Project Based Learning Models Impact on Geography Learning During Pandemic: An Experimental Research

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A R T I C L E I N F O

A B S T R A C T

This research is focused on a study that uses an online project based learning model viewed from student's interest in learning geography. The study aimed to see how distance learning affected students' creative thinking skills. Quasi-experimental research methodology is employed in this study using a pretest-posttest control group design. Students from Malang's XI Social Science State Senior High School 9 served as the study's participants. Determine the control class and the experiment is determined with the help of a random generator. As the experimental class, class XI Social Science 2 was used, and class XI Social Science 1 was used as the control class. Data collection techniques utilizing creative thinking ability test sheets and student learning interest questionnaire sheets. Statistical analysis used was the Mann-Whitney test and Two Way Anova test with the help of SPSS 26.0 for Windows. The findings reveal that (1) the project-based learning model had an effect on students' ability to think creatively with a value of asymp sig. (2-tailed) 0.005 < 0.05. (2) the project-based learning model has an impact on creative thinking abilities viewed from students' interest in learning with sig. 0.037 < 0.05.

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1. Introduction

The Covid-19 pandemic has brought about many changes in community activities. Acording (Diva et al., 2021), who stated that this Covid-19 pandemic has greatly affected every aspect of human life particularly the field of education. Education services are one of the rights of every student. However, during the Covid-19 pandemic, educational services had to come up with a new breakthrough, which is to implement online learning. In line with The Republic of Indonesia's Ministry of Education and Culture, Circular Letter No. 4 of 2020 was published. The circular provides details on the implementation of educational measures during the emergency stage of the Covid-19 outbreak. Point (a) of Circular 2 explains that distance learning takes place online (Kemendikbud RI, 2020). This is aimed at minimizing the spread of the Covid-19 pandemic in the educational environment.

Online learning encourages educators to keep students actively involved in learning activities. Learning activities continue to strive to develop and achieve skills in the 21st century and use a learning approach that is by the 2013 curriculum in all subjects, especially geography. 21st-century skills are a future provision for students that can be developed through the learning process. These skills are related to critical thinking, communication skills, creativity, and the ability to work together (Erdoğan, 2019).

Geography is a dynamic science. Developments that occur on earth affect each other's needs in understanding the needs of their own living space (Sudarma, 2014). Efforts to resolve a phenomenon that exists between natural and environmental phenomena, as well as interactions between humans that are intertwined in geography subjects, require different problem-solving. These problems can be faced by developing student's creative thinking skills in learning geography. Students can come up with new ideas and provide innovations on existing ideas to solve a phenomenon that exists on the surface of the earth.

Students' creative thinking skills in the discipline of geography may be improved with a project based learning model. The project-based learning model no longer limits students to seeking and finding geographic knowledge that must be adapted to the learning provided by the teacher. The success of geography creative thinking skills may be measured based on achievement parameters. Fluency, originality, flexibility, and elaboration are parameters of creative thinking abilities (Islami et al., 2018).

A project-based learning model can be used to fulfill the goals of learning geography by incorporating one of the 21st-century abilities, namely creativity. One of the learning styles that teaches student to learn and involves them actively is project-based learning. The role of students in learning via projects is to be able to produce or develop a product based on ideas and ideas developed independently, which are by the problems and actual learning conditions. Products that are arranged can increase student's positive attitudes towards the surrounding environment (Mahanal et al., 2010).

In the 2013 curriculum, one of the suggested learning models is project-based learning. This is because the project-based learning model uses a scientific and contextual approach that is by the 2013 curriculum learning development. The advantages of adopting the project-based learning approach for learning are increasing student creativity, student activity, cooperation and responsibility in students, and student motivation in learning (Baidowi et al., 2015).

The recommended learning model by the development of the 2013 curriculum is one of the things to be considered when having distance learning activities. The use of a better learning model in the 2013 curriculum will be an alternative to achieve the goals of developing the 2013 curriculum in the distance learning period. The utilization of online project based learning models is an alternative to distance learning activities to achieve learning goals and develop 21st-century skills by the 2013 curriculum (Jacobs & Association for Supervision and Curriculum Development, 2010; Wulan & Rusdiana, 2014).

