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PROBLEM BASED LEARNING (PBL) AND GROUP INVESTIGATION ON SCIENCE THINKING SKILL

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ABSTRACT

This research aims to know the significant difference of science thinking skill which is taught using Problem Based Learning (PBL) model and Group investigation (GI) of fourth grade student of SDN Dampit 03. This research uses Quantitative Approach with Quasi Experimental Comparative Research design. By using the Nonequivalen Control Group Design research design. The population of this study is all students of grade IV SDN Dampit 03. Sampling in this study using purposive sampling technique. Class IVa as experimental class and class IVb as control class. Instrument in this research is test. The results of the study through hypothesis test using t test with 5% significance level. show the value of T arithmetic> T table (2,158> 1,687) and significance <0,05 (0, 03 8 <0,05), then H refused H_a accepted. Thus, it can be concluded that there are differences in science thinking skills that are taught using Problem Based Learning (PBL) and Group Investigation (GI) model of fourth grade students of SDN Dampit 03.

Keywords: Science thinking skill, Problem Based Learning (PBL), Group Investigation (GI)

INTRODUCTION

Scince is one of the rational and objective subjects of the universe and everything in it. In general, Natural Science is a science that learn about the natural surroundings, and it can also be said that science is a collection of science that learn about the natural events around are arranged systematically. A good science learning should link the science to the daily life of the students. Students are given the opportunity to ask questions, generate student ideas, build curiosity about everything in their environment, build the skills necessary to learn. As a teacher must be aware that the understanding of elementary students is more likely in concrete or real examples that can be implemented in everyday life in accordance with the level of development and students' thinking skill. In the learning process, the teacher acts as a student-centered facilitator and learning activity. Student learning activities take place when teachers can design appropriate learning

strategies so that students are more creative, active, effective, and fun in the learning process.

However, from the observation, it is known that in some elementary schools the teachers are still using conventional learning by teacher method and assignment. In this teachers method, the teacher presents the material with the package book. After completing the materials, students are given the task to work on the problems contained in the work sheet so that less enjoyable learning , thinking skill or student achievement has not developed with the average value is still below the minimum standard of 68. Science learning process requires learning model so that students do not get bored and saturated in learning and more active and active in the learning process that can improveability to think . The ability to think critically of thinking skill is indicated by the categories of knowing, understanding, applying, interpreting, logically defining, analyzing causation, evaluating and predicting and solving a problem (Bloom, 2012) .

Thinking skills can be taught to students through learning (academic activities) (Pieterse et al, 2016) where teachers use methods, ways of teaching thinking skills (Vong and Kaewurai, 2016) and appropriate curriculum materials (Gadzella & Masten, 1998; Halpern, 1993; McMillan, 1987). In learning thinking skills, students must be able to communicate effectively and solve problems efficiently and require students to engage actively in problem-solving skills (Zivkovic , 2016).

From the problems presented above, a new strategy for active learning involving students should be sought. Active and fun learning activities can arouse students' curiosity in learning a lesson. So that the learning process takes place well, the teacher convey the material effectively while the students receive the material with full curiosity. But the ability to teach through small group collaborative activities will make it possible to promote active learning activities in a special way.

Science learning not only focuses on information absorption, but rather prioritizes the development of skills, information processing, and communication among students. For that the activities of learners need to be improved through exercises or tasks by working in small groups and explaining ideas to others (Hartoyo, 2000: 24). Therefore, to overcome the problems above, effective learning model and can improve student achievement is a model of learning *Problem Based Learning (PBL)* and *Group Investigation (GI)*.

Problem Based Learning (PBL) is a student-centered learning method, and the curriculum is presented in the form of existing problems (real) so that students have a high curiosity which will then solve the problem. *Problem Based Learning* Model *(PBL)* is a learning model that uses real-world problems as a context for students to learn about critical thinking and problem-solving skills, and to acquire essential knowledge and concepts from subject matter (Nurhadi, 2004) , (Arlah, 2016, Ghou, 2014) , develops long-term knowledge retention and is easy to apply (Goh and Dewey, 2016). PBLs can be embodied in a learning process integrated into the student worksheet to develop the ability of a priest through critical questions about everyday life (Choo, et.al, 2011).

Group Investigation is a learning process in which learners will seek to find information (ideas, opinions, solution data) related to learning from various related support sources, and students attempt to synthesize the truth of the information

obtained collectively. *Group Investigation (GI)* is a learning model that emphasizes student choice and control rather than applying classroom room (Shoimin, 2014) techniques. Model *Problem Based Learning (PBL)* and *Group Investigation (GI) are* widely used as research themes, not least from previous researchers claiming there is improvement of thinking skills through both models.

Based on the above description, the purpose of this research is to know the difference of science thinking skill which is taught using *Problem Based Learning (PBL)* and *Group Investigation (GI)*model of fourth grade students of SDN Dampit 03.

