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THE EFFECT OF USING A PROBLEM BASED LEARNING MODEL ON THE LEARNING OUTCOMES OF FOURTH GRADE SCIENCE AND TECHNOLOGY STUDENTS AT SD NEGERI 74 PALEMBANG

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Abstract

This study aims to determine the effect of using a problem-based learning model on the learning outcomes of IPAS students in class IV SD Negeri 74 Palembang. This research used quasi-experimental design method with nonequivalent control group design type. The population in this study were all fourth grade students of SD Negeri 74 Palembang. The sample taken in this study was 58 students who were divided into experimental and control classes. The sampling technique in this study used purposive sampling technique. The instrument used in the study was a multiple choice test. The data analysis technique in this study used the Independent Samples T-test which was first carried out normality and homogeneity tests. The results in this study showed that the pretest value of the experimental class obtained an average of 56.90 and the control class of 50.34. While the posttest value of the experimental class obtained an average of 77.59 and the control class amounted to 66.55. The results of the Independent Samples T-test calculation with a significant level of α = 0.05 obtained a sig value. 0.002, where sig. 0,002 < 0,005. Based on the results of the Independent Samples T-test, it can be concluded that there is a significant effect of using a problem-based learning model on the learning outcomes of IPAS class IV students of SD Negeri 74 Palembang.

Keywords: *Problem Based Learning, Learning Outcomes, IPAS*

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A. Introduction

Education is a conscious effort to develop human life and educate the life of the nation. Therefore, education will improve the quality of human resources which are used as the main model to be able to contribute to the development and progress of the nation's life. Djonomiarjo (2020) states that education that supports future development is education that is able to solve problems*problem* in education itself. Students will develop the potential conscience and competencies they already possess through education.

According to legislation on the Education System no. 20 of 2003, states that education is a conscious and planned effort to create an atmosphere of learning and learning. This is done so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble morals and skills needed by themselves and society. According to Fajri (2019) one of the foundations of education is the curriculum. The curriculum is used as a tool to achieve educational goals and as a guide in teaching and learning activities.

According to Law no. 20 of 2003 Chapter 1 article 1 states that the curriculum is a set of plans and arrangements regarding objectives, content and learning materials as well as the methods used as a guide for implementing learning activities. Indonesia has experienced many changes to the education curriculum. Curriculum changes are made because there are changes in the political, socio-cultural, economic and science and technology systems in national and state society and following increasingly advanced developments. The education curriculum in Indonesia starts from the 1947 curriculum, 1952 curriculum, 1964 curriculum, 1968 curriculum, 1975 curriculum, 1984 curriculum, 1994 curriculum and 1999 curriculum supplement, 2004 Competency Based Curriculum (KBK), 2006 Education Unit Level Curriculum (KTSP), 2013 curriculum (K-13) and is currently implementing the independent learning curriculum.

The independent learning curriculum is a curriculum that demands student independence to access knowledge, either from formal education or non-formal education. The independent learning curriculum is developed with diverse intracurricular learning and focuses on essential material as well as developing character values and competencies in students. This is designed to develop the creativity of teachers and students. According to Manalu et al (2022), the independent learning curriculum is a curriculum that does not limit the concept of learning that takes place at school or outside school and demands creativity from teachers and students. The independent learning curriculum gives students the freedom to learn according to their interests and talents with creative thinking. The

independent learning curriculum was developed by the government with the hope of producing a millennial generation that is not only able to remember the lesson material presented by the teacher, but students are also able to understand and apply the material.

The independent learning curriculum is structured into 2 main activities, namely Intracurricular Learning and the Project for Strengthening the Pancasila Student Profile (P5). Apart from that, the subjects in the independent learning curriculum consist of religious education, Pancasila education, Indonesian language, mathematics, physical education, sports and health, arts and culture, English, and science and science. Science is a combined subject between science and social studies. In the 2013 curriculum, science and social studies subjects stand alone, while in the independent curriculum, science and social studies studies are combined into Natural and Social Sciences (IPAS).

