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Science Learning Outcomes Student Class IV Through Application of Constructivist Learning Model with Direct Instructional Model in Primary Schools

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Abstract
The purpose of this study was to determine differences in student learning outcomes using a constructivism learning model with the direct learning model in material science lessons Thermal Energy. This type of research is a Quasi-Experimental Research. Subjects in this study is the fourth grade students of SDN Cimanuk 01 of 60 people consisting of 30 class A and 30 Class B. The data were obtained from the pretest, potest and documentation. For the analysis of quantitative data were processed with statistical formulas. Based on the results of the research data analysis and hypothesis testing can be concluded that: There is a difference in student learning outcomes between experimental class using constructivism learning methods with classroom control direct teaching methods. This can be evidenced from the calculation using t-test normal data and homogeneous, ie df = n1 + n2 - 2 = 30 + 30-2 = 58, t table (0.05; 58) = 1.67155, t = 2, 91 t ≥ t table, then Ha accepted and Ho rejected. 2.91≥ 1.67155 obtained so Ha is received.
Keywords: Science Learning Outcomes, Contextual Learning, Learning Direct, Experimental Research

1. Background

Education is the most important factor in life, a good education produces quality human resources and be able to compete. School as one of the executors is expected to implement the learning process of learning well. Good learning process is a learning process that can make students actively involved in learning. Teachers as one of professional educators with the primary task of educating, guiding, directing, train and evaluate students on education in the formal channels.

In the educational process necessary to have a learning strategy, the use of methods, media and appropriate learning models so as to create an atmosphere of learning that is comfortable and can excite student learning in all subject areas, especially in science subjects in primary school. In the process of learning science, should the link between learning material to students' lives everyday, so there is a correlation between the activity of students in the classroom to real-world life.

According Powler in Usman Samatowa (2011: 3), Natural Sciences (SCIENCE) is the science related to natural phenomena and material are systematically arranged on a regular basis, generally accepted in the form of a collection of observations and experiments / systematic (regular) means knowledge it is composed of a system, not a stand-alone, one with the other interrelated, mutually explain that entirely is a unified whole, while the generally accepted meaning of that knowledge is not only applicable or by a person or persons by way of experimentation of the same will get results the same or consistent. From the statement of theoretical science is a science, but the theory was based on observations, experiments on natural phenomena by using a special method.

Based on the above definition, SCIENCE relating to the natural way of finding out about the learning process in a systematic and emphasizes providing direct experience to develop the potential in order to explore and experience about scientific nature. SCIENCE was instrumental in helping students to understand natural phenomena. It became a reference for teachers in science teaching should use learning strategies, the use of methods, media and learning model that makes the children are not passive in the learning process in the classroom. In addition the use of methods, models and strategies appropriate learning a good effect on learning in the classroom.

Therefore, teachers are required to have the creativity, since elementary school age stage of concrete operational thinking is a real think they see in their surroundings. In accordance with the stage of development of the students, this study used the constructivism learning model to explore the concept of beginning students, using this model students are expected to be more active in the learning process. Because the constructivist approach is a misunderstanding to say that knowledge is formed in a person's mind and provides the opportunity for students to explore their own knowledge.

In constructivism learning, learning success is not only dependent on the environment or learning conditions but also on the students' knowledge. Knowledge can not be moved intact from teacher to student's mind, but actively constructed by the students themselves through real experience. In the learning process will be changes in the behavior of individuals or learners, the change could be in the cognitive, affective and psychomotor. Thus, it is clear that the stage of elementary school age children thought to be linked to real things

and the beginning of knowledge, students should be built on its own so that teachers are expected to choose a learning strategy, the use of methods,

But in fact, a method often used by teachers, the lectures, the students just listen to the teacher at the time explained without involving the students' active learning, so students are not given the opportunity to develop his own knowledge. The learning process is centered on the teacher and students to be passive. From the results of field observations obtained a description that the learning process is not optimal considering the learning objectives. A teacher needs to consider the initial conception of students before the lesson. Otherwise, an educator will not succeed instill the concept of the right to the learners, thus learning difficulties will arise.

Selection of the model used by the teachers are very influential on students' cognitive learning outcomes. The success of a subject affects how a teacher to run the learning that has been planned. The hope is that students play an active role in learning, students can understand what they have learned, as well as the students were able to complete certain enrichment provided after learning. From the above conclusions, learning that occurs at this time has a tendency on the activity of teachers only. Low student learning outcomes as estimated method used by the teacher is using a lecture, assignments, thus making passive student during a lesson. With the current economic conditions, the authors took the initiative to use the constructivism learning model.