METHOD

This research using a quantitative approach. The design of the research conducted in this study is Comparative Quasi Experiments. The design of this study using *Nonequivalent Control Group Design,* in this study conducted *pretest* and *posttest* to control class and experiment class to be able to know the effect of *treatment* given. Schematic of research table like below:

The population of this research is all fourth grade students of SDN Dampit 03. Sampling is done using *Purposive Sampling* technique . In this study the researchers took 2 classes as a sample of the study. From the sample selected class IVa used as experimental class taught by using *Problem Based Learning* model *(PBL)* , While class IVb become control class taught by using *Group Investigation (GI)*model . The determination of control classes and experiments based on coin throws, this is because the initial ability of the two classes is almost the same before treatment is given . The instrument used in this study is a 20-item questionnaire that has been validated by a team of experts and has been tested in class V SDN Dampit 03 first. Instrument test is done through validity

Table 1 Schematic of Research Table

Group	*Pre-test*	Treatment	*Post-test*
Experiment	O1	X1	O2
Control	O3	X2	O4

(Arikunto, 2010: 126)

Information:

O_1 : *Pre-test* experimental group to determine initial capability

X_1 : Giving treatment to the experimental group by applying the *Problem Based Learning (PBL)*

O_2 : Post-test experimental group to know the results of thinking skills

O_3 : Pre-test the control group to determine initial capability

X_2 : Giving treatment to the control group by applying the *Group Investigation* learning model *(GI)*

O_4 : Post-test the control group to find out the results of thinking skills

test, reliability test, distinguishing power, and difficulty test. The process of data analysis is done through 3 stages of testing ie normality test to test what normal distributed data is not, homogeneity test to test sample homogeneity, and last test hypothesis to answer problem formulation using t test.

DISCUSSION

The student's initial ability data is presented on the el tab . 2

Table. 2 *Pretest and Postes* class values of Experiments and Controls

Value	Class	
	Experiment	Control
Pretest	65.25	62.63
Postes	84.25	78.15

Based on table 2 of the *Pretest* grade of the Per s account and Control grade, the average *Pretest* value in the experimental class is 65 and the *Pretest* value in the Control class is 63. The data of the science thinking skill, the average ratio of students› thinking skills to the science subjects in the experimental class is 84 , 25 and the average value of control class 78.15 .

The results of further research conducted based on the test table *Independent Samples Test so* obtained significant 0, 03 8 <0.05. Testing criteria: (α = 0.05). If sig> 0,05 then H_o = received, and if sig <0,05 then H_o = rejected. Hypothesis test is done to know the difference of experiment class and control class. Test results show $t_{arithmetic}$ with 95% confidence level dk = n1 + n2 - 2 = 37, t table value is 1.687. The value of $t_{arithmetic}$ seen from *Equal Variances Assumed* is 2.158> 1.687 with the value of Sig. *(2-tailed)* is 0.038 <0.05. The conclusion is that Ho is rejected and Ha is accepted. This means "There is a difference of science thinking skill which is taught using *Problem Based Learning (PBL)* and *Group Investigation (GI).*

Based on the result of hypothesis test using t test, significant value at pretest greater than 0,05 is 0,490> 0,05 so pretest data test show there is no difference of thinking skill which is taught using *Problem Based Learning (PBL)* and *Group Investigation (GI).* While the posttest significant value obtained is 0.038 which shows the value of sig 0.038 <0.05 then the posttest can be said there is a difference in science thinking skills are taught using *Problem Based Learning (PBL)* and *Group Investigation (GI)* model of fourth grade students SDN Dampit 03 .

From the data obtained from the results of the test of thinking skills or after learning and *posttest* in the experimental and control class, there is a difference in mean value of thinking skills between the experimental class and control group. From table 3 the average science-thinking skill is evident that the average for the experimental group is higher than the average achievement for the control group. The average value of thinking skills for the experimental class is 84 and the average thinking skill for the control class is 78. Based on the data presented, the *Problem Based Learning (PBL)* Model is more effective in improving thinking skills than the Learning Model *Group Investigation (GI)* .

In this study, students who have been divided into two classes, each required to develop the ability to think through the model *Problem Based Learning (PBL)* and *Group Investigation (GI).* The thinking skills achieved show that there is a change in different thinking skills, between pretest to posttest. After the

students were treated with different models, this indicated a difference in thinking skills taught using *Problem Based Learning (PBL)* and *Group Investigation (GI)*

The average difference in the group can occur because the learning that occurs in the experimental class can be better understood by the provision of treatments in the form of *Problem Based Learning* (*PBL).* The average difference indicates the effect after the different treatments, ie the experimental class is taught using *Problem Based Learning (PBL)* while the control class is taught using *Group Investigation (GI).*

Problem-based learning is the learning process that the starting point of learning based on problems in real life and then on the issue of students are stimulated to study this issue based on the knowledge and experience they have had before (*prior knowledge*) so that from *prior knowledge* of this will form the knowledge and experience new. Discussion using small groups is a key point in the application of PBL (Zulharman, 2007).

According to Suyatno, (2009: 56) *Group Investigation (GI)* is a cooperative learning involving small groups where students work using *cooperative inquiries* , planning, projects, and group discussions and then present their findings to the class. In the PBL, students identify problems, collect data, and use the data to solve problems that teachers provide, whereas in the GI, choose the topic of problems, plan learning procedures, implement, elaborate and combine ideas, teachers as consultants then present their findings.This can be proved in this study, students develop the ability to think, exchange opinions to develop interpersonal skills and group dynamics. It is also supported by the change of average of higher thinking skill from pretest to posttest which is taught using *Problem Based Learning (PBL)* model and *Group Investigation (GI)*

CONCLUSION

Based on the research conducted, the results of hypothesis testing using t test obtained T count> T table (2,158> 1,687) and significance <0,05 (0,038 <0,05), this indicate that there is difference of science thinking skill which is taught by *problem Based Learning (PBL)* and *Group Investigation (GI) of* fourth grade students of SDN Dampit 03. The difference was also seen from the average score of science thinking skill in the previous experiment class from 65.25 to 84.25 and the previous control class from 62.63 to be equal to 78.15 both have different thinking skills, where the experimental class experienced a higher increase than the control class.

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