
The effectiveness of the housing plan project-based learning model in improving students' creative thinking skills

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Abstract

This study aims to examine how effective the application of a project-based learning model that focuses on residential plan design in improving students' creative thinking skills. The underlying problem of this research is the lack of learning methods that can develop students' creativity in an effective way through relevant and contextual practical experiences. Project-based learning was chosen because it can allow students to hone creative thinking skills by completing tasks that are directly related to their daily lives, such as designing a living plan. The main objective of this study is to evaluate the extent to which the application of the project-based learning model can improve students' creative thinking skills, which includes four main aspects, namely *fluency*, *flexibility*, *originality*, and *elaboration*. This study adopts a quantitative approach with a quasi-experimental design, which involves two groups, namely the experimental class that applies the project-based learning model and the control class that uses traditional learning methods. Data collection was carried out by pre-test and post-test to assess changes in creative thinking skills, as well as observation during the learning process and assessment of the results of the plans made by students. Data analysis was carried out by statistical testing to measure the significance of the differences between the two groups. The expected results of this study are to identify the level of effectiveness of the project-based learning model in improving students' creative thinking skills, as well as contribute to the development of innovative learning methods that can be applied in the broader educational context.

Keywords: project-based learning; living plans; creative thinking; learning effectiveness

INTRODUCTION

Today's world is changing rapidly, demonstrated by information flows, cultural exchanges, and unexpected technological advancements. Therefore, 21st-century applicability is very important to have, one of which is creative thinking skills. This skill allows students to not only receive information but also turn it into new ideas, solutions, or innovations that can be applied in various aspects of life. Previous studies have shown that students in Indonesia have very low levels of creativity. According to the survey *Global Creativity Index* (CGI), Indonesia is ranked 115th out of 136 countries in the world with a global creativity index of 0.037. This shows that Indonesian students are less creative than students in other countries (Richard, 2015). Improving thinking skills can be improved depending on the learning model used, one of the learning models that succeeds in increasing student creativity is the project-based learning model, this is evidenced by previous research conducted by Elmanidar et al., (2023) mentioned that project-based learning uses books *Pop Up* proven to be influential in increasing student creativity as seen from the test results *Paired Sampel T-test* is 0.000, where 0.000 is below 0.05. Therefore, the researcher is interested in using a project-based learning model, but the researcher modifies it to project-based learning of a residential plan, where students will later make a group living plan using the materials that are already available.

The hypothesis in this study is Alternative Hypothesis (H_a): The learning model based on the residential plan project has been proven to be effective in improving students' creative thinking skills in science subjects. Hypothesis Zero (H_0): The learning model based on the housing plan project is not effective in improving students' creative thinking skills in science subjects. This study aims to find out how effective the housing plan-based learning model is in improving students' creative thinking skills.

METHOD

This research uses the research method *Quasi-experiment* with shape *Nonequivalent Control Group Desain* which aims to find out the effect of treatment. In this study, the treatment was given to the experimental group, then the results were compared with the control group that did not receive the treatment (Scott, 2024). The paradigm used in this study can be described as follows:

Table 1. *Nonequivalent Control Group Desain*

Class	<i>Pre-test</i>	<i>Treatment</i>	<i>Post-test</i>
Eksperimen	O_1	X	O_2
Control	O_3	Y	O_4

Source: Sugiyono, (2010)

Information:

O_1, O_3 = *Pre-test* to determine initial ability (before using the housing plan)

X = *Treatment* using the residential plan

O_2, O_4 = *Post-test* to find out the results of the experimental class (after using the residence plan)

$(O_2 - O_1), (O_4 - O_3)$ = The effect of project-based learning of the housing plan on improving students' creative thinking skills

The sample according to Arifin in (Adhi et al., 2020) is a part of the population to be investigated, or a population in the form of a miniature population. In other words, if the entire population is taken to be used as a data source, this method is called a sample. Taking into account this statement, the sample selected by the researcher was 25 students in grade IV C and 25 people in class IV D at SDIT Widya Cendekia.

The data collection technique in this study is to use questionnaires that will be filled out by students during *the pre-test* and *post-test*. Before being tested to students, the instrument is validated first and will be tested on students when the instrument is declared valid and reliable. Meanwhile, the data analysis technique in this study is to use the normality test using *the Shapiro Wilk test*. Then the homogeneity test uses the Statistical Lavene test. The normality test and the homogeneity test are prerequisites to proceed to the next test, namely the hypothesis test. After the data is declared normal and homogeneous, the researcher can then proceed with the hypothesis analysis test using *the Paired Sample T-test*. After a hypothesis test is carried

out, then the researcher proceeds to the *N-gain test*, this *N-gain test* aims to determine the effectiveness of a treatment. All of these statistical tests were tested using SPSS version 30.