This project-based learning activity model differs from the conventional project-based learning activity model. These distinctions can be evident in student learning activities, teacher-student communication, and student-student communication, as well as student-produced outputs. Learning activities are carried out with the help of learning management system, communication media, and other online learning applications. Student products in this online project-based learning model are electronic products. These products can be uploaded or accessed online by educators and friends.

The initiation of the project-based learning model entails the fundamental question, create a project plan, establish a timetable, oversee students. and monitoring project, assess the product, and evaluate the experience (Nurohman, 2015). The learning model will be implemented to produce a new product that comes from the results of student's independent thinking on a problem that has been compiled.

A successful learning is followed by the growth of a student's aptitude to be achieved in a learning activity. Factors that trigger the success of the learning process that comes from external and internal factors. Internal factors that come from within the participants. Internal factors that come from within

students. Internal factors start from a high sense of curiosity in students, so that it will bring up activities to seek and learn to find answers to that curiosity. This attitude is related to interest in learning.

Interest is something related to feelings of liking and attraction to certain objects. Interest is a driving factor to carry out an activity continuously(Sri Ira Suharwati, Sumarmi, 2016). This shows that a person's relationship with a phenomenon will increase activity to search for that phenomenon. In the learning process, the greater a student's desire to learn geography, the greater their attempt to better their search for solutions.

Various studies on project-based learning have been carried out, such as the Kumalasari research (2019) with the title The impact of the project based learning model (PJBL) on geography subjects on the creative thinking abilities of XI IPS class students of SMA Negeri 1 Gondanglegi Malang Regency and Nurrohman (2019) with the title. Outdoor Study-Based Discovery Learning Model on Critical Thinking Viewed from Student's Interests. Based on this background, The objective of this study was to find out the Influence Online Project-Based Learning on creative thinking competency in geography distance learning viewed from student's interest learning

2. Methods

In this study, a quasi-experimental design with a control group for the pretest-posttest was adopted as the research methodology. Both classes in this research design received the same pre- and post-testing. The difference was that the experimental class was given an online project-based learning model, whereas the control class was provided with standard or school-based models to apply in their learning activities (Creswell, 2014; Mills & Gay, 2016).

Participants in the study were Students from Malang's class XI Social Science State Senior High School 9. The research sample was chosen based on the average scores in geography for each class, which were almost identical and had an equal number of students. Based on this, 72 samples were used, and the experimental class was adjusted to be XI IPS 2 and the control class was raised to become XI IPS 1. The experimental and control classes were selected utilizing a basic random sampling technique with the help of a random generator.

Procedures for gathering data that involve testing, surveys, and observation. Before the research was carried out, observations were made by examining the students, the real classroom settings for geography lessons, and the instructional approaches employed by teachers during the pandemic. The tests used in this research were given both before and after treatment. This procedure serves to assess how well learners perform before and after being exposed to a particular learning approach. Students' enthusiasm in learning was assessed using the research questionnaire. This evaluation tracks learning using the method of project-based learning over many pandemic-related situations. The measurement instrument in this research consisted of an observation sheet, a test/question sheet, and a learning interest questionnaire. The normality test, homogeneity test, and hypothesis testing were performed utilizing SPSS 26.0 for Windows to analyze the data. The statistical study used the Two-Way Anova test and the Mann-Whitney test.

3. Result and Discussion

The study's first premise is that online project-based learning has a considerable impact on creative thinking skills of students. The average value of students' creative thinking skills in the experimental and control classes is used to support the hypothesis. Pretest and posttest data are used to assess creative thinking abilities. Below is a table that presents the results of the average data calculation.

Table 1.
Average the Ability of Creative Thinking and Interest in Learning

No	Data	Average Grade Score	
		Experiment	Control
1.	Pretest	64,9	63,3
2.	Posttest	81,6	75,7
3.	Gain Score	46,51	33,24

Source: Researcher's Document, 2021.

