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The Effect of Project Based Learning Model Aided Scratch Media Toward Learning Outcomes and Creativity

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Abstract

The learning process can be interpreted as a form of system designed to improve students' abilities. In fact, the learning process is still monotonous so that students are not motivated to follow the study, students who are not motivated in participating in learning will not stimulation student creativity and good learning outcomes. The purpose of this study was to measure the differences in learning outcomes and creativity of students who use the PjBL model assisted by the scratch media and students who use the PjBL model with simple media, and analyze students' responses to science learning using the PjBL model assisted by scratch media. This research used descriptive quantitative methods. The research design was posttest-only control group design. It was known that learning outcomes and creativity of the experimental class are better than the control class. The learning outcomes of the experimental class have an average value of 75.66 and the control class have an average value of 68.99. From the observation of creativity, the average creativity of the experimental class is 78.41 and the control class is 73.43. According analysis of students' responses during learning, that students of the experimental class responded well by showing very positive criteria. These results indicate that PjBL assisted by scratch media can develop students' creativity and give to good learning outcomes.

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INTRODUCTION

Education has an important role in life, because education is one of ways to improve the quality of human resources. Education must be able to develop all the potential which are possessed by the students in order to be able to adapt all the changes that occur at this time. One of ways is giving the learning method that involves students directly, active students will also make the teaching and learning process more memorable and meaningful. So that the results obtained in the learning process will also be good.

A teacher is expected to be able to manage the learning process well. Monotonous learning will certainly affect the spirit of student learning, because with monotonous learning will make students become easily bored in receiving the learning given. This is agree with Sriatun et al. (2018) which states that the constraints in the learning process are that students must be accustomed to thinking not to memorize like conventional learning models that are often used, so that students are not bored because they have to be confronted with problems directly.

Based on the results of the first interview with one of the science teachers in SMP Muhammadiyah 1 Semarang, it was known that the teachers at the school still using conventional learning methods. Of course it is a very monotonous learning. In addition, the limitation of time and media that is provided by schools are not so sufficient, it also become one of the that problems for the learning process carried out in schools. From the results of some interview could be known the impact that will occur to students is the students who are not directly involved in the learning process will be less trained to creative learning because students are not given direct experience in the learning process. Students will also feel bored with the same learning routine. Students will only absorb what the teacher says with a little seeking information from other places and does not cause the exchange information with fellow friends. Conventional learning also cannot spur the ability of students' learning interest so that students are difficult to get good learning outcomes.

Meanwhile, the 2013 curriculum requires students to engage in more active than the teachers because by involving activeness and student participation it will also be able to create students' creativity. Students who have a higher level of curiosity will be more interested in participating in the class given. This is suitable with the opinion of Saurina (2017) which states that students whose curiosity can be channeled properly will get stimulation that are suitable with their developmental tasks in the learning process. Selection of learning models should be able to overcome various problems experienced by students during the learning process (Luthvitasari et al., 2012). Based on the results of the interview, the researcher wanted to try a learning method that involved students to be more active and be creative in the learning process and one of the solutions was by applying the Project Based Learning (PjBL) assisted scratch media.

PjBL is motivated by constructivist theory which provides many opportunities for students to create learning environment more active and interesting (Cakici, 2013). PjBL is a learning model that regulates the learning process through project activities. Projects are complex tasks that are based on challenges in the form of questions and problems, making decisions, and conducting research. This learning process provides opportunities for students to work at a predetermined length of time and then produce a product and make a presentation. Another understanding based on Sudarmin (2015) PjBL is a learning method that uses projects or activities as media in the learning process. In addition, the criteria of PjBL in the form of projects that is given to students must be in accordance to the curriculum, focusing on problems that invite students to be constructivist, realistic, and independent observer (Tamim & Grant, 2013). In PjBL learning, students do exploration, assessment, intervention, synthesis, and information to produce various forms of learning outcomes. As for the steps PjBL put forward by Jalaluddin (2016) consists of

determining the basic questions, designing project planning, collaborative scheduling, monitoring students in project progress, testing results, and evaluating experiences. In this research, researchers used PjBL assisted scratch media.

The media can be used as teaching aids to help with lessons for demonstration methods (Nurfiani et al., 2016). Scratch is a program which is designed to introduce computer programming concepts in a simple way so that it can be understood by anyone from various backgrounds including students. Scratch according to Gunawan & Irsyadi (2016) is a program that is freely available and created by Lifelong Kindergarten Group from Massachusetts Institute of Technology (MIT) which is designed to be fun, educative, and easy to learn so that this scratch program can be used to create stories interactive, games, art, simulators, and much more. Another opinion also says the scratch application is a programming language designed to introduce the concept of computer programming in a simple way so that it can be understood by anyone from various backgrounds. Scratch displays an interface that is very simple and easy to use. Scratch uses graphics to teach programming logic to children so using scratch can make it easier for students to understand the logic concepts found in science learning (Iskandar & Raditya, 2017). Scratch Media is also a visual language that can create projects using intermediaries in the form of images (Martanti et al., 2013).