RESULTS AND DISCUSSION

Research Results

Pre-test and Post-test results

To measure and evaluate students' creative thinking skills, researchers used *pre-test* and *post-test methods*. This *pre-test* and *post-test* is carried out before and after the implementation of project-based learning in the classroom. Both are in the form of questionnaires and are designed to assess the level of students' creativity based on several key aspects, including originality, elaboration, flexibility, collaboration, and motivation. These aspects were chosen because they are the main elements that reflect a person's creative thinking ability.

The following is a table of *pre-test* and *post-test* results for experimental students:

Table 2. Results of *Pre-test* and *Post-test* of Experimental Class

No	Student Name	<i>Pre-test</i>	<i>Post-test</i>
1	A A P	55	73
2	A A V	52	74
3	A K F	55	69
4	A N P	52	75
5	A Q S	54	75
6	C H D	49	70
7	D A H	53	69
8	F P R	50	71
9	I S N	55	66
10	M A K	56	72
11	M F A F	52	65
12	M W F	53	66
13	M A F	51	64
14	M A A	50	74
15	M K H R	54	65
16	M R F	55	75
17	N K	55	64
18	N A S	53	67
19	O A A	54	72
20	P A R N	50	73
21	R G K	51	69
22	R Z N I	53	66
23	S R B	55	63
24	T M	57	72
25	By F R	50	62

Mean	52.92	69.24
Median	53	69
Mode	55	69

Source: Researcher data, (2024)

Based on the table above, after the students of the experimental class did the *pre-test*, the result was obtained from the mean value in the experimental group which was 52.92 with a median of 53 and mode of 55, then the lowest score in the *pre-test* of the experimental class was 49 and the highest score was 57 out of a total score of 75. Then the data obtained after the students did the *post-test* was a mean value of 69.28 with a median of 69 and a mode of 69, then the lowest score in the *post-test* of the experimental class was 62 and the highest score was 75.

Normality Test

The results of the normality test using the *Shapiro-Wilk* statistical test are shown in the table below:

Table 3. Normality Test Results with *Shapiro-Wilk*

Value	Significance (Sig.)	Information
<i>Pre-test</i> control class	.392 > 0.05	Normally Distributed Data
<i>Control class</i> post-test	.223 > 0.05	Normally Distributed Data
<i>Pre-test</i> kelas experiment	.218 > 0.05	Normally Distributed Data
<i>Post-test</i> experimental class	.087 > 0.05	Normally Distributed Data

Source: Researcher data, (2024)

The table shows the results of the normality test using the *Shapiro-Wilk* test for *pre-test* and *post-test data* in the control and experimental classes. The results of this test are used to check whether the data is normally distributed or undistributed normally. In the *pre-test* of the control class, the significance value (Sig.) of 0.392 which is greater than 0.05, indicates the *pre-test data* in the normally distributed control class. In the *control class post-test*, the significance value (Sig.) of 0.223 which is also greater than 0.05, indicates that the *control class post-test data* is also normally distributed. The *pre-test* value in the experimental class of significance value (Sig.) of 0.218 which is greater than 0.05, indicates that the *data of the pre-test* value of the experimental class is normally distributed. In the *post-test* of the experimental class, the significance value (Sig.) of 0.087 which is also greater than 0.05, indicates that the *post-test data* of the experimental class is also normally distributed. Overall, all significance values (Sig.) are greater than 0.05, indicating that all data are normally distributed.

Homogeneity Test

After the data is declared to be normally distributed, the next is homogeneity testing using the *statistical Lavene* test. The homogeneity test was carried out to find out the similarities of each data variant. Based on the results of the *pre-test* and *post-test* that have been

carried out by students, both the control class and the experimental class, the following homogeneity test data was obtained:

Table 4. Homogeneity Test Results Using *Lavene* Statistics

Value	<i>Lavene</i> Statistics	df 1	DF 2	Sig.
<i>Pre-test</i>	.246	1	48	.622 > 0.05
<i>Post-test</i>	.262	1	48	.611 > 0.05

Source: Researcher data, (2024)

The results of the homogeneity test using *Lavene* Statistics showed that the variance between groups in the *pre-test* and *post-test* was homogeneous. In the *pre-test*, the *Statistical Lavene* value was 0.246 with a Sig. value = 0.622 (greater than 0.05), which indicates that the variance between the control and experimental groups was not significant or in other words that the data was homogeneous. Similarly for the *post-test*, the *Lavene* Statistical value was 0.262 with a Sig. value = 0.611 (greater than 0.05), which also indicates that the variance between groups in the *post-test* was homogeneous. Thus, the two groups i.e. the control and experimental groups have similar variants, which meet the homogeneity assumptions for further statistical analysis.