IPAS is a subject with content closely related to nature and human interaction. IPAS in the independent curriculum is a concept that covers all aspects of knowledge that are relevant in life. According to Sulehayanti (2018), IPAS is a combined subject of natural science that studies living and dead things in the universe. In addition, IPAS also studies human life as individuals and social beings that interact with the environment.

Science subjects do not only pay attention to academic aspects, but also pay attention to social, economic, environmental and ethical aspects. In addition, the concepts in science and science lessons encourage students to evaluate information critically so that they can participate actively in facing complex challenges in various areas of life. This is in line with the opinion of Mazidah & Sartika (quoted by Anggita et al., 2023) who state that learning with the IPAS concept is trying to provide experience and improve students' abilities.

Science subjects aim to develop inquiry skills, increase understanding of oneself and the environment, and expand knowledge and concepts in the learning process. Apart from that, science and science subjects are used as a basis for preparing students to develop understanding before studying more in-depth concepts at junior high school level. Agustina (quoted by Anggita et al., 2023) stated that the science and science subjects in the independent curriculum aim to develop interest, curiosity, an active role, and can develop knowledge and skills.

Based on the results of interviews with class IV teachers at SD Negeri 74 Palembang, information was obtained that the science learning outcomes of class IV students were still low. Of the 123 students in class IV, 64 students had low scores. Based on the interview results, information was also obtained that class IV

teachers still often use conventional learning models in the form of lectures, questions and answers, assignments, demonstrations, etc*discovery learning*. Learning science and science using lectures and questions and answers will make students less actively involved. If students are not provoked with questions, then students will be more dominant as recipients of information regarding the material presented by the teacher. Meanwhile, if the teacher uses demonstrations and*discovery learning*, student activity will be more visible. Students will be involved in every learning process, whether trying to use teaching aids or finding and expressing ideas related to the material being studied. Using the right learning model can influence the quality of learning and better learning outcomes.

Learning model *problem based learning* encourage students to think systematically and logically, and require students to be active in solving problems.*Problem based learning* is a learning model that makes problems the starting point in starting learning. Apart from that, the learning model*problem based learning* designed as learning that requires students to acquire the ability to solve problems, be independent and have good participation skills in order to gain new knowledge (Nurbaiti & Dinandar (quoted by Monica et al., 2019)).

Problem based learning makes students not only learn concepts related to problems but also able to learn scientific methods to solve these problems. This is in line with the opinion expressed by Ward (quoted by Harapit, 2018) that the model*problem based laerning* is a learning model that involves students to solve a problem through the stages of the scientific method. In addition, students can learn knowledge related to the problem while also having the skills to solve the problem.

Based on the results of interviews with class IV teachers at SD Negeri 74 Palembang, the teacher had never used a learning model*problem based learning*. Even though the learning model*problem based learning* can make learning more meaningful, can integrate concepts in relevant contexts, can improve students' critical thinking skills, foster student initiative in working, and develop interpersonal relationships in group work. Through a learning model*problem based learning*, students can be actively involved in every process of learning activities in class and can improve students' critical thinking abilities.

Based on the explanation above, researchers are interested in conducting research entitled "The Effect of Using Learning Models*Problem Based Leaening* on the Science and Science Learning Outcomes of Class IV Students at SD Negeri 74 Palembang".

B. Method

This research uses a quantitative approach with an experimental type of research. According to Sugiyono (2019:111), the experimental research method is a quantitative research method used to determine the influence of independent variables (*treatment*/treatment) on the dependent variable (outcome) under controlled conditions.

Researchers use research design*quasi experimental design* with type*nonequivalent control group design*. According to Sugiyono (2017:74) in this research there will be two groups that were not chosen randomly. The group is then given*pretest* to determine the initial conditions and differences between the experimental group and the control group.

This research was carried out at SD Negeri 74 Palembang which is located at Jl. KH. Wahid Hasyim Lr. Tajur, 5 Ulu, Kec. Seberang Ulu I, Palembang City, South Sumatra 30254. This research was carried out in the odd semester of the 2023/2024 academic year.

