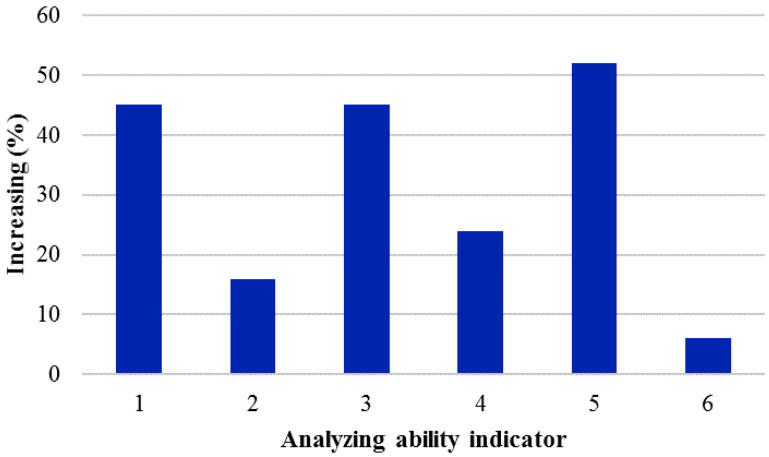

Figure 2. Analyzing ability score

The results of analyzing the ability scores rise to pre-test and post-test can be seen in the picture above. The highest increase in the indicators of the 5th: the ability of learners to describe the problem by 52%, the amount of improvement in the ability to analyze the students helped with the clarity problem in providing the information required by learners. The lowest increase in the indicator-6 is the ability to determine the intent of a problem.

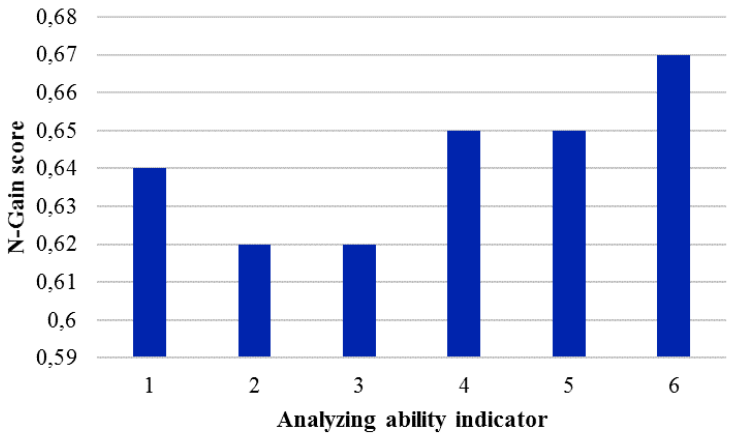

Figure 3. N-Gain score

Learners have difficulty in representing in the form of a mathematical equation by the subject matter at hand. The subject matter, which is a significant constraint on the material pesetas student effort and energy are the subject matter in the equation representing mechanics and the law of conservation of energy, and learners have difficulty in determining the initial and final conditions of the system. So we need to focus on the material sub represents energy conservation law.

The application of physics-based instructional media use sparkol videoscribe PACE can improve the ability to analyze learners by 35% as research conducted Syukrimansyah (2017). Thus, learners are expecting to solve the problems of physics that can be applying in everyday life.

CONCLUSION

Based on the analysis of the data above it can be concluding, the physics module based on Project, Activity, Cooperative Learning, Exercise (PACE) assisted by Sparkol Videoscribe that has been implemented in physics learning averages the pre-test values of students in the Business and Energy material before the implementation of learning using the PACE model is 46.28 and after implementation is 80.75. The increase in the ability to analyze the fifth largest in the indicator amounted to 52%, which is the ability to describe the problem.

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