Uji Paired Sample T-test

After the data is declared normal and homogeneous, it can be continued to the next test, namely the hypothesis test. The first hypothesis test in this study uses the *Paired Sample T-test* using SPSS version 30. The following is a table of results from the hypothesis test of the comparative data of the *pre-test* and *post-test* values of the experimental class:

Table 5. *Paired Sample Test Results Pre-test and Post-test* Experimental Class

Class	Result	Mean	Sig.	Conclusion
Eksperimen	<i>Pre-test</i>	52.92	<.001	H _a Accepted
	<i>Post-test</i>	69.24	<.001	H ₀ Rejected

Source: Researcher data, (2024)

The results of the hypothesis test for the *pre-test* and *post-test* in the experimental class showed a significant improvement. At the *pre-test*, the mean value was 52.92 with a Sig. value of <.001 that was smaller than 0.05, so H_a (alternative hypothesis) was accepted. This shows that there is a significant improvement in students' creative thinking skills after the treatment of the project-based learning model. Similarly in the *post-test*, the mean value was 69.24 with a Sig. value of <.001 that was smaller than 0.05, which caused H₀ (hypothesis zero) to be rejected. This shows that there is a significant difference between the *pre-test* and *post-test* results, which indicates a significant improvement in students' creative thinking skills after the implementation of the housing plan-based learning model.

N-gain Test

After the hypothesis test is carried out, the next step is to test the *N-gain*. *N-gain Test*

This was done to determine the effectiveness of the housing plan project-based learning model on improving students' creative thinking skills. The data of the N-gain test results are as follows:

Table 6. N-gain Test Results

Class	<i>N-gain Score</i>	<i>N-gain conditions</i>	<i>N-gain category</i>
Eksperimen	.7377	$g > 0.7$	High effectiveness

Source: Researcher data, (2024)

Based on table 4.9, the *N-gain* value of the experimental class of 0.7377 exceeds the limit of 0.7. Based on *the N-gain* measurement, the value shows that the learning effectiveness in the experimental class is in the category of "high effectiveness". This means that after participating in project-based learning, students' creative thinking skills and understanding improve significantly which is reflected in an *N-gain* value greater than 0.7. This category shows that applied learning has a significant influence on student progress in the measured dimension.

Discussion

The results of statistical analysis showed a significant increase between students' pre-test and post-test scores in experimental classes that applied project-based learning. These improvements are not just numbers, but reflect a profound change in the way students think, manage ideas, and innovate in solving problems. For example, the average pre-test score of the experimental group which was initially 52.92 increased to 69.24 after the implementation of project-based learning. This considerable improvement shows that the project-based learning model can have a strong impact on improving students' creative thinking skills, this is in line with the opinion (Krajcik, Joseph S. and Blumenfeld, 2005). A statistical test using the Paired Sample T-test yielded a Sig. < value of 0.001, indicating that project-based learning significantly increases student creativity. This very small p-value further emphasizes that the positive changes that occurred in the experimental group were the result of the application of the project-based learning model. This is strengthened by the results of the N-gain test which showed the result of the N-gain score in the experimental class which was 0.7377 (greater than 0.7) which proved that learning based on the housing plan project has high effectiveness in improving the creative thinking skills of students in the experimental class.

CONCLUSION

The application of the "Residence Plan" project-based learning model has proven to be effective in increasing students' creativity, especially in the subject of IPAS map material. The results of *the N-gain* test showed that the experimental group using the project-based learning model had high effectiveness (*N-gain* 0.7377). This is strengthened by a hypothesis test using *the Paired Sample T-test* which showed a significant increase in students' creative thinking skills after the implementation of the "Residential Plan" Project-Based Learning Model, which is with a p-value of < 0.001. Through the results of the statistical test, it can be concluded that

the Project-Based Learning Model "Residential Plan" has proven to be effective in improving students' creative thinking skills in science subjects.

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