2. Theoritical review

2.1 Direct Learning Model

According Arends (1997) in (Trianto, 2013: 41), direct instructional model is one model of learning that is designed specifically to support student learning relating to knowledge dekleratif (can be expressed with words) and procedural knowledge are structured which can be taught with the pattern of activity gradually, step by step. Besides the direct teaching model indicated also to help students learn the basic skills and obtain information that can be taught step by step.

According Kardi and Nur (2000: 8-9) in (Trianto, 2013: 44), although the purpose of learning can be planned jointly by teachers and students, direct learning model is primarily centered on the teacher so that students tend to be in a passive position.

2.2 Constructivism Learning Model

According to Good & Brophy in Mark K.Smith, et al (2010: 84) Constructivists believe that "learners construct their own reality or at least interpret it based on the perceptions of their experience, so that the individual's knowledge becomes a function of experience, mental structure, and confidence previous conviction of a person who is used to interpret objects and events ". Meanwhile, according to Janasson in Mark K. Smith, et al (2010: 84) states constructivism is what a person knows persepsifisik based on social and understood by the mind ".

Constructivism is the process of building or developing new knowledge in the cognitive structure of students based on experience. According to Piaget in Samatowa (2011: 54), states that the implications of view of constructivism in school is that knowledge can not be transferred intact from teacher to student's mind, but actively constructed by the students themselves through real experience.

According to West & Pines in Samatowa (2011: 54), which according to the constructivist view of learning success depends not only on the environment or conditions of learning, but also at the beginning of students' knowledge. Learning involves the formation of a "meaning" by the students of what they do, see, and hear. Constructivism, on the other hand, proposed a learning experience aims to open where methods and learning outcomes are not easily measured and may not be equal to each learner. (Mark K. Smith, et al, 2010: 100).

3. Research methodology

The method used in this research is quasi-experimental. According Sukmadinata (2010: 207) is called a quasi experiment because it is not an experiment but as a pure pure. This experiment also commonly called quasi-experiment. Because of the variety of things, especially with respect to the control variables, the possibilities can be difficult once pure experiment. In this quasi experimental problem formulation should contain causal or causal relationship between the variables that have been found at the time of formulating the background. This study included research into the existing theory test (Deni Darmawan, 2014: 51),

Later in this quasi experimental needed treatment usually indicated the experimental class and is expected this treatment can give different results, that is much better than the control class. Why is that, because of the control class is not given treatment (treatment), as to what we ujikan (Deni Darmawan, 2014: 52),

The study design used is non-Aquivalen pretest-posttest control group design. In this design, there are two groups were selected at random, then given a pretest to determine the initial state representing the difference between the experimental group and the control group. The following table research design:

Table 1.2 Research Design

(Sukardi, 2008: 185)

Group	pretest	Treatment	posttest
Experiment	Y1	X1	Y2
Control	Y1	X2	Y2

Information :
X1: Constructivisme Model
X2: Direct learning model
Y1: Delivery of the initial test (pretest)
Y2: Giving a final test (Posttest)

According to the table above, this study was conducted by administering a pretest in an experimental class and control class before being given treatment in the form of application of learning models. It aims to measure the ability of students to the science lesson to be taught. Then on learning activities, the experimental class were treated by using a constructivism learning model. While in the control group treated with the direct learning model. The last stage is given a posttest to determine the students' understanding of the concept after being treated in the form of the application of constructivism learning model and learning modeldirectly,

4. Results and Discussion

This research was conducted at SDN 01 Cimanuk Cimanuk sub district, Pandeglang, in Class IV consisting of 2 classes as samples. Class IV B as an experimental class was taught using a constructivism learning model, while class IV A as the control class taught by direct learning model. The subject of science is taught in this study is Thermal Energy.

Below is presented the research data in the form of the final test calculation results of the experimental class and control class. The data in this study is data collected from the pretest and post-test results that have been given to students of SDN 01 Cimanuk Cimanuk sub district, Pandeglang.

Of the 30 students in the experimental class before being treated to get the average value of 44. The best value obtained by the students before and were subjected to the experimental class is 60, while the lowest value obtained by the students in the experimental class is 33. However, after being treated in the form of Constructivist learning model application during the learning process, obtained an average value of 81. the best value obtained after treatment by the students in the experimental class is 100, while the lowest value obtained by the students is 60.