Table 1's information displays the pretest, posttest, and gain scores for the experimental and control classes. The test activities used in the control and experimental courses to assess students' creative thinking skills prior to carrying out learning activities produced results on the average value of the ability to think creatively. While test activities to evaluate students' creative thinking abilities followed learning activities in the control and experiment classrooms, the data on the average value of the posttest ability to think creatively.

In the control class, the increase in the average score obtained before learning activities until after learning activities was from 63.3 to 75.7. Whereas in the experimental class, the average score achieved before learning activities increased from 64.9 to 81.6 after learning activities. According to the table, compared to the control group, the experimental class possesses a greater ability to think creatively.

The difference between the posttest and pretest values is divided by the difference between the maximum and pretest values to get the gain score. The average gain score for the experimental class and the control class. According to the table, the experimental class's average value is greater than the control class's average value. The experimental class had a value of 46.51, whereas the control class had a value of 33.24. The experimental and control classes had a difference of 13.27 based on the values obtained.

Based on the data obtained, test the hypothesis for the formulation of the first problem. After performing preparatory tests, for instance, normality and homogeneity tests, hypothesis testing is performed. Normality test performed using Kolmogorov Smirnov statistics. The experimental class data had a significance value of 0.015, whereas the control class data had a significance value of 0.200. The results obtained have a meaning of $0.200 \geq 0.05$ which shows that the data on the ability to think creatively of control class students are normally distributed. The significant value of the experimental class is 0.015, which equals $0.015 < 0.05$. These results suggest that the data on creative thinking skills of students in the experimental class exhibits a non-normal distribution.

A The homogeneity test determines whether or not the data variance is homogeneous. The homogeneity test was undertaken utilizing Levene's test for equality of variance statistical test. The homogeneity test yielded a highly significant result with a value of 0.000, which equals $0.000 < 0.05$. According to these findings, the data on creative thinking ability obtained is not homogenous.

The hypothesis test used in the initial formulation was a non-parametric test called the Mann-Whitney test, which was based on the prerequisite test. The calculations using the Mann Whitney test with a significance level of 0.05 are shown below (0.05).

Table 2.
Mann Whitney Test Results

Data	Asymp. Sig. (2-tailed)	Significant Level	Information
Creative Thinking Skill	0,005	0,05	Significant

Source: Researcher's Document, 2021.

Based on table 2 shows the Asymp value. Sig (2-tailed) is 0.005, while the probability value is 0.05. Based on the decision-making criteria 0.005 <0.05, and the experimental class's average value was higher (46.51) than the control class's (33.24). Based on these results, in accordance with decision-making parameters, H0 is rejected based on these findings, indicating that the online project-based learning approach has an effect on creative thinking skills of students.

During the distant learning era, the success of boosting creative thinking skills using the online base learning project model was successfully executed. The acceptance of the first hypothesis in this study is also supported by each stage and treatment given to the online project-based learning model learning activities that meets the indications of creative thinking skills of students, Throughout the distance learning era.

The first stage is start with the essential questions. Essential questions can stimulate thinking, giving rise to new questions that require a variety of answers (Kurniastuti et al., 2018). The preparation of these essential questions can provide more focused and meaningful learning (Kurniastuti et al., 2018). At this stage, students are presented with a video about natural disasters. Showing this video aims to build focus and also give meaning to students about the material to be studied. Based on this first step, there will be an interaction between students and educators. This activity has trained several indicators of student's creative thinking skills, namely fluency which is indicated by the ease with which students generate answers, as well as indicators of flexibility shown by the variety of answers given by students in answering the questions given.

In the second stage, the process of designing a project plan according to the topic of discussion is obtained. The right strategy to monitor the project, from the tools needed to the techniques and activities carried out systematically can facilitate the objectives of the compiled project. The formulation of the strategy starts from determining the type of product to be compiled, then determining the sources of support in the manufacture of the product, and determining the tools that will be used to complete this project. This will indirectly train the indicators of creative thinking skills, namely originality which is marked by the birth of new ideas or ideas from the compiled project, creative thinking skills will appear which are marked by product updates to be designed and details in their preparation of the product. In addition, at this stage students will show flexibility in providing ideas and ideas for planning project plans, as well as detailed details of existing ideas for project planning (elaboration).