This research uses techniques*nonprobability sampling* with type*purposive sampling*. *Purposive sampling* is a sample determination technique with various specific considerations (Sugiyono, 2018: 138). The samples in this study were 32 class IVA students and 31 class IVC students. Class selection is based on considerations of cognitive abilities which are included in the homogeneous category as well as suggestions from the teacher.

Research data analysis was carried out by analyzing students' science learning outcomes data, which aims to determine whether there is an influence on the use of learning models*problem based learning* on the science learning outcomes of class IV students. Before data analysis is carried out, a normality test is first carried out. If the data is normally distributed, it will be tested using the t-test. Data collection techniques in this research are tests and documentation. Before carrying out a hypothesis test, a normality test and homogeneity test are first carried out.

C. Finding and Discussion

This study used the One Group Pretest-Posttest Design. The researcher carried out a pretest for the 2 classes used in the study. After carrying out the pretest, the researcher gave treatment in the form of learning using the Mind Mapping model for 2 meetings. After giving the treatment, the researcher gave a posttest to find out the learning outcomes of the students after receiving the treatment.

1. Finding

Researchers first carried out normality and homogeneity tests. Then, the researcher carried out a hypothesis test. Normality and homogeneity tests aim to determine whether the data is normally distributed or not, and whether the data is homogeneous or not. In carrying out inferential tests, researchers use assistance*Microsoft Excel 2013* and*IBM SPSS Statistics 29 for windows*. The following are the results of the normality test in the experimental class and control class.

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Kelas	Statistic	df	Sig.	Statistic	df	Sig.
Hasil Belajar Siswa	Pretest Eksperimen	.145	29	.122	.941	29	.109
	Posttest Eksperimen	.160	29	.056	.943	29	.121
	Pretest Kontrol	.145	29	.121	.933	29	.067
	Posttest Kontrol	.153	29	.081	.932	29	.063

Figure 4.21 Normality Test Output Results

Based on Figure 4.21, it is found that the results of the normality test with Shapiro-Wilk are*pretest* the experimental class has a sig value of 0.109 > 0.05, and*pretest* the control class has a sig value. 0.067 > 0.05. Meanwhile, learning outcomes*posttest* the experimental class has a sig value. 0.121 > 0.05, and*posttest* the control class has a sig value. 0.063 > 0.05. Based on the sig value. on*pretest* and*posttest* The experimental and control classes obtained normal distributed data.

Then the examiner carries out a homogeneity test which aims to find out that the student learning outcomes data for both the experimental class and the control class come from a population with the same variance. The following are the results of the homogeneity test in the experimental class and control class.

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Hasil Belajar Siswa	Based on Mean	.268	1	56	.606
	Based on Median	.225	1	56	.637
	Based on Median and with adjusted df	.225	1	55.936	.637
	Based on trimmed mean	.278	1	56	.600

Figure 4.22 Homogeneity Test Output Results

Based on Figure 4.22, the homogeneity test results have a sig value. 0.606 > 0.05 which indicates that the data is homogeneous. After carrying out normality and homogeneity tests, the researcher then carried out a t-test. The t-test in this research uses a test *Independent Samples T-test*. Test*Independent Samples T-test*

This was done to find out whether there was a difference in the scores*posttest* experimental class and control class.

The hypothesis formulation in this research is:

Ho : Use of learning models*problem based learning* has no effect on the science and science learning outcomes of class IV students at SD Negeri 74 Palembang.

Ha : Use of learning models*problem based learning* influence on the science and science learning outcomes of class IV students at SD Negeri 74 Palembang.

The basis for decision making in this research is if the sig. (2-*tailed*) < 0.05, then there is a significant difference. However, if the sig value. (2-*tailed*) > 0.05, then there is no significant difference. Following are the results of the hypothesis test*posttest* experimental class and control class.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
						Significance				95% Confidence Interval of the Difference
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Hasil Belajar Siswa	Equal variances assumed	.268	.606	3.179	56	.001	.002	11.034	3.472	4.080	17.989
	Equal variances not assumed			3.179	55.939	.001	.002	11.034	3.472	4.080	17.989

Figure 4.23 Hypothesis Test Output Results

Based on Figure 4.23, the test calculation results are obtained*Independent Samples T-test* on*posttest* the experimental class and control class obtained sig values. 0.002. The results of the hypothesis test showed that 0.002 < 0.05, this shows that there is a significant difference in learning outcomes between the experimental class and the control class. So, it can be concluded that the use of learning models*problem based learning* influence on the science and science learning outcomes of class IV students at SD Negeri 74 Palembang.

