Difference Analysis of Physics Learning Result Based on Learning Model

Elia Putri, Jufri Fajri, Ummi Habibatul Islamiyah, Muhammad Nasir

To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v8-i3/3913 DOI: 10.6007/IJARBSS/v8-i3/3913

Received: *06 Feb 2018,* ***Revised:*** *02 Mar 2018,* ***Accepted:*** *15 Mar 2018*

Published Online: 25 Mar 2018

In-Text Citation: (Putri, Fajri, Islamiyah, & Nasir, 2018)

To Cite this Article: Putri, E., Fajri, J., Islamiyah, U. H., & Nasir, M. (2018). Difference Analysis of Physics Learning Result Based on Learning Model. *International Journal of Academic Research in Business and Social Sciences*, *8*(3), 186–194.

Vol. 8, No.3, March 2018, Pg. 186 – 194

http://hrmars.com/index.php/pages/detail/IJARBSS **JOURNAL HOMEPAGE**

Difference Analysis of Physics Learning Result Based on Learning Model

Elia Putri[1], Jufri Fajri[2], Ummi Habibatul Islamiyah[3], Muhammad Nasir[4]

[1] Lecturer University of Muslim Nusantara Al-Washliyah, Medan. Indonesi, [2] Faculty of Applied Social Sciences, Universiti Sultan Zainal Abidin, Terengganu. Malaysia, [3] Faculty of Teaching and Learning, Sekolah Tinggi Agama Islam (STAIN) Teungku Dirundeng Meulaboh. Indonesia, [4] Faculty of Islamic Contemporary Studies, Universiti Sultan Zainal Abidin, Terengganu. Malaysia

Abstract

This research is to know the result of student learning in class by using learning model of reciprocal teaching on subject matter of gas kinetic theory. The result of student learning in direct instruction class is by using direct learning model on the subject matter of gas kinetic theory. The goal is to know the effect of learning model reciprocal teaching on student learning outcomes on the material kinetic theory of gas. This research method is an experiment with research design of free test and post-test. The population in this study is the students of class XI Semester I High School An-Nizam Lessons Year 2017/2018 which amounted to 116 people. This research sampling technique with simple cluster random sampling is by taking randomly two existing classes from three classes. One class is presented using a reciprocal teaching-learning model and one other class is presented with a direct instruction model. Based on data analysis and hypothesis testing, from data processing can be concluded that there are differences in student learning outcomes based on learning models.

Keywords: Physics Learning, Learning Model.

Introduction

Education plays a very important role in the survival of human life. Starting from the success in the field of education a nation to go forward. Through education is expected to produce qualified human resources and able to answer the challenges of the times that ultimately can realize the progress and prosperity of the nation.

The reciprocal teaching-learning model (inverted learning or two-way learning) is expected to motivate students to actively engage in problem-solving. This is because in this learning model students are exposed to situations that push their limits. This model of learning provides an opportunity for students to become learners as they seek to master a problem. So after they

master it, they become teachers for their friends who are still learning. Learning outcomes are often interpreted as the values achieved in learning. According to Nana Sudjana (2005: 22), learning outcomes are the abilities that students have after he received his learning experience.

Learning Model Reciprocal Teaching

The teaching of reciprocal teaching is one of the learning models that enable students to study a coherent, valuable, and meaningful set of knowledge.According to Wahyudin (2009), there are four basic strategies that help students to realize and react to signs of failure of understanding. Among others are Questioning, Clarifying, Summarizing, and Predicting. These strategies have two goals, namely to increase understanding and to monitor understanding. All this takes place in small groups that are maintained, monitored by teachers or tutors. Basically, reciprocal learning is developed as a technique to help teachers bridge students who show the gap between decoding skills and comprehension skills.

Direct Instruction Model

Direct instruction or direct instruction is known as active teaching. Direct learning is also called whole-class teaching. The mention refers to the style of teaching in which teachers are actively involved in carrying the content of the lesson to learners and teach directly to the entire class (Suprijono, 2009: 46). Modeling is a major approach to direct learning. Modeling means demonstrating a procedure to learners. Direct learning with a modeling approach requires full mastery of what is learned (modeled) and requires practice before delivering it in the classroom. Teachers must be competent to the behavior they want to model in the less-than-competitive learning that modeling will not be effective.

Direct learning is designed for the mastery of procedural knowledge, declarative knowledge (factual knowledge) as well as various skills. Direct learning is intended to complete the two learning outcomes: the mastery of well-structured knowledge and skills acquisition.

