



Implementation of Discovery Learning Based Worksheet To Improve Students' Concept Mastery of Science

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Abstract: This study aims to determine the application of student worksheets based discovery learning to increase concept mastery student in the experimental class 1 and class 2 experiments. The method used is pre experimental design with one group pretest-posttest design to look at the increase in the value pretest and posttest in each class experiment. The results showed that through learning using student worksheets based discovery learning can improve students mastery of concepts with high category in the experimental class 1 and class 2 experiments with each N-gain of 0.72 and 0.71.

Keywords: discovery learning, worksheet, concept mastery.

***Abstrak:** Penelitian ini bertujuan untuk mengetahui penerapan students' worksheet berbasis discovery learning terhadap peningkatan penguasaan konsep siswa pada kelas eksperimen 1 dan kelas eksperimen 2. Metode penelitian yang digunakan adalah pre-eksperimental dengan desain one group pretest-posttest design yaitu dengan melihat peningkatan nilai pretest dan posttest pada setiap kelas eksperimen. Hasil penelitian menunjukkan bahwa melalui pembelajaran menggunakan students' worksheet berbasis discovery learning dapat meningkatkan penguasaan konsep siswa dengan kategori tinggi pada kelas eksperimen 1 dan kelas eksperimen 2 dengan masing-masing N-gain sebesar 0,72 dan 0,71.*

***Kata kunci:** pembelajaran penemuan, lembar kerja siswa, penguasaan konsep.*

▪ INTRODUCTION

Education is the main means of a nation that determines the quality of society in adjusting to the rapid changes and advances in science and technology, so that education continues to develop in an effort to improve the quality of education. One of the methods taken is through science learning. Natural Science (IPA) is a study of natural phenomena in the form of facts, concepts, principles through a process of discovery that is a series of activities in the scientific method. IPA products are obtained through a process of thinking and acting in dealing with or responding to problems that exist in the environment, so that through science learning can help students to actively act physically or hands-on and actively think minds-on in finding information related to these matters. things learned (Zubaidah et al., 2014).

Activities in science learning require learning media to help students in the discovery process. Learning media used can influence the effectiveness of learning. According Schmidt (2012), media is a communication tool that can streamline the teaching and learning process, so that learning media is a supporting tool for implementing learning. The media serves to facilitate the teacher in delivering the subject matter to be more interesting and not monotonous. Student Worksheets (students' worksheet) is one of the learning media that can help students add information about concepts learned through systematic learning activities, and can help teachers direct students to discover concepts through their activities.

Students' worksheet contains a set of fundamental activities that must be carried out by students to maximize understanding in an effort to form basic abilities according to indicators of achievement (Choo, Rotgans, Yew, & Schmidt, 2011; Karsli & Şahin, 2009; Utami, 2016). Students' worksheet includes print media as a result of the development of print technology in the form of books and contains Visual material. The worksheet can help students in the learning process become better and more meaningful. Moreover, worksheets can improve the science learning outcomes of high school students (Özmen, DemİrcİoĖlu, & Coll, 2009; Taşlıdere, 2013). students' worksheet preparation must fulfill certain conditions in order to become good quality worksheets. Good worksheet must fulfill didactic, construction, and technical requirements, namely: (1) Didactic conditions governing the use of universal worksheets can be used well for students who are slow or smart. students' worksheet places more emphasis on the process of finding concepts, and most importantly in students' worksheet there are variations in stimulus through various media and student activities. students' worksheet is expected to prioritize development social, emotional, moral and aesthetic communication skills. Student learning experience is determined by students' personal development goals; (2) Construction requirements related to language usage, sentence structure, vocabulary, level of difficulty, and clarity in students' worksheet; and (3) Technical requirements emphasize writing, drawing, appearance in students' worksheet. students' worksheet is declared of quality if it meets three criteria, namely validity, practicality, and effectiveness (Nieveen, 2007).

In fact, currently the existing students' worksheet does not meet the requirements of quality students' worksheet. This is in accordance with the results of a preliminary observation of several junior high school teachers in Lampung Province who were randomly selected, namely SMP N 1 Natar, South Lampung District, SMP N 22 Bandar Lampung and SMP N 15 Pesawaran, stating that the three schools used students' worksheet originating from publishers . The students' worksheet from the issuer after being analyzed has many weaknesses. These weaknesses include: the contents of the

students' worksheet only focus on the cognitive. The material description on the students' worksheet does not represent indicators in the syllabus, making it difficult for students to carry out the exploration and introduction to concepts. The application of student concepts emphasizes the completion of quantitative questions.

Unfortunately, worksheet that had been used in schools was conventional students' worksheet purchased from book agents who had not used a particular learning model (Sintia, 2015). Conventional students' worksheet does not make students find structured directions to understand the material provided so that students tend to be passive, not active in the learning process so that it is not in accordance with the nature of science learning which emphasizes providing direct learning experiences in finding concepts. As a result, most students score below the average of more than 50%. The low achievement of Indonesian students' learning can also be seen from several international research results, namely the results of the Trends in International Mathematics and Science Studies (TIMSS) 2015 said that Indonesia's science results ranked 44th out of 47 countries with an average value of 397 higher than the average value of Saudi Arabia, Marocco and Kuwait countries, namely 390, 352, and 337. The results of the 2015 Program for International Student Assessment (PISA) research also found that the ability of Indonesian students in mathematics, science, and reading was still low, namely Indonesia ranked 62nd out of 70 countries (OECD, 2015).