Meanwhile, of the 30 students in the class control before being treated to get the average value of 40.73. The best value obtained by the student prior to being treated in the control group was 60, while the lowest value obtained by the students in the control class is 27. However, after being treated in the form of direct learning model application during the learning process, obtained a score with the average value of 62 , 5. The best value obtained after untreated control class is 80, while the lowest value obtained was 40

Differences Learning Outcomes Grade Science Class Experiment and Control

Science learning outcomes differences between the experimental class and control class, can be seen in the following table:

Table 1.2 Differences Between Student Learning Outcomes Science Experiment Class and Class Controls

Statistics	class Experiment		classroom Control	
	pretest	*posttest*	*pretest*	*posttest*
The number of samples (N)	30	30	30	30
The highest score	60	100	60	80
The lowest value	33	60	27	40
mean ($\overline{X}$)	44	81	40.73	62.2
Median (Me)	43	82	45.89	63.4
Mode (Mo)	36.61	79.5	41.5	65.31
Variance (S2)	73.10	91.74	70.13	102.26
The standard deviation (S)	8.55	9.58	8.37	10,11

The above data can be seen the difference between the experimental class and control class. Experimental class of 30 students both pretest and posttest obtained average value is higher than the control class also consists of 30 students.

This shows that the science student learning outcomes after being treated on the subject of Thermal Energy in the experimental class that uses Constructivism learning modelhigher than the control class that uses a direct instructional model. , Differences in cognitive science student learning outcomes of the average value data pretest and posttest the two groups can be seen in the following diagram:

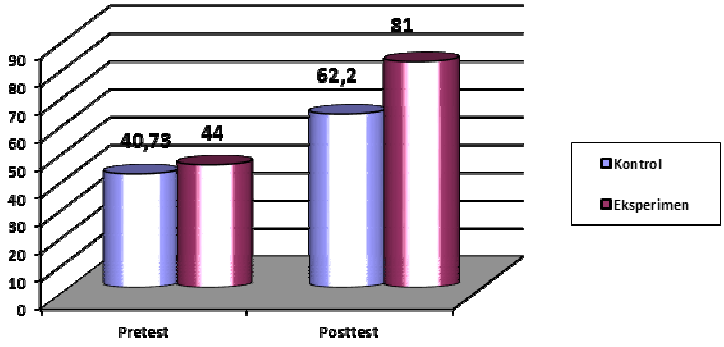

Figure 1.1
Diagram pretest and posttest data Class Value Control and Experiment

Based on the above diagram, we can see there are differences in learning outcomes of the two groups, in which the higher learning experimental group than the control group. This is because the experimental group which uses a constructivism learning model, students learn in an atmosphere that is more active than the control group who tend to be passive. In the experimental class, the students learn by linking new knowledge is their experience, each question and answer with the teacher, talk to each other and work together, so that the concept can be easily accepted given student. In contrast to the control group which only received materials from the teacher's explanation (lecture) and frequently asked questions, so as to make the students feel bored and passive. Therefore,

Constructivism learning model is a model of learning that can be developed on students, giving students the opportunity to think about the experiences that the students think creatively, imaginatively, encouraging reflection on theories and models, recognize scientific ideas at the right time.

Robert E. Yager in O'Rourke (2008: 17-18) argues that constructivism learning phase consists of four phases, in which the first stage is the stage Invitational, at the invitation identifying the initial conception stage prior to the implementation of learning students do. This can be done through activities such as observing the curiosity of students, students answer the question, consider the possibility of answers to questions, noting things that are not expected to, and recognize situations that are expected of students.

Next is the stage of exploration, the implementation phase of learning by involving students actively explore new information. The activities can be done at this stage of exploration is the teacher invites students to focus on learning, discussing develop alternative possibilities, looking for information, to experiment with the tools and materials that have already provided by the teacher, observe specific symptoms, modeling, collect and process the data, using the strategies of problem solving, choosing sources appropriately, discuss solutions with others, designing and conducting experiments, particsciencete in discussions, recognizing the risks and consequences that arise, define parameters and investigation, analysis data, and so on.

Then proceed to the stage of submission of explanations and solutions, which is the stage of discussions among students both individually and in groups. These discussions can also take place with the teacher. The activities take place at the stage of submission of explanation (explanation) and the solution (settlement) is to communicate information and ideas, build and explain the model, building a new annotation, review and peeling completion, use evaluation group, post answers or solutions, determining the appropriate cover, and integrate solutions with the knowledge and experience.

And the last stage is Taking Action or taking action stage is the final stage of learning. At this stage the students formulate the results of exploration and discussion. At this stage also provided an evaluation by way of answering the questions posed by the teacher, either orally or in writing. The activities can be performed on the stage of taking action is to make decisions, use their knowledge and skills, transferring knowledge and skills, a variety of information and ideas, to answer new questions raised by teachers, and develop the results and ideas.