Table I
Direct Instruction Model

Phase	The Role of The Teacher
Phase 1 Deliver goals and prepare students	The teacher explains the background information of the lesson, the importance of the lesson, prepares the students to learn
Phase 2 Demonstrate knowledge and skills	The teacher demonstrates the skills correctly, or the presentation of information step by step
Phase 3 Guide training	Teachers plan and provide initial training guidance
Phase 4 Check your understanding and provide feedback	Checks whether the student has successfully performed the task well, giving feedback
Phase 5 Provide opportunities for advanced training and deployment	Teachers prepare opportunities for advanced training, with special attention to application to more complex situations and everyday life

Direct learning models can be applied to any subject. But the most appropriate for performance-oriented or performance-oriented subjects, such as reading, writing, math, language, art, biology, physics, chemistry, and physical education. The direct learning model is also suitable for skills components in subjects that are more information-oriented, such as history, sociology, and the like.

Literature Review

The previous reciprocal teaching-learning model has been studied by Lestari (2016), which is the study mentioned that the development of reciprocal teaching pair share model refers to a cooperative approach which will improve students' thinking skill. Learning model strategy is a learning model to foster students' awareness of thinking, solve problems together by integrating and applying the skills and knowledge of students. Thus thinking activities become more focused because there is a demand to report the results of his thinking to his friends.

Novitasari (2015) stated in his study that learning model of learning result with mind mapping technique can improve student's learning motivation. Students look more attentive to the explanations of their own friends during the presentation, whether it's a small topic presentation in a group or a presentation of the team's topics in front of the class. So that each student can

link each topic learned with another topic from their friends in one group. Thus it can foster a more confident attitude and satisfaction with the topics they have already gained to be presented in class.

Furthermore, Fauzi (2016) mentions the project-based and conventional learning models affect the student learning outcomes. Gain good post-test results in the experimental class because students are interested and motivated with project-based learning. That way, student learning outcomes will increase because students are able to receive lessons and be able to apply the learning correctly. Through the project, tasks can make students independent, train student responsibilities or tasks that have been given by teachers, and invite students directly involved in learning.

Research Methodology

To find out the results of physics learning, students will be given a test. The test is pre-test (before treatment) and post-test (after treatment). Thus, the design of this study can be seen in the table as follows:

Experimental Design Tables

Sample	Treatment	Post-test
Class Reciprocal teaching	X_1	T_1
Class Direct Instruction	X_2	T_2

Explanation :

T_1 = Post-test class Reciprocal
T_2 = Post-test class Direc Introduction
X_1 = Treatment with Reciprocal teaching learning model
X_2 = Treatment using Direc Introduction model
Y = Learning outcomes

Results

The data obtained from this research is a raw score obtained from the final test of gas kinetic theory teaching in the Reciprocal teaching model classroom that is class XI IPA 1. Next class using Direct Instruction learning is class XI IPA 2 which is then processed for hypothesis testing. A score of student learning result using Reciprocal teaching-learning model and a score of student learning result by using Direct Instruction learning model analyzed as follows:

Results Learning Student Learning with Reciprocal Teaching Learning

Student code	Score	Student code	Score
S-01	19	S-16	16
S-02	19	S-17	16
S-03	19	S-18	15
S-04	19	S-19	14
S-05	18	S-20	14
S-06	18	S-21	14
S-07	18	S-22	14
S-08	18	S-23	13
S-09	18	S-24	12
S-10	18	S-25	12
S-11	17	S-26	11
S-12	16	S-27	10
S-13	16	S-28	10
S-14	16	S-29	9
S-15	16	S-30	9

The average value of student learning outcomes by using the reciprocal teaching-learning model is:

$$X = \frac{\sum X_1 f_1}{\sum f_1}$$

$$X = \frac{449}{30} = 14{,}96$$

$$S_2 = \sqrt{\frac{n \sum f_1 x_1^2 - (\sum f_1 x_1)^2}{n(n-1)}}$$

$$= \sqrt{\frac{210465 - 201601}{30\ (29)}}$$

$$S = \sqrt{10{,}188} = 3{,}19$$

Learning Results Learning Student Learning with Direct Instruction Learning

Student code	Score	Student code	Score
M-01	18	M-16	14
M-02	17	M-17	14
M-03	17	M-18	13
M-04	17	M-19	13
M-05	17	M-20	13
M-06	17	M-21	13
M-07	16	M-22	13
M-08	16	M-23	13
M-09	16	M-24	12
M-10	16	M-25	11
M-11	15	M-26	11
M-12	15	M-27	10
M-13	15	M-28	10
M-14	15	M-29	9
M-15	14	M-30	7