The third stage is the create a schedule. The time management compiled in this activity rundown can be useful for achieving the objectives of preparing the project by the given deadline. The preparation of this project activity schedule can be an efficient project progress control and use the agreed time as productively as possible so that the objectives of the project preparation will be by the agreed time(Gea, 2014). At this stage, students will ask questions to trigger problem-solving that has been prepared according to the time given by the teacher (fluency). Besides that, students can come up with a variety of different ways to tackle an issue that is organized in a list of actions that are timed (flexibility). Students will also provide specifics of activities that are indications of the student's ability to think creatively at this stage (elaboration).

The fourth step is to monitor students activities as well as the project's progress. Students consult and convey the progress of the activities. Students also address the difficulties encountered in preparing the project, and students provide details of the sources and tools used to develop the product. At this point, the teacher is in charge of overseeing work activities until the project is completed.

The fifth step is assess the outcome. At this stage the product results that have been compiled by students are uploaded to their respective drives, then the link is embedded on the google classroom platform. This upload is the basis for the teacher's assessment, as material for measuring standard achievement, evaluation material for each student, and providing feedback on the product. Some products from each topic are uploaded on social media, instead of presentation activities in class. The teacher and students reflect on learning activities using an online project-based learning model. Students express their feelings and responses to the learning activities that have been completed at this stage.

Online project based learning activities in learning are accompanied by LKPD. The teacher gives LKPD to students as a means of student activities in learning and compiling projects. Because distance learning activities do not support direct interaction between educators and students. LKPD is also a student control tool in preparing projects according to the syntax of this online project-based learning model. Students will be limited and directed by this control function based on online project-based learning objectives and models, as well as learning targets to be met.

The success of learning activities using the online project-based learning model is closely linked to the model's advantages. The following are some of the benefits gained from this project-based learning model: 1) it has the potential to boost student creativity, 2) increase student activity, 3) increase student collaboration and responsibility, 4) increase student learning motivation.

The cooperative learning model is used in project-based learning. Collaborative learning is one of the defining distinctive features of the project-based learning model (Nurohman, 2015). Distance learning conditions do not allow collaborative interaction between students. The effort made in this research is to create small groups containing students with the same topic of discussion to compile products from learning projects with the help of the group feature in the WhatsApp application. Each student interacts with the materials and projects that are prepared. Online communication and activities in the online project-based learning model can support increasing student knowledge during the implementation of online discussions (Koh et al., 2010). Although arranged individually, the collaboration and interaction of distance using online project-based learning model activities can still be felt, and can achieve the objectives of the learning activities.

Table 3.
Distribution of Pretest Results for Each Indicator of Creative Thingking Ability

No	Indicator	Score	Average		Difference (E-C)
			Experiment	Control	
1	Fluency	25	17,6	15,8	1,8
2	Flexibility	25	18,5	19,2	-0,7
3	Originality	30	18,7	19,3	-0,6
4	Elaboration	20	10,1	9	1,1
	Jumlah	100	64,9	63,3	1,8

Source: Researcher's Document, 2021.

The average value attained by the experimental class is 64.9, while the control class is 63.3, as shown in table 3. The difference between the average pretest scores of the two classes is 1.6. The experimental class has an average fluency indicator of 17.6, whereas the control class has an average fluency indicator of 15.8, resulting in a 1.8 difference between the two classes.

In the elaboration indicator, the experimental class got an average score of 10.1 while the control class got a score of 9, so that the average difference between the two classes was 1.1. The indicators of flexibility and originality show that The control group's average is greater than the experimental group's. In the indicator of flexibility, The experimental class received a score of 18.5 wherease the control class received a score of 19.2. In the originality indicator, The control group averaged 19.3, while the experimental group averaged 18.7.

According to the distribution of the pretest scores for each parameter in the experiment and control groups, it can be assumed that both classes with the same creative thinking capacity receive treatment in the form of a learning model.

