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Analysis of Optical Concepts with Understanding Expository Model for SMP

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***Abstract*—The aim of this study is to know the level of comprehension to understand the concept of optical through an expository model for students in SMP Negeri 6 Paya Seunara Sabang, Aceh. This study uses an experimental approach involving 62 students from 5 class asses chosen randomly. The results showed that the application of expository methods cannot improve students' understanding of SMP Negeri 6 Paya Seunara Sabang on the concept of optics matter. The change of student learning behavior is 74.6%.**

Keywords—analysis; optical concepts; expository model

I. INTRODUCTION

The learning model adopted by physics science teachers is generally based on the hidden assumption that knowledge can be transferred completely from the teacher's mind to students' minds [1]. This condition leads to the perception of teachers who have felt good teaching, causing changes in cognitive structure in students. This condition is one of the causes of the low absorption of students in science subjects. According to constructive views, knowledge is built by students based on the cognitive structure that is present in students in the form of prior knowledge [2]. So, in the learning process, the students themselves are mentally active in building knowledge, while the teacher functions more as a creative facilitator or mediator [3]. In carrying out its function as a facilitator in the learning process, the teacher must know and understand the cognitive structure or scheme that exists in the student. The cognitive structure exists in the form of students 'conceptions (student's conception), also called the students' initial knowledge (Prior knowledge). If the teacher knows the prior prioritization of students then they can be expected to be able to become effective and efficient facilitators or moderators of learning. In connection with this, the prior knowledge of students needs to be explored and identified before the subject is taught.

In a previous study entitled "Analysis of Knowledge, Understanding, And High Schools Skills of Physics Teachers of State Senior", that the learning outcomes of teachers to students have not fully run [4]. Physics is one of the subject matters that is integrated into the subjects of natural science at the junior high school level. Physical learning can foster students' thinking skills that are useful for solving problems in everyday life through theories and concepts that study phenomena and involve scientific processes and attitudes. The physics learning process emphasizes giving direct experience to develop students' competencies in order to understand and master the concepts of physics. In studying physics subjects, it is necessary to have effective and enjoyable learning activities so that the expected learning objectives can be achieved. Physics teaching in schools still emphasizes physical concepts that are identical to mathematical equations and formulas [5]. This causes many students to regard physics subjects as elusive lessons and many confusing formulas. Therefore, special methods are needed to be applied so that the process of students' understanding of a subject matter can increase.

According to Rusman, in the learning system the teacher is required to able to choose the learning method right, able to choose and use learning facilities, able to choose and using evaluation tools, able to manage learning in class or in the laboratory, master the material, and understand character student One of the teacher's approval is being able choose the right learning method to teach [6]. When the learning method the teacher uses right then Agreement on learning objectives will be easy It is expected, thus the value of student completeness will be increase. in a previous study written by Elly Eka Wahyudi et al. that in terms of physics learning PBL models are learning models with student learning approaches to problems authentic, so he can organize its own knowledge, grow develop higher skills, empower students, and improve confidence [7]. While the expository method is one of the learning methods that are expected to improve students' understanding of physics learning. The expository method learning process is carried out through several stages, i.e. the introductory stage (the teacher mentions the learning objectives to be delivered), preparation (the teacher prepares the material in a systematic and neat manner), apperception (the teacher asks or gives a brief description to direct students' attention to the subject matter), presentation (the teacher presents and explains clearly developed subject matter, definitions, concepts, rules, or principles), and recitation (the teacher asks students and students to answer, or students are asked to restate material that has been learned in words own). The question posed to students aims to find out the extent to which students have understood the concept in question. The final stage is the development of assignments [8]. The aim of this study is to know the level of comprehension to understand the concept of optical through an expository model for students in SMP Negeri 6 Paya Seunara Sabang, Aceh. Therefore, the optical

concept in learning physics in junior high school it is necessary firmly implanted, so students don't have trouble when on higher level. Physics Learning better packaged in learning emphasize concepts and train students think creatively and be critical, so that students can become interested in learning Physics.

II. METHODS

This research uses descriptive quantitative approach with development research type. This study was conducted from February to April 2017. The study was conducted at SMPN 6 Paya Seunara Sabang, Aceh. experimental method using sampling technique, which is a simple random sampling technique or commonly referred to as a simple random technique. According to Sugiyono simple random sampling technique is a sampling technique from members of the population carried out randomly regardless of the strata that exist in that population [9]. The study was used as an experimental method involving 62 students in class VII were selected randomly from 5 classes. The intended experiment was the way researchers directly taught all classes (from grades VII1 to class VII5, about the concept of optics in SMP Negeri 6 Seunara Sabang. Measuring the level of students' understanding through the results of test assessments, while the change of student learning behavior was an assessment by observation sheet.