Based on the above, efforts to improve the quality of science teaching, experts developed various models of learning which one of them constructivism learning model in the view of Piaget. This view found in the children's learning process to build his own knowledge and gain a lot of knowledge from outside the school (Dahar, 1989: 160). Hence each student will bring their preconceptions acquired during interaction with the environment in learning activities.

Then, the success of this study also confirmed previous research that is relevant, as did Hapsari Sumi Tri Rr (2010), entitled "Application of Constructivist Learning Model to improve learning outcomes SCIENCE"which states that the experimental class Constructivist models can affect student learning outcomes, dimaana experimental class is higher than the control class.

Based on research that has been done, one reason which is also a study with constructivism model can

affect student learning outcomes increase of the learning process. It can be seen from the results of the research show that students are excited to work together with friends and can help friends who have difficulty in understanding the learning ability in discussion groups, in addition to the students construct their own knowledge either individually or in groups. This is consistent with the final stages: stage*filing of explanation*and the solution, which is the stage of discussions among students both individually and in groups. These discussions can also take place with the teacher. The activities take place at the stage of submission of explanation (explanation) and the solution (settlement) is to communicate information and ideas, build and explain the model, building a new annotation, review and peeling completion, use evaluation group, post answers or solutions, determining the appropriate cover, and integrate solutions with the knowledge and experience.

Constructivism model described by Hilda (2009) have examined the impact on the value of cognitive, affective and psychomotor. This study proves that constructivism model able to improve on all three realms.

Research conducted in the control classes implement the direct learning model. In the study, as it is commonly applied previously, the learning activities tend to be centered on the teacher, the teacher gives the material with a lecture, followed by giving assignments to the students, learning becomes less effective as a result. In the direct instruction of students tend to be passive because only listened to the teacher so that less interaction between students and teachers.

Stages in direct instructional model begins with the stage outlines the objectives and prepare students, in which teachers convey the purpose of learning and prepare students to start learning. Then, proceed to the stage of presenting information. At this stage, the teacher gives the material in the form of lectures and then the students move kebuku note continued. The next stage is the stage of the training guide. At this stage the students were given brief training and meaningful to students truly master the concepts learned. Then, the next stage is the stage of checking understanding and provide feedback. At this stage, the teacher gives oral or written questions to the students and teachers to respond to students' answers. The last stage is the stage provides an opportunity for advanced training and implementation. At this stage, teachers assign work to students in the form of chores or homework (homework) independently and apply newly acquired skills independently to the next lesson. Direct learning model has the advantage, that not only learning in the form of lectures, but can training or practice, and teamwork. The weakness is centered on the teacher and instructional form of lectures, which teachers could deliver teaching material, frequently asked questions and were assigned. This can be evidenced from the learning management system dilakuakan by teachers must guarantee student involvement, mainly through watching, listening, and recitation (frequently asked questions) are planned (Kardi and Nur, 2000). teachers assign work to students in the form of chores or homework (homework) independently and apply newly acquired skills independently to the next lesson. Direct learning model has the advantage, that not only learning in the form of lectures, but can training or practice, and teamwork. The weakness is centered on the teacher and instructional form of lectures, which teachers could deliver teaching material, frequently asked questions and were assigned. This can be evidenced from the learning management system dilakuakan by teachers must guarantee student involvement, mainly through watching, listening, and recitation (frequently asked questions) are planned (Kardi and Nur, 2000). teachers assign work to students in the form of chores or homework (homework) independently and apply newly acquired skills independently to the next lesson. Direct learning model has the advantage, that not only learning in the form of lectures, but can training or practice, and teamwork. The weakness is centered on the teacher and instructional form of lectures, which teachers could deliver teaching material, frequently asked questions and were assigned. This can be evidenced from the learning management system by teachers must guarantee student involvement, mainly through watching, listening, and recitation (frequently asked questions) are planned (Kardi and Nur, 2000).

5. Conclusion

Based on the results of research in primary school Cimanuk 01 that obtained the following conclusions, there are differences in student learning outcomes in subjects of Natural Sciences between Constructivist learning models and models of Direct Teaching. This can be evidenced from the calculation using t-test normal data and homogeneous, ie df = n1 + n2 - 2 = 30 + 30-2 = 58, t table (0.05; 58) = 1.67155, t = 2, 91 t ≥ t table, then Ha accepted, Ho rejected. 2.91 ≥1.67155 obtained, so Ha is received

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