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The Effect Of Discovery Learning Approach Using Online Newspaper and Learning Motivation On The Physics Learning Outcomes

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Abstract. This study aims to determine the effect of Discovery Learning by utilizing some online newspapers and the influence of student learning motivation on physics learning outcomes, and the interaction between the two. The method used in this research is quasi experiment with factorial design 2X2, by comparing two physics classes in a high school using four classes divided into two groups. The students of two classes in group I (N = 44 students, XI IPA 1 and XI IPA 2, Topics: heat energy) were taught using the news-assisted Discovery Learning from Online Newspaper, while the students of two classes in group II (N = 40 students, XI IPA 3 and XI IPA 4, Topics: heat energy) were taught using conventional approach. According to the hypothesis of test results with Two Ways Anova, using the significance level $\alpha = 0.05$, it was found that: (1) There is an influence of the Discovery Learning approach using online newspaper to the physics learning outcomes ($F_{calculate} = 4.56 > F_{table}=3.96$), (2) There is no influence of learning motivation to physics learning outcomes (F $F_{calculate} =0.47 < F_{table}=3.96$), (3) There is no interaction between the Discovery Learning approach using online newspaper and learning motivation on the physics learning outcomes ($F_{calculate} = 0.67 < F_{table}=3.96$)

1. Introduction

Physics is a knowledge studying about nature, natural phenomenon, and every interaction in it. The main purpose of this knowledge is to find the regularity of human's observation to the universe. It also aims to prepare the students to be able to face the developing logical, efficient, rational, and effective thoughts.

Badan Nasional Pendidikan Standar (BSNP) states that Physics has the lowest score (only 59.-72) among the other science subjects in all science majors in DKI Jakarta in the academic period 2014/2015. The average score of National Exam for Physics in PB Soedirman Islamic Senior High School is 50.06 in 2017. And it is only 59.64 in 2016, and 75.36. In conclusion the average score is not satisfying enough.

The natural phenomena have been written in many sources, such as books, news, encyclopedia, etc. There are also interesting natural phenomena on Online News that we can learn. The students can find out the causes of the natural phenomena from the Physics perception.

The approach of active learnings can be an effective way to learn Physics. It is also according to the curriculum in 2013 that the students have to use their creativity as maximumly as possible in developing their competency through discoveries. One of the suitable approaches is Discovery Learning. Discovery Learning enables the students to search for information and studying concept independently.

The characteristic of Discovery Learning is a process of a discovery by providing stimulus to the students. The present of the stimulus is the first stage of a discovery. It can be a problem that has to be prepared so well that the active students are involved in the process of the discovery. The

problems faced by the students are the problems engineered by the teachers. The problem has a function to confuse the students, and then is continued not giving generalization of a desire to investigate by them. A natural phenomenon in an online newspaper can be an alternative to the problems that can be given to the students. The Online news is arranged in a worksheet that will be conveyed to the students.

In a learning process, the students' motivation of learning can become an expected factor to the students' results of learning. The importance of the students' motivation in learning can also encourage the students to make a discovery in Discovery Learning. Generally, a good motivation of learning will give power to the students to study harder, and learn to make a better change.

Based on the explanation above, there should be a research about the effect of Discovery Learning approach using online newspaper and learning motivation on the physics learning outcomes.

2. Organization of the Text

2.1 Literature Review

Discovery Learning is a method of inquiry-based instruction and is considered a constructivist based approach to education. A review of the literature suggests that discovery learning occurs whenever the learner is not provided with the conceptual understanding and must find it independently and with only the provided materials [1]. Sund dan Trowbridge said *Discovery is the mental proocess of assilimating concepts and principles in the mind* [2]. Students must have the mental readiness to learn in this way [3]. Discovery Learning is a teaching method that allows learners gain a new knowledge without involving direct notifications but makes learners discover by themselves instead [4]. In discovering a concept, students need to observe, classify, make assumptions, explain, draw conclusions, etc. to find some principles.

