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THE EFFECT OF PROBLEM BASED LEARNING MODEL ON CREATIVE THINKING OF STUDENTS

The aim in this research article is to test the effect of the problem based learning model on the creative thinking abilities of fourth grade elementary school students. The study was conducted using a quantitative approach to the type of experimental research. The sample used in this study was fourth grade students at Kateguhan 02 Elementary School and 02 Corner Elementary School. The instrument used was a test inventory. The results obtained were analyzed using one way ANOVA using SPSS program assistance. The results obtained in this study indicate that there is a positive and significant influence on the Problem Based Learning model on the creative thinking of fourth grade elementary school students. Test results using one way ANOVA showed an F-value of 55,329 and p 0,000 < 0.05.

Key words: creative thinking; elementary school; learning; model of problem based learning; student.

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Introduction. Education is an important component needed in human development in gaining knowledge and experience as a provision of life in the community. Knowledge and experience can be obtained through learning activities at school. Learning activities need to be designed as well as possible to help student development. This design can be in the form of subject matter, objectives to be achieved, learning models that attract the attention of students, assessment, evaluation, students, and teachers. All of these must be interconnected and supportive so that learning activities can be achieved according to the design that has been created.

An important component in learning is learning objectives that are directed at cognitive, affective, and psychomotor aspects. The 2013 curriculum used today also facilitates the development of these three aspects. This curriculum does not discuss material separately as the previous curriculum, but is designed using themes. Setach level has a different theme. The lower classes have themes in the lower classes and the upper classes have nine themes and sub-themes. The fourth grade elementary school theme consists of several subjects, namely mathematics, Indonesian, Civics, Natural Sciences, Social Sciences, and SBdP which are interrelated. The theme in this study is the theme of four «Various Occupations» subtheme 2 «Occupations around Me».

Learning activities using the 2013 curriculum are not only teacher centered, but students are required to be more active, critical and creative. The use of innovative learning models greatly helps students develop abilities in

cognitive, affective, and psychomotor aspects. Cognitive aspects are the main aspects to be achieved. One of them is the ability of students' creative thinking. Creative thinking is the ability to create new ideas by seeing existing ideas and problems to be solved. R. J. Stenberg (2006) describes creativity as a topic of broad scope and importance for individuals and community groups in completing a task or problem. In line with this opinion M. Worthington (2005) that student creativity is based on students' curiosity, then expands students' ability to understand the material and conduct experiments by using imagination in developing their creative ideas.

In fact, the learning activities that are currently underway still use the old learning style of teacher centered. The teacher occasionally invites students to discuss. But its activities are still going one way. Children's creativity in conveying the material is also not yet visible.

The problem is known by conducting observations at SDN Tawang Sari District, Sukoharjo. The results of these observations indicate that children's creativity in understanding and conveying material has not been seen. Only a few students who dare to ask questions and answer questions raised by the teacher. How to teach teachers also still look conventional even though occasionally have inserted a learning model with cooperation or discussion. This shows that the students' creative thinking ability is less developed. One model that can be used in learning activities is the Problem based Learning model.

Model Problem Based Learning is a learning model that emphasizes thinking skills and problem solving. B. Levin (2001) explains that PBL is a model that

provides opportunities for students to develop the ability to identify and analyze problems that exist in the surrounding environment. In line with this opinion S. Baden & C. Major (2004) explained that the PBL model is a model with a metacognitive approach to develop students' skills in solving problems using certain strategies. H. Warsono & M. Hariyanto (2013) explained that PBL models have advantages among them that students are accustomed to solving existing problems in the surrounding environment, fostering cooperative and social attitudes through group discussions, establishing two-way communication between students and teachers, and problem solving is done by experimental methods.

The characteristics of Grade IV Elementary School students are very diverse and there needs to be development in developing creative thinking abilities. The use of problem based learning models aims to design learning activities with discussion with groups to solve existing problems in the environment creatively and environmentally friendly. Based on this statement, a study was designed to determine the effect of the PBL model on students' creative thinking.

The aim of the research article is to test the effect of the problem based learning model on the creative thinking abilities of fourth grade elementary school students.