Project-based learning has enormous potential to train students' thinking processes that lead to student learning outcomes. One of the causes of student learning outcomes is not good because teachers rarely use teaching aids and some teachers have not been able to find the right method when learning. Latifah et al. (2018) stated that learning methods that do not vary also become one of the causes of low student learning outcomes, less varied ways of learning will make students more easily bored and less eager in learning.

Through the learning process, students must have creativity to solve problems and find new concepts. Titu (2015) states that creativity is the ability of students to create something new in their learning activities. Creativity is considered as a divergent thinking ability or a way to solve a problem by using various alternative answers toward the same problem. By creativity students can have the ability to design, discover, and apply something new and unique that can be developed by everyone (Cenberci & Yavuz, 2018). There are four creativity indicators identified by Mokaram et al. (2011) that is (1) fluency, is the ability to produce large numbers of ideas (2) flexibility, is the ability to produce variety of ideas (3) elaboration, is the ability to develop ideas (4) originality, is the ability to produce unusual ideas.

Based on the various descriptions above, it is necessary to apply the PjBL learning model which can increase student participation in order to be more active in the learning process in order to get better learning outcomes and can develop the creativity possessed by students. The results of this research are expected to be the latest reference in the use of learning models conducted in schools.

METHODS

The method of this research was a quantitative descriptive method in the form of Quasi Experimental which is used to describe differences in student learning outcomes and creativity in the experimental class and control class as well as student responses to PjBL learning aided by scratch media. The research design was posttest only control group design. This research was conducted on a sample of 62 students who were divided into control class (PjBL assisted by simple media) and experimental class (PjBL assisted by scratch media) in SMP Muhammadiyah 1 Semarang.

Data collection techniques in this research were tests in the form of multiple choice questions of solar system and non-content material in the form of observation sheets in the

form of likert scales totaling 10 statement items related to students' creativity when making the project, as well as student's responses that were taken based on student's response questionnaires about scratch media assisted PBL containing 10 statements.

Then the value or score of the results of learning and creativity in using t-test analysis were conducted testing normality and homogeneity using SPSS 16.0. After data has been known normal and homogeneous then did t-test. The values were converted through categorization in the form of a percentage (%) by the following formula:

$$NP = \frac{R}{SM} \times 100\%$$

Information :

NP : The value percent is sought or expected

R : raw scores obtained by students

SM : maximum score idela of tests relevant

While, the student' responses from the student questionnaire was measured using a Likert scale with a score of 1-4 interval and chose one of four alternative answers that were provided, namely using the answer choices strongly agree (SS) with a score = 4, agree (S) with a score of 3, less agree (KS) with a score of 2, disagree (TS) with a score of 1. Criteria for student's responses in this study was sought by the formula:

$$Average\ Scor\ (RS): \frac{Number\ of\ scores\ for\ each\ indicator}{Number\ of\ question\ items}$$

Table 1. Criteria scoring student responses

The average score	Criteria
3.6 ≤ Xi 4≤	very Positive
2.6 ≤ Xi 3.5≤	Positive
1.6 ≤ Xi 2.5≤	quite positive
0 ≤ Xi 1.5≤	not Positive

Criteria scoring average response results are shown in Table 1. The results of the students' response is said to be good if the average of each indicator is at a positive minimum score.

RESULTS AND DISCUSSION

The results of the research that has been done are the percentage of learning outcomes, creativity and student's responses to PjBL learning assisted by scratch media and PjBL assisted by simple media that has been done to students in SMP Muhammadiyah 1 Semarang on solar system material.

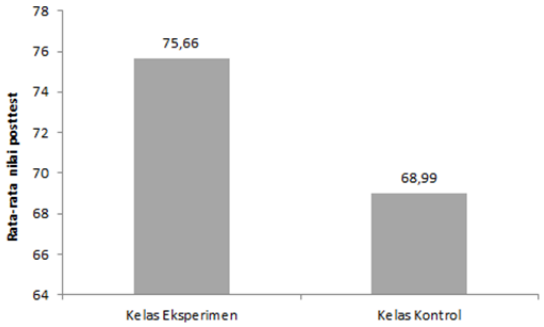

Figure 1. average student's learning outcomes

Figure 1 shows that the average of the student learning outcomes of the experimental class showed a higher percentage than the control class, the results was obtained from the statistical tests using SPSS 16.0 first tested the normality and homogeneity of the variance of the two groups. Based on the shapiro-wilk test of the Test of Normality with a Sig. level of α = 0.05, the value of Sig = 0.055 is obtained. Sig. value> 0.05 so it can be concluded that the posttest value in both classes are normal distribution.