Motivation refers to an internal state which results from a need and which activities, or arouses, behaviour that is usually directed toward fulfilling the activing need [5]. Motivation is a force in a person that can generate perseverance and enthusiasm in carrying out an activity, which can come from within the individual itself (intrinsic motivation) or from outside the individual (extrinsic motivation) [6]**.** Motivation is seen as a mental impulse that moves and directs human behavior including learning behavior [7]. Motivation involves the processes that energize, direct and sustain behaviour [8]

Learning outcomes have a goal to know the level of success achieved by students after attending a learning activity where the success rate is marked by the scale of the value of letters or words or symbols [9]. Learning outcomes are grouped into three areas, i.e. cognitive, psychomotor, and affective [10]. In this study, the learning instrument used is the cognitive domain. According to Bloom (1979), the cognitive domain is closely related to the thinking ability, including the ability to memorize, understand, apply, analyze, synthesize, and the ability to evaluate [11].

The study of Discovery Learning has been conducted by several researchers. (1) Astra *et al*. in 2015 in a publication titled Development of student worksheet by using Discovery Learning Approach for senior high school student concluded that Discovery Learning-based Student Worksheets are effective for use in physics learning in high school; (2) Rohim *et al* 2012 mentioned that the implementation of Discovery Learning model can improve the creative thinking ability of students. Based on the theory, this research hypothesis can be formulated as follows:

Hypothesis I:

H_0 = There is no influence of the Discovery Learning approach using online newspaper to the physics learning outcomes

$$H_0 = \mu_{A1} = \mu_{A2}$$

H_1 = There is an influence of the Discovery Learning approach using online newspaper to the physics learning outcomes

$H_1 = \mu_{A1} \neq \mu_{A2}$

Hypothesis II:

H_0= There is no influence of learning motivation to physics learning outcomes

$H_0 = \mu_{B1} = \mu_{B2}$

H_1= There is an influence of learning motivation to physics learning outcomes

$H_1 = \mu_{B1} \neq \mu_{B2}$

Hypothesis III:

H_0 = There is no interaction between the Discovery Learning approach using online newspaper and learning motivation on the physics learning outcomes

$H_0 = A \ X \ B = 0$

H_1= There is an interaction between the Discovery Learning approach using online newspaper and learning motivation on the physics learning outcomes

$H_1 = A \ X \ B \neq 0$

2.2 Research Methods

The research instrument was obtained from motivational questionnaire and instrument of learning outcomes to obtain the appropriate data. The motivational questionnaire was adapted from the proven Hsiao-Lin Tuan's motivational instrument (2005), while the instrument of learning outcomes was adapted from the Suprapto's instrument (2017). The Motivation instruments were tested for validity and reliability, and validation results showed that from 35 questionnaire items there are 7 items were not valid. The learning outcomes instruments were used to measure the physics learning outcomes in high school students on the subject matter of heat and temperature. Data collection was conducted in August 2017.

The method used in this research is quasi experiment. The first stage of the research is the measurement of motivation by using student motivation instruments in the form of questionnaires. The next step is to divide the students into two groups of high motivation and low motivation based on the result of the motivation questionnaire. In the learning process, experimental class was given instruction using Discovery Learning approach with online news and the control class is given teaching with conventional approach. The final stage of the study is the measurement of student learning outcomes in the experimental and control classes. The design used in this experimental study is Treatment Design by level 2x2.

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Table 1. Experiment Design

Motivation (B)	**Learning Approach (A)**	
	Discovery Learning using Online Newspaper (A1)	**Conventional Approach (A2)**
High motivation (B1)	$A_1 B_1$	$A_2 B_1$
Low motivation (B2)	$A_1 B_2$	$A_2 B_2$

2.3 Results And Discussion

This research was conducted at a High School, with the subject matter of heat and temperature, in accordance with the Indonesian curriculum 2013. The experimental class conducts teaching and learning activities with the Discovery Learning approach using online newspaper, the news contained in the Online newspaper was quoted and compiled into a worksheet, the news was used in the first

stage of Discovery Learning (stimulation). While the control class doing teaching and learning activities with the conventional approach by discussion method.

In this study, students were divided into heterogeneous groups, then the teachers distributed the worksheet containing a collection of news from online newspapers made by the researchers. Stages of the learning process in the experimental class: (1) The first stage is stimulation, students read a worksheet that contains a collection of news articles and read the questions given in the worksheet, this news is used to create something that creates confusion. The news provides the interaction and conditions of learning that can develop and motivate students to conduct exploration activities; (2) The second stage is the problem statement, students answer or hypothesize through questions on the worksheet; (3) The third stage is data collection, the students collect as much information through the various learning resources available, such as books, internet search, interviews, and other; (4) The fourth stage is data processing, each group discusses and processes the information obtained; (5) The fifth stage is verification, each group presents the results of group discussions and important information related to concepts, theories, then the other groups and teacher responded to produce a correct concept; (6) The sixth stage is generalization, each group presents a conclusion, then the students draw the final conclusions of each activity that has been done in the group.