Table 4.
Distribution of Posttest Results for Each Indicator of Creative Thingking Ability

No	Indicator	Score	Average		Difference (E-C)
			Experiment	Control	
1	Fluency	25	22,2	21,7	0,5
2	Flexibility	25	21,3	20,3	1
3	Originality	30	23,3	21,4	1,9
4	Elaboration	20	14,8	12,1	2,7
	Jumlah	100	81,6	75,5	6,1

Source: Researcher's Document, 2021.

Table 4 shows the average score of 81.6 attained by the experimental group who were treated with an online project-based learning model, The control group, alternatively, received treatment in the form of conventional learning activities and received an average score of 75.5. The difference in the average posttest scores of the two classes is 6.1. The experimental class scored higher on each indicator than the control class based on the average score for each indicator.

The experimental class had a 22.2 fluency indicator, while the control class had a 21.7 fluency indicator. In the flexible indicator, the experimental class has a score of 21.3, whereas the control class has a score of 20.3. The difference in the average score of the originality and elaboration indicators in the two classes is quite large. In the originality indicator, the difference between the two classes is 1.9, with the experimental class scoring 23.3 and the control class scoring 21.4.The elaboration indicator has the biggest difference compared to the other four indicators between the two observed classes which is 2.7, with an experimental class score of 14.8 and a control class score of 12.1.

The average table of indicators for the achievement of creative thinking ability utilizing online project-based learning model, the Originality indicator has the highest online score on the pretest and posttest. The originality indicator is one of the benchmarks for the level of creative thinking ability when students can come up with new ideas or provide innovations in existing ideas (Dumas & Dunbar, 2014). Based on learning activities, students can provide new ideas related to disaster mitigation efforts which are arranged in a product in the form of animated videos from online project based learning activities. In these indicators, students initiate new ideas and arrange them independently to become a product that can be of positive value.

According to the distribution of the experimental and control classes' posttest results, it is possible to obtained that, after the experimental class had an online project-based learning model and the control class had conventional methods, various results were observed. The experimental class's average value of creative thinking ability on each indicator of creative thinking ability was higher than the control class's.

Treatment of experimental classes in the project-based learning model online indicated an enhanced achievement of students' creative thinking skills before and after learning activities. The score table also supports the difference in the value of student's creative thinking abilities in the experimental class that utilizes a online project-based learning model even though learning activities are carried out online

The second hypothesis in this study is from the perspective of student interest in learning, the online project-based learning paradigm has a considerable impact on creative thinking skills. The data that supports the hypothesis is not only according to the average value of the experimental and control classes' creative thinking abilities, but is also supported by student's learning interests. Below is a table that presents the results of the average measurement of student interest in learning data.

Table 5.
Average of Student's Interest

Classification of Student's Interest	Frequency		Percentage	
	Experiment	Control	Experimen	Control
Tinggi	9	7	30%	23,3%
Sedang	19	11	63,3%	36,7%
Renda	2	12	6,7%	40%

Source: Researcher's Document, 2021.

Based on table 5, there are 12 students in the control class (40%) who are included in the classification of low learning interest. While those included in the classification of moderate learning interest were 11 students (36.7%). Only 7 pupils (23.3%) in the control class are identified as having a high level of curiosity.

In the experimet class, there are 2 students (6.7%) who are classified as having low interest in learning. While those included in the classification of moderate learning interest were 19 students (63.3%). Students who are classified as high interest are 9 students (30%). For the second problem formulation, a hypothesis test was conducted based on the data obtained. Hypothesis testing in the formulation of this second problem uses a two-way ANOVA test. The following are the findings of calculations using the Two Way Anova test with a significance of (0.05).

Table 6.
Two Way Anova Test Results

Data	Sig.	Significant Level	Information
Creative Thinking Ability viewed from Students Learning Interest	0,037	0,05	Signifikan

Source: Researcher's Document, 2021.