Various efforts can be made to improve student learning outcomes, one of which is the learning process using discovery learning models. Based on the results of previous studies: (1) Cohen (2008) states that learning using the discovery learning model influences the understanding of science concepts and scientific attitudes of students, namely there are differences in the average value of understanding concepts and scientific attitudes of students that are significant between groups of students learning with discovery models learning with groups of students who study with the direct teaching model. (2) Sintia (2015) also states that the development of students' worksheet based on discovery learning through a scientific approach to temperature and heat material was declared effective with the percentage of 79.41% of students completing KKM. On this basis, this research has developed students' worksheet based on discovery learning. Discovery learning is a learning model that emphasizes active students in finding their own concepts. According to Joolingen (1999), discovery learning is learning where students build their own knowledge by experimenting, and draw conclusions from rules / concepts from the experimental results. Based on the above background, it shows that students' worksheet is needed which can improve the mastery of students 'concepts, so research on the development of student worksheets based on discovery learning is done to improve the mastery of students' concepts.

▪ **METHOD**

The research method used was pre-experimental with the design of one group pretest-posttest design. The research was conducted in SMPN 15 Pesawaran Lampung in two classes, namely class VII-D as experimental class 1 and class VII-A as experimental class 2. Both classes used students' worksheet products based on discovery learning. The data obtained from the mastery of students' concepts in learning using students' worksheet based on discovery learning is done by using tests so that the results of the mastery of the science concept can be seen from the pretest and posttest scores. From the results of the pretest and posttest, the N-gain is calculated to determine the extent of the mastery of the science concept.

▪ RESULT AND DISCUSSION

Increasing students' mastery of concepts is an increase in mastery of students' concepts through the implementation of science learning using students' worksheet based on discovery learning as a result of development. The increase in mastery of student concepts is shown by the scores obtained by students in the concept mastery test (pretest and posttest), indicated by the N-gain score, ie the difference between the pretest and posttest scores is calculated based on the Hake equation. The mean results of mastery of student concepts are listed in table 1.

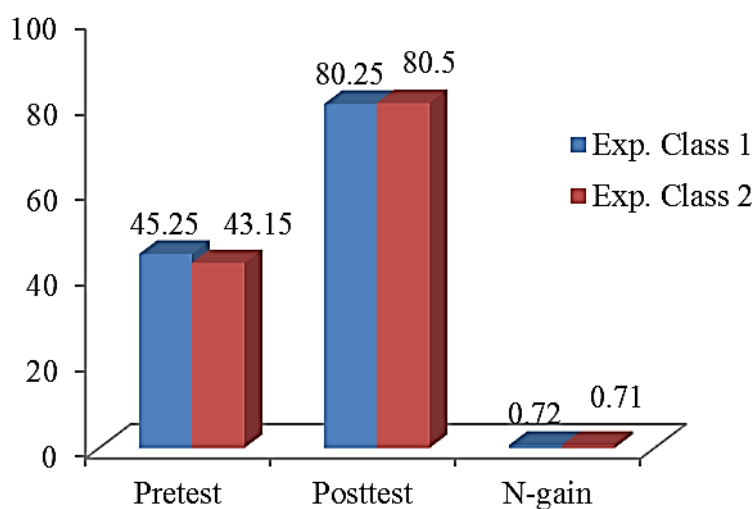


Figure 1. Students' concept mastery data

It can be seen that N-gain experimental class 1 has an average of 0.72 classified as high criteria so that it can be said that the experimental class 1 has a high increase in mastery of concepts. Experiment class 2 has an average N-gain of 0.71 with high criteria, it can be said that the experimental class 2 has a high increase in mastery of concepts. Based on the results of the study at the beginning of the learning obtained the value of mastery of students' concepts in the material changes in the objects around us on average is less satisfactory seen from the results of the pretest of the concept mastery. After using students' worksheet based on discovery learning there is an increase, this is based on the results of the posttest about the concept mastery. The results showed an increase in N-gain scores, this shows that science learning using students' worksheet based on discovery learning is able to improve mastery of students' science concepts. This is in line with the results of Kurnianto's research, et al (2015) that discovery learning learning models accompanied by students' worksheet can improve student learning achievement on aspects of knowledge and skills. Likewise with the opinion of Balim (2009) which states that learning through inquiry will be able to improve academic achievement, learning retention, and inquiry learning skills, both in the cognitive and affective domains of students. This is reinforced by Syafi'i, et al (2014) that Question based discovery learning that is used in learning by performing discovery learning stages can improve student learning outcomes. Thus, the results of the development of students' worksheet in this study can be used as an alternative in

helping teachers to improve the mastery of the concept of class VII SMP students on the material changes in the objects around us.

▪ CONCLUSION

The implementation of learning with students' worksheet is based on discovery learning in science learning to improve students' mastery of concepts very high. The increase in mastery of the science concept is shown through the N-gain score, which is the difference between the pretest and posttest scores. Based on the results of the research and discussion it can be concluded that the use of students' worksheet based on discovery learning has succeeded in increasing the mastery of concepts of students with high categories.

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