Research Method. This research was conducted using a quantitative approach with quasi-experimental research types. The design used in this study is non-equivalent control group design. Quasi experiment is a type of research to find out cause and effect that may occur is independent variable (independent) and dependent variable (dependent). The independent variable (X) used is the Problem Based Learning model and the dependent variable (Y) used is the ability to think creatively.

The population in this study were fourth grade students of SDN in Tawang Sari District. The technique used in this research is random sampling. The sample used in this study was Categorization 02 SDN as an experimental class that was given treatments using PBL models and Corner Corner 02 SDN as a control class without treatment.

The data collection technique used is to provide a test in the form of an inventory of tests used to measure students' creative thinking abilities. Questionnaires were given in the form of a checklist given before being given treatment in the form of pre-test and after being given treatments to be post-test. This was done to determine the effect of the Problem Based Learning model on students' creative thinking abilities.

Before the research is conducted first, a validation test is performed to determine whether the instrument used is valid or not. This validity test is performed using Cronbach's Alpha. After that the reliability test was conducted to determine the level of instrument confidence that will be used in this study. The reliability test was carried out using the Kolmogorov Smirnov formula with the help of SPSS.

After the reliability test and the instrument are declared valid, the next step is to carry out research to retrieve data in the field. The data obtained in the field are then tested for normality and homogeneity first. The next step is to test the hypothesis using one way ANOVA with the help of SPSS.

Result and Discussion. Data is collected twice, that is before being given a *treatment (pre-test)* and after being given a *treatment (post-test)*. *Pre-test* is done to find out

the student's initial ability, and *post-test* is done to see the student's final ability. Data was collected in two classes, namely the experimental class using the *Problem Based Learning* model and the control class using the conventional model. Both classes were given a pre-test and post-test and then a hypothesis test were conducted. The results of the pre-test of creative thinking ability are as follows (see table 1):

Table 1

Pre-test scores of students' creative thinking abilities

Class	Total	Average
Control	26	55
Experiment	31	65

Based on the table above it can be seen that the pre-test value in the control class is 55 and the pre-test value in the experimental class is 65. Post-test was conducted to determine the students' final creative thinking abilities.

The post-test value of students' creative thinking ability is the following cause (see table 2):

Table 2

N-values post-test creative thinking abilities of students

Class	Total	Average
Control	26	62
Experiment	31	73

Based on the table above it can be seen that the post-test value of creative thinking ability using PBL models in the experimental class obtained an average value of 73, and the average *post-test value* in the control class of 62.

After the data is obtained the next step is to carry out the analysis prerequisite test that is normality test and homogeneity test. Normality test is done to determine whether the data collected is normal or not. The results of the normality test were performed using the Kolmogorov windows formula. The normality test results obtained are as follows (see table 3):

Table 3

Normality test results

Class	Pre-test	Post-test	Conclusion
Control	0.579	0.642	Normal
Experiment	0.801	0.750	Normal

The results of the normality test in the control class showed that the pre-test in the control class was significant of 0.579 and the post-test value in the control class is significant of 0.642.

Normality Test on the experimental class pre-test value obtained significant of 0.801 and the post-test obtained significant equal to 0.750. It can be seen that the value obtained in this study has significant 0.05 greater, so it can be concluded that all data in the experimental class and the control class are normally distributed.

Homogeneity test is performed to find out which variables are used homogeneous or not. Homogeneity test is done by looking at the F test with decision making if the value of significant > 0.05 , it can be concluded that the data is homogeneous, and if the value of significant < 0.05 , it is said to be not homogeneous. Homogeneity test in the experimental class results > 0.05 , and control class > 0.05 , then the homogeneity test results are declared homogeneous and the homogeneity results meet the prerequisites for hypothesis testing.

Hypothesis testing is carried out to test hypotheses that have been made using one way ANOVA test because there is only one independent variable and one dependent variable. The collection of decisions and drawing conclusions on the hypothesis test is done with a significance level of 0.05. The criteria used in drawing conclusions are if the probability of error < 0.05 then the null hypothesis is rejected, and if the error > 0.05 then the null hypothesis is accepted. The hypotheses in the study are as follows:

H0: «There is an influence of the use of Problem Based Learning Models on the creative thinking of fourth grade students at SDN Tawang Sari District, Sukoharjo Regency».