Furthermore, homogeneity tests were carried out in both study samples. Homogeneity test of variance used the Levene test with a significance level of α = 0.05. Based on the Levene test to test the variance homogeneity of the two research samples were obtained the value of Sig. = 0.708. Because the value of Sig. = 0.708> 0.05, it can be concluded that the value of Postest in both research classes have a homogeneous variance.

The difference between the results of the application in the experimental class and the control class on student learning outcomes was done by t test with a Sig. level of α = 0.05. The results of the analysis of independent sample

tests showed that Tcount (3.214)> Ttabel 5% (2.00) so that Ha stated the students' learning outcomes in science learning using the PjBL model assisted by scratch media (experimental class) better than the PjBL model assisted by simple media (control class) was accepted. This shows that the learning done with PjBL models assisted by scratch media is better used for student learning outcomes.

The comparative data found that the students' creativity scores in the experimental class and the control class also used the t test. The statistical test first did the testing for the normality and homogeneity of the variances of the two groups. Based on the shapiro-wilk test of the Test of Normality with a Sig. level of α = 0.05, the value of Sig. = 0.75 was obtained. Sig. value> 0.05 so it can be concluded that the value of creativity in both classes is normally distributed.

Furthermore, homogeneity tests were carried out in both study samples. Homogeneity test of variance using the Levene test with a significance level of α = 0.05. Based on the Levene test to test the variance homogeneity of the two research samples were obtained the value of Sig. = 0.514. Because the value of Sig. = 0.514> 0.05, it can be concluded that the value of observation of creativity in both research classes has a homogeneous variance. The difference in the results of the experimental class with the control class on students' creativity was carried out by t test with a significance level of α = 0.05 using SPSS 16 software. Briefly presented in Figure 2.

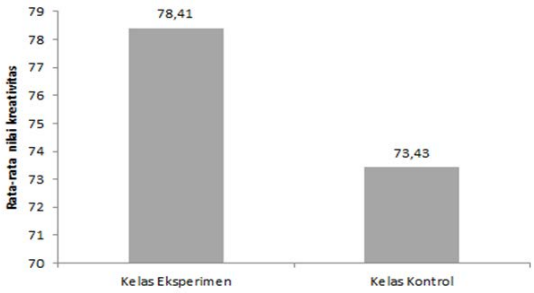

Figure 2. Average value of student creativity

The average creativity between the experimental class (78.41) and the control class (73.43) shows the difference. The results of the analysis of independent sample tests was measured using SPSS 16.0 showed that Tcount (5,407)> Ttable 5% (1,671) so that Ha expressed students' creativity in science learning using the PjBL model assisted by scratch media (experimental class) better than the PjBL model assisted by simple media (control class) received. This shows that the learning that is done with PjBL models assisted by scratch media is better for students' creativity. This can be strengthened by Tawil & Suryanasi (2012) which states that with project learning students can be provoked to think creatively, so that the project can provide opportunities for students to be openminded and flexible without fear or shame.

From the results of Figures 1 and 2 it can be seen that students who take the PjBL class assisted by scratch media are better than students who take PjBL class assisted simple media. This can be strengthened by the statement (Son, 2017) that by changing the focus of a particular material during the learning process can help students become experts in the material, and solving the problems faced can be overcome, when students are faced with a problem the ability to think creatively will be sharpened so that creativity arises in developing and seeing the existing problem situation and can channel ideas or solutions to solve the problems.

Whereas the students' response to PjBLmodel assisted by scratch media was obtained from the questionnaire responses that was given after following the learning process. The results of the analysis of the students' response statement during the learning process were known 100% of the students responded well by showing very positive and positive criteria. These results indicate that PjBL assisted by scratch media can bring a pleasant learning environment for students. These results are reinforced by Lau et al. (2012) which states that learning using projects can improve students' learning achievement in creativity, and can also foster students' creative ability to think independently and innovate.

The student response indicator that shows the highest response is the number one indicator that responds to students' responses in the learning process, the average value of number one indicator is 3.58. Followed by the next highest response, which is number two indicator that discusses students' responses to the learning device provided, the average value of number two indicators is 3.52. The next highest indicator value is known from indicator number three which discusses students' responses to the material being taught. The average value of the number three indicator is 3.43. The last indicator of student response is the response to student interest in the learning process has an average value of 3.42.

CONCLUSION

Based on the results of the research and discussion above, it can be concluded that there is a significant amount of student learning outcomes and creativity during the learning of solar system material between students who according to the PjBL model assisted by scratch media with students who take the PjBL assisted by simple media in class VII students SMP Muhammadiyah 1 Semarang. The results of student responses from PjBL by scratch media class during learning were very good by showing very positive and positive. The existence of significant differences shows that PjBL model assisted by scratch media is positive on student learning outcomes and creativity compared to PjBL model assisted by simple media. These results are PjBL assisted by scratch media that can develop students' creativity and provide good learning outcomes.

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