Students become more active in following learning activities with Discovery Learning method. Students are more enthusiastic and more focused in learning when using worksheets that contain a collection of news from online newspapers. Students become active in finding the cause of a phenomenon related to life written in the news, then students can make a conclusion.

After conducting prerequisite tests, it was found that normally distributed and homogeneous data were then tested by Two Way ANOVA. The results are shown in Table 2.

Table 2. Research Data

		Discovery Learning	**Conventional Approach**
High Motivation	Mean	71.09	62.30
	Standard Deviation	10.875	14.060
	Maximum	87	80
	Minimum	43	36
Low Motivation	Mean	67.45	62.80
	Standard Deviation	13.023	11.569
	Maximum	87	80
	Minimum	46	43
Total	Mean	69.2727	62.55

The data in Table 2 shows that the average learning outcomes of students taught by using Discovery Learning with online newspaper is higher than with conventional learning. Based on the table, students who studied with Discovery Learning using online newspaper had a mean score of 69.27, while the class using conventional approach has a mean score of 62.55. In the experimental class, the average physics learning outcomes of the students is proportional to the student's learning motivation, students who have high learning motivation have average learning outcomes of 71.09, while students with low motivation have average of 67.45. While in the control class, the average learning outcomes is inversely related to student learning motivation, students who have high learning motivation have an average value of 62.30 while low motivation have 62.80.

To answer the hypothesis that has been presented, the calculation was done using Two ways Anova. Two Way ANOVA test is a type of statistical parametric test that aims to determine whether there is an average difference between two groups of samples or more. The purpose of the Two Way

ANOVA test is to determine whether there is an influence of the various criteria being tested against the desired results. Once calculated, Two Ways Anova test results are as follows:

Table 3. Table Anova

Hypothesis	Db	$F_{calculate}$	F_{table}
Model of Learning	1	4.5603	3.96
Students' Motivation	1	0.4739	3.96
Interaction	1	0.667	3.96

Based on the result of hypothesis test (1) using Anova Two Ways technique with significance level of 0.05 was obtained $F_{calculate} = 4.5603$ and $F_{table} = 3.96$ which means that H_o is rejected and H_1 is accepted ($F_{4.5603} > F_{3.96}$). The result of hypothesis test stated that There is an influence of the Discovery Learning approach using online newspaper to the physics learning outcomes. So overall learning outcomes of students in XI IPA 1 and XI IPA 2 on the subject matter of heat and temperature that applied the Discovery Learning approach using online newspaper are better than those obtained by conventional approaches. The result of hypothesis test (2) significance level of 0.05 yield $F_{calculate} = 0.4739$ and $F_{table} = 3.$ which means that H_o is accepted and H_1 is rejected ($F_{0.4739} < F_{3.96}$). Thus, obtained an information that there is no influence of student learning motivation to the physics learning outcomes. Result of hypothesis test (3) significance level of 0.05 yield $F_{calculate} = 0.667$ and $F_{table} = 3.96$ which means that H_o is accepted and H_1 is rejected ($F_{0.667} < F_{3.96}$). It shows that There is no interaction between the Discovery Learning approach using online newspaper and learning motivation on the physics learning outcomes.

Although H_o is accepted in the second hypothesis (2) and (3), in the experimental class the average value of physical learning outcomes is proportional to the learning motivation, while in the control class gives the opposite result. This is likely due to the students learn physics from some different teachers, i.e. school physics teachers and tutor from tuition center, as well as student's background in learning can also be the cause. Therefore, further research needs to be done with broader physics material and longer learning meetings.

3. Conclusion

Based on the research results found that (1) There is an influence of the Discovery Learning approach using online newspaper to the physics learning outcomes; (2) There is no influence of learning motivation to physics learning outcomes; (3) There is no interaction between the Discovery Learning approach using online newspaper and learning motivation on the physics learning outcomes. In this study the researchers did not make their own instruments of motivation and learning result. Based on this research, it is suggested for the next research to create their own instruments and the questions on the worksheet should be further improved.

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