H1: «There is no effect of the use of Problem Based Learning Models on the creative thinking of fourth grade students at SDN Tawang Sari District, Sukoharjo Regency».

Based on the results of data analysis that has been done using one way ANOVA, the following hypothesis test results are obtained (see table 4):

Table 4

Data Results of One Way Anova Creative Thinking with Problem Based Learning Model

ANOVA					
THINK YOUR CREATIVE POSTEST					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3533.990	1	3533.990	55.329	.000
Within Groups	3512.993	55	63.873		
Total	7046.982	56			

One way ANOVA test results on the variable of creative thinking using the Problem Based Learning model obtained the following results: F-calculated value of 55.392 and $p = 0.000 < 0.05$ then rejected, so it can be concluded that there is a significant influence on the use of Problem Based Models Learning of students' creative thinking. Based on this, the second hypothesis is stated that: «There is an Effect of the Use of Problem Based Learning Models on Creative Thinking of Class IV Students at SDN Tawang Sari District, Sukoharjo District».

This hypothesis was carried out to determine the effect of the Problem based Learning Model on students' creative thinking. Pre-tests are given at the beginning of the meeting before the Problem Based Learning model is applied. Students are asked to work on questions in the form of a test inventory of 24 questions. At this stage students are asked to put a mark on each question. The next meeting students were given treatment in learning

activities using the Problem Based Learning model. Learning activities carried out for 6 lessons on the sub theme «Various My Work». The final stage after students are given treatment students are asked to work on the post-test questions to determine the effect of the PBL model on the material students have learned.

R. Arend (2010) explains that the PBL model is a student-centered learning model and adapted to existing problems. O.-S. Tan (2009) explores the understanding of the PBL model is an effective learning model for making changes and innovations in the world of education by using learning that emphasizes the activeness and creativity of students to solve problems in learning. In line with this opinion R. Sihaloho & I. Ginting (2017) explained that at the end of learning activities by using the PBL model, students can identify and solve problems with their own ideas and abilities that develop creative thinking skills as one of the higher-level thinking abilities.

P. Westwood (2008) explains the strengths of the Problem Based Learning model: 1) encouraging self-direction in learning activities, 2) preparing students to think critically and analytically, 3) empowering students to identify, find and use appropriate resources, 4) problems that are learning is closely related to the real world and motivates students, 5) actively involved in integrating information and skills from various disciplines, 6) the knowledge and strategies obtained tend to be maintained and transferred to other learning situations. In line with this opinion I. Kurniasih & B. Sani (2015) explained the strengths of the PBL model as follows 1) developing critical thinking and creative skills of students, 2) can improve the ability to solve problems in students by themselves, 3) increase student motivation in learning, 4) help students learn to transfer knowledge with a completely new situation, 5) can encourage students to have the initiative to learn independently, 6) encourage student creativity in the disclosure of the investigation of problems that have been done, 7) with this learning model students integrate knowledge and skills simultaneously and apply them in relevant contexts, 9) this learning model can improve critical thinking skills, foster student initiative in work, internal motivation to learn, and can develop interpersonal relationships in group work.

E. Johnson (2007) explains that creative thinking is a mental activity that fosters original ideas and new understandings. In line with this opinion D. McGregor (2007) explained that creativity is the ability to think that involves the ability to produce new and original ideas.

Problem Based Learning Model influences the creative thinking ability of fourth grade students at SDN Tawang Sari, Sukoharjo Regency. This can be seen from the One Way ANOVA test which shows the sig value of PBL models towards students' creative thinking at $0,000 < 0.05$. The results of this study are supported by research conducted by K. G. Septiana (2014) explaining that the Problem Based Learning model influences students' creative thinking abilities. In line with this opinion A. Masnur (2016) also explained that students' creative thinking is influenced by the Problem Based Learning model. So it can be concluded that the PBL model influences students' creative thinking.

Based on the results of data analysis and explanation above, it can be seen that the Problem Based Learning model can be used to help hone students' creative thinking abilities and can be applied in the 2013 curriculum.

