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The Effect of Inquiry Laboratory with Group Discussions Method on Improving of Students' Learning Outcomes

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Abstract: This study aims to determine the effect of laboratory-based inquiry learning models with group discussion methods in improving student learning outcomes. The research subjects were students of the 2012/2013 biology education who took the vertebrate zoology course. The sample used in this study was taken using a cluster random sampling technique of 2 classes. The concept discovery observation data in the form of quantitative data obtained through cognitive test sheets consisting of 25 questions and tested using the t test with a real level $\alpha = 0.05$. Based on the results of data analysis shows that there is an influence of laboratory-based inquiry learning models on diversity of vertebrate animals.

Keywords: laboratory learning, student learning outcomes, inquiry.

Abstrak: *Penelitian ini bertujuan untuk mengetahui pengaruh model pembelajaran inkuiri berbasis laboratorium dengan metode diskusi kelompok dalam meningkatkan hasil belajar mahasiswa. Subjek penelitian adalah mahasiswa pendidikan biologi angkatan 2012/2013 yang menempuh matakuliah zoology vertebrata. Sampel yang digunakan dalam penelitian ini diambil dengan menggunakan teknik cluster random sampling sebanyak 2 kelas. Data pengamatan penemuan konsep berupa data kuantitatif diperoleh melalui lembar tes kognitif terdiri atas 25 soal dan di uji dengan menggunakan uji t dengan taraf nyata* $\alpha = 0,05$*. Berdasarkan hasil analisis data menunjukan bahwa ada pengaruh model pembelajaran inkuiri berbasis laboratorium pada materi keanekaragaman hewan vertebrata.*

Kata kunci: *pembelajaran laboratorium, hasil belajar mahasiswa, inkuiri.*

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▪ INTRODUCTION

The development of various learning methods and models is still in the spotlight to achieve learning quality. The low quality of education was more due to the ineffectiveness of the learning process in the classroom (Hamre et al., 2013). This indicates that a revolution in learning is needed. According to Hosnan (2014) that the achievement of learning quality one of them uses the principle of providing a diverse learning experience through the application of various strategies and methods of learning that are fun, contextual, effective, efficient and meaningful. Achievement of learning objectives, until now the truth is still sought regarding the models and methods of learning that are appropriate in teaching students (Maulina, 2015; Shephard, 2008).

Teacher creativity is needed in carrying out the learning process for an achievement of good student learning outcomes (Hosnan, 2014; Korthagen, 2013; Núñez Pardo & Téllez Téllez, 2009; Lee & Erdogan, 2007). Learning model as one of the principles of achieving quality learning is needed in order to improve the quality of learning. Model is a systematic procedure of learning patterns to achieve learning goals and as guidance for instructors in planning and implementing learning activities (Hosnan, 2014). Thus model-based learning for an instructor becomes an important part, referring to the failure to achieve learning goals.

Biology Learning is a science learning that requires students to be able to develop ideas or creativity towards an object of view (Maulina, 2015). Therefore in its implementation, a model is needed which can reflect the characteristics of science learning. Inquiry is one of the learning models that encourages students to build a conceptual understanding. Inquiry learning emphasizes student activity to the maximum to find and find out (Banchi & Bell, 2008; Bell, Urhahne, Schanze, & Ploetzner, 2010; Hosnan, 2014; Shih, Chuang & Hwang). Inkuri learning activities also support the creation of increased activities, especially in honing student soft skills. The discussion method will build an informative cooperative relationship within group members (Maulina, 2015). The inquiry learning model is a series of learning activities that emphasize the process of thinking critically and analytically to find and find answers to a question in question (Sanjaya, 2006).

The implementation of learning by applying a self-evident model to construct concepts (constructing) knowledge is clearly in accordance with the experience data obtained during the learning process. Therefore, learning activities in vertebrate zoology courses are presented using wet preparation animals. Students will construct the characteristics and characteristics of animals belonging to the vertebrate sub-phylum and classification of animals into each class from the preparation of wet specimens through observation. Inquiry laboratory is applied to see the successful conceptual understanding of students in vertebrate zoological subjects. Thus the expectation of the implementation of inquiry-based learning is to find out the improvement in the quality and quality of student learning as measured by understanding concepts and can be used as a development of knowledge about learning for the team of lecturers involved in these learning activities. This study aims to determine the effect of learning incuri on improving student learning outcomes.

▪ METHOD

This study is a quasi-experimental study with the population in this study were undergraduate students of Department Biology Education, University of Lampung at 2012/2013 academic year. The sample used in this study was taken using a cluster

random sampling technique of 2 classes with 30 classes each. Observation data of concept discovery in the form of quantitative data obtained through cognitive test sheets consisting of 25 questions. All instrument of this research was validated by expert in biology content and education.