Table 6 indicates the significant value of the interaction test between variables, namely the online project-based learning model on abilities to generate inventive ideas in terms of student interest in learning, the results are 0.037, while the probability value is 0.05. Considering the decision-making criteria, the value of 0.037<0.05, in accordance with the decision-making criteria, it is stated that there is a rejection of H0. This means that there is an effect of online project-based learning models on abilities to generate inventive ideas in terms of student's interest in learning

Factors that influence student's interest in learning come from internal factors and external factors. External factors can be in the form of learning activities carried out by teachers related to the strategies, models, approaches, and methods used (Bimantara, 2018). One of the variables that may increase students' interest for learning is the right learning model.

A project-based learning model can be one of the learning models that can be an external factor that increases student enthusiasm in learning. Project based learning models will increase student's attention, involvement in learning activities, and student's interest in participating in learning activities (Roziqin et al., 2018). The project based learning model is characterized by the preparation of original products by students. Student involvement will be much greater when students carry out learning projects according to the designs that have been prepared (Roziqin et al., 2018). This involvement will increase student's interest in learning distance learning activities

The achievement of students in learning activities with project-based learning models that might think about their learning interests can be observed in the cross-tabulation table of the value of creative thinking skills of students based on their learning interests obtained from learning interests. Viewed from their learning interests, the following table compares students' average creative thinking skills.

Table 7.
Cross-tabulation results of students creative thinking skills and interest in learning

Interest to Learn	Average Creative Thinking ability	
	Control Class	Experiment Class
High	54,1	55,9
Medium	37	44
Low	15	27,5

Source: Researcher's Document, 2021.

Table 7 illustrates that students' average value of creative thinking skills varies depending on their learning interests as determined by student learning interest questionnaires. Evidently, based on the table, it can be noted that the experimental class students got a higher average score in the low, medium, or high-interest classification than the control group. The information that the experimental class has a greater interest in learning than the control class.

Interest in learning is a key component of a learning process' success factors. This is by the opinion which states that interest is one of the internal factors that have a positive impact in determining the success of a learning process (Sri Ira Suharwati, Sumarmi, 2016). Students who are based on a high interest in learning will have enthusiasm and sincerity to achieve the best value in the learning process.

In this day, student enthusiasm in learning is one of the aspects which can aid learning achievement when implementing an online project-based model. Students who have an interest in an activity will be more interested in finding learning resources, even seeking a deeper understanding of existing learning material (Renninger & Hidi, 2019). The existence of student interest in distance learning will maintain student interest in participating in learning activities. Student interests might have an impact on the goals and abilities that can be attained through online learning.

According to the description, it shows that there is a relationship between online project based learning models, student's creative thinking abilities, and student's interest in learning. To achieve student interest in learning, there are external factors that influence, one of which is related to the learning model used by the teacher in learning activities. The right model will increase students' enthusiasm in learning. This enthusiasm for learning can serve as a factor for success in learning activities to achieve the abilities to be achieved in a learning process

4. Conclusion

Distance learning activities during pandemic have to take notice based on 21st century skills. One of the competencies are developed for students is thinking creatively. This is a challenge for educators to carry out the innovative to develop students abilities. The learning innovations provided by students will certainly increase the students competence if they are able to improve their interest or enthusiasm in learning geography. One of the learning that can be actively realized by students with the teacher as a facilitator by the Project Based Learning model. Researchers aim to test and see the consequence of project-based learning implemented on distance learning assisted by other digital media and the assessment of the interest level in geography subjects during pandemic.

The results showed that there was an influence given by the project-based learning model on the level of creative thinking skills of students. This is supported by the acquisition of the value of creative thinking ability in the experimental class getting a greater average gain score (46.51) than the control class (33.24). Furthermore, this is supported by the asymptotic significance value (2-tailed) which obtained a value of 0.005. Project-based learning models also have an impact on creative thinking skills, as seen from students' learning interest with a significance value of 0.037. This indicates an improvement in creative thinking abilities because the obtained value is less than < 0.05. In addition, this study also shows that there are factors that support the improvement of creative thinking skills of students when viewed from students' interest in learning geography subjects in the era of distance learning.

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