PBL models can be used as a means to build student understanding in understanding material, develop students' ability to solve problems creatively, and can be used as an experience to equip students in their lives.

This research was conducted using a small sample of one experimental class and one control class. If the research is carried out using a larger sample, the results to be obtained will be even more accurate. The selection of the right model also influences the results to be obtained. The learning model used must also be adapted to the characteristics of students and the material to be achieved so that cognitive, affective, and psychomotor aspects can be achieved.

Conclusion. The implementation of learning activities using the Problem Based Learning model

in the experimental class and conventional models in the control class have different effects and impacts on students' creative thinking abilities. The results of the research that has been carried out obtained the results that the creative thinking ability of students in the experimental class is higher than the control class. So it can be concluded that the Problem Based Learning model influences students' creative thinking abilities. Suggestions for future research are expanding the research subject with a sample of various regions so that the results obtained are more accurate and more generalizable.

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ВПЛИВ ПРОБЛЕМНОГО НАВЧАННЯ НА ТВОРЧЕ МИСЛЕННЯ УЧНІВ

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Стаття присвячена експериментальному дослідженню впливу моделі проблемного навчання на розвиток творчого мислення учнів. Творче мислення розуміємо як розумову діяльність, що сприяє породженню ідей та нових розумінь, тобто здатність створювати нові ідеї на основі існуючих ідей та проблем, які потребують розв'язання. Проблемне навчання в статті розглядається як модель з метакогнітивним підходом до розвитку умінь студентів розв'язувати проблему з використанням певних

стратегій. Дослідження щодо впливу моделі проблемного навчання на розвиток творчого мислення учнів було проведене з метою перевірки впливу цієї моделі на творчі здібності учнів початкових класів четвертого класу. Експериментальне дослідження проводилось з використанням кількісного методу. Учасниками контрольної та експериментальної груп у цьому дослідженні були учні четвертого класу початкових шкіл. Для дослідження був використаний тестовий метод. Тестування для вимірювання творчого мислення учнів проводилось у контрольних та експериментальних групах двічі: до впровадження моделі проблемного навчання і після нього. Для перевірки валідності тестів був вирахований коефіцієнт альфа Кронбаха. Отримані результати були проаналізовані за допомогою порівняння двох незалежних вибірок (ANOVA) за допомогою програми SPSS. Результати, отримані в цьому дослідженні, свідчать про позитивний та істотний вплив моделі проблемного навчання на творче мислення учнів початкових класів четвертого класу. Результати тестування за допомогою ANOVA, показали значення $F 55,329$ і $p 0,000 < 0,05$. Отже, модель проблемного навчання розвиває у студентів здатність творчо розв'язувати проблеми, і озброює їх досвідом цієї діяльності для майбутнього використання в житті.

Ключові слова: креативне мислення; модель проблемного навчання; навчання; початкова школа; учні.

ВЛИЯНИЕ ПРОБЛЕМНОГО ОБУЧЕНИЯ НА ТВОРЧЕСКОЕ МЫШЛЕНИЕ УЧЕНИКОВ

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Статья посвящена экспериментальному исследованию влияния модели проблемного обучения на развитие творческого мышления учащихся. Творческое мышление понимаем как умственную деятельность, которая способствует рождению идей, то есть способность создавать новые идеи на основе существующих идей и проблем, требующих решения. Проблемное обучение в статье рассматривается как модель с метакогнитивным подходом к развитию умений студентов решать проблему с использованием определенных стратегий. Экспериментальное исследование о влиянии модели проблемного обучения на развитие творческого мышления учащихся проводилось с использованием количественного метода. Участниками контрольной и экспериментальной групп в этом исследовании были ученики четвертого класса начальных школ (Tawang Sari, Indonesia). Для исследования был использован тестовый метод. Результаты, полученные в этом исследовании, свидетельствуют о положительном и существенном влиянии модели проблемного обучения на творческое мышление учащихся. Таким образом, модель проблемного обучения развивает у студентов способность творчески решать проблемы и вооружает их опытом этой деятельности для будущего использования в жизни.

Ключевые слова: креативное мышление; модель проблемного обучения; начальная школа; обучение; ученики.

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