This research was applied to vertebrate zoology subjects with the main material of the characteristics and characteristics of vertebrate animals, the diversity of vertebrate animals, pisces, reptiles, amphibians, aves, and mammals. The research design used in this study was the pretest posttest control group. Analysis of the data test was carried out using the t test with a real level $\alpha = 0.05$ which was processed using the SPSS 17.00 calculation program. The acquisition of statistical data is then interpreted descriptively.

▪ RESULT AND DISCUSSION

Data obtained from calculations using the SPSS 17.00 program are presented in Figure 1 below. Figure 1 shows a comparison of the results of understanding concepts from the experimental class (group 1) and the control class (group 2). The experimental group (M = 38.9333) had a higher change compared to the control group (M = 6,700). The results of the analysis show that the data is homogeneous (F = 0.150; where p> 0.05). This shows that there is no variance between the experimental and control groups. In other words the data variation in the two treatment groups was the same.

Group Statistics

	kelompok	N	Mean	Std. Deviation	Std. Error Mean
gain	1,00	30	38,9333	15,59163	2,84663
	2,00	30	6,7000	16,02186	2,92518

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
gain	Equal variances assumed	,150	,700	7,897	58	,000	32,23333	4,08166	24,06300	40,40367
	Equal variances not assumed			7,897	57,957	,000	32,23333	4,08166	24,06287	40,40380

Figure 1. The result of t-test

Figure 1 shows that there is a difference at the level of 5 percent ($\alpha = 0.05$) where the results of the calculation of t count = 7.897 greater than 0.05. The results of this calculation means that the experimental class (group 1) has a significant change compared to the control class (group 2).

Vertebrate zoology is a compulsory subject which in its learning activities contains practical activities. Vertebrate zoology studies the diversity of vertebrate animals that includes five classes in the order of kingdom animalia. Vertebrate zoology in learning is a very complex subject which includes a classification system with special characterization at each grade level. The problem that arises is the wide diversity of vertebrate animals how students can easily master the concept of classification material to its taxonomic order.

The results of understanding the concept of students in vertebrate courses are presented in the display of data Figure 1. The results show that there is an effect of the implementation of inquiry learning on students' conceptual understanding of vertebrate zoology courses. Amin (2010) states that the implementation of science learning can use the now popular learning methodology namely constructivist and contextual learning. Inquiry as part of learning that adheres to constructivism can be a solution in science learning. In this contextual study as mentioned it was obtained through direct observation of the object of study with the acquisition of data as a basis for drawing conclusions. Shields (2006) states that inquiry learning begins with a question. The implementation of laboratory-based inquiry is carried out starting from a question about the subject matter that will be discussed at each meeting which then continues on a basic hypothesis that will be revealed. Through observation of the object studied, the hypothesis can be searched for truth. Data and facts become references in formulating concepts.

Mastery of concepts can be obtained from observations of observations of animal preparations. Students learn to understand the real characteristics seen from each observation, the differences and similarities of several animals so that students learn to group several animals at the same class level. The results of the observations during conducting research showed that students felt interested and enthusiastic about attending the lectures of Vertebrate Zoology. The learning process is fun and students are taught to have other abilities besides constructing an understanding of how to classify vertebrate animals based on traits that appear to be accompanied by factual data contained in the body of each vertebrate animal that is the object of observation.

The results of the study showed that there was influence on the application of the inquiry learning model compared to the control class. As stated by Maulina (2015) that through lesson study activities inquiry learning models can improve understanding of learning concepts and enhance student learning activities. Inquiry as a model teaches students to be careful and careful in making observations, so that appropriate conclusions can be obtained. Maulina (2016) states that students find it difficult to understand the material in cell biology lectures that have an impact on low learning outcomes, addressing this requires a solution in learning to present contextual lecture material that contains contemporary material related to real life. Being involved in learning to train students to contextually learn from observing objects directly. Thus, inquiry in biology learning as part of science is very relevant to be used in learning in which integrated processes, attitudes and scientific products (Minner, Levy, & Century, 2010).

The form of the concept understanding test provided is a cognitive test which shows that students in the experimental class have a higher understanding of the concept than the controls ($p > 0.05$). Doing learning in a combination in the laboratory makes students able to deduce data to build conclusions that are a general understanding of the concept. Studies in the laboratory generally emphasize an inductive approach to learning concepts (Abraham, 2011; Nivalainen, Asikainen, & Hirvonen, 2013). Explained that concept formation is an inductive process. Through learning experience gained during the learning process understanding of concepts is obtained.

▪ CONCLUSION

The results of this study can be concluded that to improve the understanding of the concept of learning, inquiry is one of the offers that can be applied in learning

science, especially biology learning. In science learning that requires a contextualization process, so that direct observations in the laboratory are suitable for use in vertebrate zoology lectures. Further research is needed to find out how much knowledge and understanding of concepts obtained by students and need to be reviewed the improvement of student activities which accompanies an increase in understanding of concepts with the implementation of inquiry in learning.

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