The average value of student learning outcomes by using direct instruction is :

$$\bar{X} = \frac{\sum f_i x_i}{\sum f_i}$$

$$\bar{X} = \frac{421}{30} = 14{,}03$$

$$S_2 = \sqrt{\frac{n\sum f_1 x_1^2 - (\sum f_1 x_1)^2}{n(n-1)}}$$

$$= \sqrt{\frac{30\,(6123{,}5) - (421)^2}{30\,(30-1)}}$$

$$= \sqrt{\frac{6464}{870}} \quad = \sqrt{7{,}429} = 2{,}72$$

$$S^2 \text{ gab} = \frac{(n1-1) + Sx_1{}^2\,(n2-1)Sx_2{}^2}{n1+n2-2}$$

$$S^2 \text{ gab} = \frac{(30-1).3{,}19 + (30-1).2{,}72}{30+30-2}$$

$$S^2 \text{ gab} = \sqrt{2{,}955}$$

$$S^2 \text{ gab} = 1{,}71 = 2$$

Testing the hypothesis of student learning outcomes is the result of learning physics by using the model of learning reciprocal teaching and direct instruction learning model that is done by using the test "t":

$$t = \frac{\overline{X_1} - \overline{X_2}}{S\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$= \frac{18,1-12,6}{2\,x\,\sqrt{\frac{1}{30}+\frac{1}{30}}}$$

t =10,6

From statistical calculations:

$t_{(s1-1/2a)(n1+n2-2)} = t_{(1-1/20.05)(30+30-2)}$

$t = 0,975:58$

Since in table t for dk = n1 + n2 -2 = 58 with a = 0.05 is not in the distribution list t, then to find the price can be determined by linear interpolation as follows: $t_{(40:0,975)}$ = 2,02 and $t_{(60:0,975)}$ = 2,00 then :

$$t_{(40:0,975)} = \frac{t(40:o,975)-t(60:0,975)}{40}(60-58) + t(60:0,975)$$

$$= \frac{2,02-2,00}{40}\,x2 + 2,00$$

$$= \frac{0,04}{40} + 2,00$$

$$= 0,001 + 2,00 = 2,001$$

From the results of the calculation of statistics t arithmetic above is greater than the price of t table (t hit = 10,6> t (1-a) = 2,001).

This research was conducted in class XI IPA Semester I in two different treatment classes, where the first class was given the learning model of reciprocal teaching. While in the second class is given direct instruction learning model on the subject of gas kinetic theory in High School An-Nizam Medan Lesson Year 2017/2018. Descriptive research results are shown by average price and standard deviation of physics lesson scores on the subject of gas kinetic theory with reciprocal teaching-learning model of 14.96 and 3.19 respectively. As for the model of direct instruction average and standard deviation obtained is 14.03 and 2.72. Thus there is an average difference of 0.93 and 0.47. In the normality test, it is known that the score of student learning outcomes on the subject of the kinetic gas theory comes from the population that distributed norms. This is indicated by the price of L_o = 0.093 (for the reciprocal teaching-learning model) has a larger price compared to the price of L = 0.161 and L_o = 0.109 (for direct instruction model) which has a smaller price compared to the price L = 0.1519 the real a= 0,05 for the same sample size (n_1 = n_2 = 30). While on testing the homogeneity of variance is known that F_{count} = 1.17 is smaller than F_{table} = 1.80. The average results obtained on the learning with the reciprocal teaching model tested its significant with 5% risk, in other words, this learning model showed a better influence in improving student learning outcomes on the subject of gas kinetic theory to students of class XI IPA Semester I High School An- Nizam Medan Lesson Year 2017/2018. Learning Reciprocal teaching is one of the learning models that enable students to study a

coherent, valuable, and meaningful set of knowledge. And to build up an exchange of strategies that will enable them to learn new content by themselves.

Conclusion

Based on the results of research obtained from the data analysis and hypothesis testing, from data processing can be concluded that there are differences in student learning outcomes based on learning models. This learning model showed a better influence in improving student learning outcomes on the subject of gas kinetic theory to students of class XI IPA Semester I High School An- Nizam Medan Lesson Year 2017/2018.

References

Fauzi. (2016). Pengaruh Model Pembelajaran Terhadap Hasil Belajar Siswa Pada Materi Pencemaran Lingkungan di SMA Negeri 1 Bendahara Aceh Tamiang. *Jurnal Pendidikan Biologi, Vol. 6, No. 1.*

Lestari, P. B., & Widyaningrum, D. A. (2016, November). Pengembangan Model Pembelajaran Reciprocal Teaching Pair Share (RTPS) Untuk Meningkatkan Kemampuan Metakognisi Matakuliah Mikrobologi Mahasiswa IKIP Budi Utomo. In *Prosiding Seminar Biologi* (Vol. 13, No. 1, pp. 528-535).

Novitasari, D. (2015). Penerapan Model Pembelajaran Berbasis Masalah Dilengkapi Teknik Mind Mapping Terhadap Peningkatan Motivasi dan Hasil Belajar Siswa SMAN 1 Pakusari Jember Pokok Bahasan Jamur Kelas X Semester Gasal Tahun Ajaran 2013-2014. *Jurnal Pancaran, Vol. 4, No. 2 : 35-48.*

Sudjana, N. (2002). Metode Statistik*. Bandung : Tarsito*

Suprijono, A. (2009). Cooperative Learning Teori dan Aplikasi PAIKEM. *Yogyakarta: Pustaka Pelajar.*

Wahyudin, A. (2009). Dasar-Dasar Akuntansi. *Jakarta: Penerbit Erlangga*