2. Discussion

Based on the results of research conducted at SD Negeri 74 Palembang, it was found that before receiving different treatment, the results *pretest* Experimental class and control class students have averages that are not much different. Results *pretest* the experimental class obtained an average score of 56.90 and the control class 50.34. Then the researcher gave treatment to the experimental class using a learning model *problem based learning*. After being given treatment, students are then given treatment *posttest*. Results *posttest* the experimental class obtained an average score of 77.59 and the control class 66.55. This shows below average*post office* the experimental class is larger than the average*posttest* control class.

The inferential analysis used in this research is by using the test*Independent Samples T-test* which produces a sig value. 0.002. This data shows that it was rejected and accepted, as stipulated if the sig value. < 0.005 then the research hypothesis can be accepted. Thus it can be concluded that the use of learning models*problem based learning* influence on the science and science learning outcomes of class IV students at SD Negeri 74 Palembang.

After conducting the research, the researcher found that before the action was given to the two classes, namely the experimental class and the control class, it appeared that the students in these classes had an understanding of the material that was not much different. This can be seen from the average results*pretest* both classes. Then the researcher gave different treatments to the two classes. The experimental class was given learning model treatment*problem based learning*, while the control class was given conventional learning model treatment. After that, the researcher gave*posttest* in each class. From the results*posttest* It was found that the average*posttest* experimental class is higher than the average*posttest* control class.

In line with the opinion of Saputro & Rayahub (2020) that*problem based learning* is a learning model that invites students to solve problems in the real world that are less structured through the learning process. This learning model also encourages students to work actively in collaborative learning. Furthermore, Ariyani & Kristin (2021) stated that learning with models*problem based learning* not only providing learning material in one direction as in the application of conventional learning methods. However, through learning*problem based learning* It is hoped that this will take place naturally in the form of student activities to strengthen problem solving abilities and increase student independence, so that they are able to formulate and solve problems in various contexts.

In line with research conducted by Handayani, et al (2023) that the learning model*problem based learning* influence on the science and science learning outcomes of class IV students at SDN Sawah Besar 01. Then in research conducted by Hayun & Azizah (2020) with a research design*nonequivalent control group design* test calculation results were obtained*independent samples t-test* namely 0.001 with a significance level of 0.05, this means there is a significant difference between students in the experimental class and students in the control class. So it can be concluded that there is an influence of the learning model*problem based learning* on the mathematical representation abilities of fourth grade students at Al-Musyarrofah Islamic Elementary School. The research above also supports research conducted by Handayani & Muhammadi (2020) that the model*problem*

based learning has a significant effect on student learning outcomes in integrated thematic learning in class V of SDN 35 Parak Karakah, East Padang District, Padang City.

Based on the results of research conducted by researchers, it can be concluded that the treatment uses a learning model*problem based learning* influence on the science and science learning outcomes of class IV students at SD Negeri 74 Palembang.

D. Conclusion

Based on the results and discussion described in the previous chapter, it can be concluded that the use of learning models*problem based learning* influence on the science and science learning outcomes of class IV students at SD Negeri 74 Palembang. This is supported by data obtained through test calculations*Independent Samples T-test* with a significance level = 0.05, namely sig. 0.002 where sig. 0.002 < 0.05. This shows that it is rejected and accepted. Apart from that, the data is also supported based on the difference in average values*pretest* and*posttest* in the experimental class and control class, namely the average*pretest* experimental class is 56.90 and value*posttest* experimental class is 77.59. Meanwhile, the average value*pretest* control class is 50.34 and value*posttest* control class is 66.55.

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