A. Data Analysis

To know the effect of students' understanding of the optics matter through the result of written test assessment following formula:

$$Z = \frac{\bar{x} - \mu_0}{s/\sqrt{N}}$$

Where:

$\bar{x}$ = Average value achieved

μ_o = 65

S = Standard deviation

N = Total sample

To know how much the change of student learning behavior, interest, and motivation of students for learning physics optics matter, following formula:

$$Percentage\ (\%) = \frac{n}{N}\ x\ 100\%$$

Where:

n = Total score of all respondents

N = Maximum score

% = Percentage level achieved

Criteria interpretation of this research variable is determined:81–100 = very good; 61–80 = good; 41–60 = fair; 21–40 = less; 0–20 = not good.

III. RESULTS AND DISCUSSIONS

This research was carried out starting from February – April 2017 in class A to VII1 with VII5 SMP Negeri 1 Run. Class VIII as A class VIII class B and experiments as a control class. Research data are obtained from the results of pretest, posttest, and the now of the second class. Pretest and posttest to question each one consists of a 20-question multiple choice. As for the now consists of 18 statement. Before being given treatment, the second class is given now to gauge early learning activities of students and also to know the initial ability pretest understanding students through the learning model expository Optical concepts in Class VII semester 4 SMP 6 Seunara Paya Sabang. The next fifth grade was given the treatment, experiment using model class Advance Organizer (AO) and control using model lectures. After that, students are given a posttest to measure the achievement of the learning results obtained. Furthermore, the students are prompted to fill in question form to measure the activity of learning in learning physics. Treatment in each of the classes are conducted twice meeting with allocation of time 2 x 40 minutes for each meeting. Meeting schedule-class experimentation and classroom control is used.

TABLE I. IMPROVED LEARNING ACTIVITY QUESTIONNAIRE RESULTS

Class	Value		Percentage (%)
	Minimum	*Maximum*	
Eksperimen	51	75	74%
Control	46	76	69.5%

From these calculations, it can be noted that the experiment class had an average value of higher learning results compared to the control class. Then from the results above, it can be noted that the value and the frequency of the five classes contained in table 2 below:

TABLE II. FREQUENCY DISTRIBUTION OF TEST RESULTS OF OPTICAL CONCEPTS WITH EXPOSITORY MODELS

Value	Frequency
40-45	6
46-51	3
52-57	7
58-63	12
64-69	10
70-75	18
76-81	6

The Z test results show that the value of $Z_{test}<Z_{tab}$ (-1.0828 <1.645) at a significant level of 5% ($\alpha = 0.05$). This shows that the null hypothesis (H_0) is accepted which indicates that there is no increase in students' understanding through the expository learning model of the Optical concept in the class VII 4th semester of SMPN 6 Paya Seunara Sabang. In the experimental class, teachers tend to use control of the learning process actively, while students are relatively passive to accept and follow what is presented by the teacher. This expository learning method is a teacher-centered learning process, the teacher becomes the main source and informant. Implementation of teaching and learning with the expository

method, the teacher gives the material in a coherent way which then continues by working on the questions and discussed together, students are not actively involved, students only receive material from the teacher without being given the opportunity to share with other friends according to the knowledge they have. In the application of learning with the expository method, researchers encountered several obstacles, including in learning, researchers must prepare and master the material that will be taught to students and teachers have difficulty measuring the level of students' understanding because sometimes students who do not understand the material are ashamed or lazy to ask.

Students interest and motivation influence the level of students' understanding of the subject physics of optics matter. Student motivation and student learning interests are shown in Table 3.

TABLE III. MOTIVATION AND STUDENT LEARNING INTERESTS

Aspect	Average percentage	Category
Motivation	76.45	Good
Student learning interests	72.75	Good

According to Table 3, it can be seen that the motivation and interest of students of SMP Negeri 6 Paya Seunara Sabang are included in the good category. Motivation and interest in learning have an important role in improving student learning outcomes. According to Uno motivation has a great role in the success of a person in learning [10]. Motivation to learn physics grows because of the desire to be able to know and understand something, and encourage and direct students' interest in learning so earnest to learn and motivated for achievement [11]. The results of the research have shown that expository methods can trigger students to be motivated to learn. The condition of the student learning environment will both strong interest and motivation to learn [12]. While the change of student learning behavior still under the criteria of at least 75%.

IV. CONCLUSIONS

The results of this research can be summed up: there was no influence of learning from expository results using the concept of optical material against the results of student learning. Optical material concept learning method using the lecture does not give a very good influence against the learning outcomes of students; While the student learning behavior change is 74.6% and still below the criteria at least 75%.

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