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The Infact of the Project Based Learning (PjBL) Model on Strengthening the Pancasila Profile of Creative Thinking of High School Students

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Abstract

Education is an important factor in human life. Independent curriculum is present as a response to the tight competition for Human Resources, one of the goals of learning is to equip students with creative thinking skills. The PjBL model is a learning model that can bring out student creativity. This study aims to determine the effect of using project-based learning (PjBL) models on strengthening the Pancasila Profile in State Senior High School Students. This research method is a quasi-experimental with a pretest-posttest control group design. The research design used is Nonequivalent with a random sampling technique of 76 students selected as the experimental group and the control group. There were 7 test questions distributed, 20 student response questionnaires used, and 13 observation sheets used. Data analysis techniques are used to test the hypothesis. In testing this hypothesis, the technique used is the Sample T-test technique. The results of the study indicate that the use of the PjBL model can improve students' creative thinking skills. There is a difference in gain values between the experimental and control classes. The gain value of the experimental class is higher than the gain value of the control class, so this study can conclude that the PjBL model has a significant effect on students' creative thinking skills. This study emphasizes the focus of PjBL and other meaningful tasks, namely by providing opportunities for students to work independently in constructing knowledge to create products as part of the realization of the Pancasila profile competency.

Keywords: creative thinking; education; Pancasila; PjBL

INTRODUCTION

Education is an important factor in human life. Through education, humans can develop so that they are able to face every change of the times. Education can provide an environment that encourages students to develop their potential attitudes, creativity, cognitive abilities, and learning skills so that they can produce according to the needs of society (Lestari *et al.*, 2021; Afza *et al.*, 2022; Fitriani *et al.*, 2022). However, in this modern era, the challenges in the world of education are getting bigger, seen from the emergence of various innovations both in terms of the education system, implementation of learning, learning media, and things related to the education system. This change occurs because of changes in competency needs that affect the sustainability of education. To answer this challenge, the government has implemented an independent curriculum which is a form of improving the character-based curriculum as well as competency (Darise, 2019; Nugraha, 2022; Fitra, 2023). The independent curriculum is a flexible curriculum that provides schools, teachers, and

students with the freedom to design, manage, and evaluate the learning process. The independent curriculum has the advantage of focusing on essential materials and developing student competencies, deeper, more relevant, and interactive learning. Thus, it gives teachers and schools the freedom to assess student learning outcomes more comprehensively. It can be said that the independent curriculum is a curriculum designed to give schools the authority to adjust learning to the needs and culture of each school (Zakso, 2022; Fitra, 2023; Zumrotun *et al.*, 2024).

Through this independent curriculum, it is hoped that education can be modified so that it can produce superior Human Resources who have a Pancasila Student Profile and are able to compete in the world of work. The Pancasila Student Profile is focused on producing a generation of Indonesian students who have noble morals, have national and global competitive competencies, can work together, are independent in carrying out tasks, think critically, have ideas, and are skilled so that they are able to develop local cultural character (Rusnaini *et al.*, 2021; Putri & Arsanti, 2022; Regulation of the Minister of Education and Culture of the Republic of Indonesia, 2022). Independent curriculum is present as a response to the tight competition for Human Resources (HR) globally in the 21st century. In the independent curriculum, one of the learning objectives is to equip students with creative thinking skills so that it is easier for students to quickly understand the material taught by the teacher. (Amalia, 2022; Wicaksono *et al.*, 2022; Zakso, 2022). Mastery of soft skills is important for individual life in order to be competitive in the 21st century, students are required to have high creativity in order to develop, provide good ideas, and provide solutions to problems from various perspectives. The characteristics of creative abilities have four dimensions, namely the ability to think fluently, flexibility, originality, and elaboration. In order to develop students' creativity, teachers must understand how creativity can be developed (Meita *et al*, 2018; Triana *et al*., 2021; Fitriani *et al*., 2022).

The low creative thinking ability of students in biology material is reported to be caused by the application of biology concepts given by teachers which are boring, and do not provide students with enough freedom to improve their creative thinking skills. The results of the researcher's field study found that teachers still use one-way learning methods, which do not involve students in learning. Students' creative thinking skills are also very low because students are not given the freedom to explore their abilities. This finding is in accordance with the findings of Alfaeni *et al.* (2022) which state that learning with the lecture method is less popular with students. In this case, the PjBL learning model is suitable to be applied. The PjBL learning model is one of the learning models recommended for use in independent learning which has practical benefits for students, namely it is carried out dynamically by providing opportunities for students to be actively involved in exploring problems and challenges, through the PjBL-based learning model it is expected to improve students' learning achievement and creative abilities (Putri & Andriningrum, 2019; Rahardjanto *et al*., 2019; Fadhil *et al*., 2021). The PjBL model is a learning model that can bring out student creativity, accustom students to using existing knowledge, and implementing it in learning activities and pouring out their creativity and imagination in making projects so as to strengthen the profile of Pancasila students (Nugraha, 2022; Supiati & Sugandi, 2022; Farid *et al*., 2023). In environmental pollution material, students only know the theory without knowing the solution when faced with problems in the surrounding environment, so PjBL is one of the models that is suitable for use in environmental pollution material to increase creative ideas, learning activities, and student cooperation in working on a project (Rosma & Hasanah, 2021; Alfaeni *et al.*, 2022; Fitriani *et al*., 2022). This study aims to determine the effect of the PjBL learning model on students' creative thinking skills.

METHOD

This research is a quantitative research with a quasi-experimental method. Quasi-experimental is a design that involves at least two groups. One group as an experiment and one other group as a control group. The form of research design used is Nonequivalent control group design. In this design, the experimental group and the control group are compared but the samples are taken non-randomly,

the two groups are given a pretest then given treatment and finally given a posttest. So that the results of the study will be known precisely, because it can be seen from the comparison before being given treatment and after being given treatment (Dewi *et al.*, 2019; Akbar *et al.*, 2021; Kholiyah *et al.*, 2023). The nonequivalent control group design is formulated as follows:

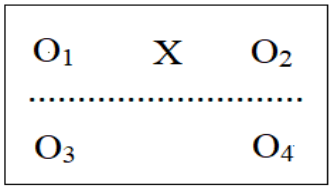

Figure 1. Research Design

The population in this study was all 10th grade students of SMA Negeri 1 Cipanas Lebak Banten totaling 302 people. The sample in this study was Random Sampling. The number of classes used as samples was 2 classes, one class was an experimental class with 38 students and the other class was a control class with 38 students. The sample was selected by first giving a number to each individual in the population and then randomly shuffling it. The numbers that came out represented the students selected as research samples. The selection of SMA Negeri 1 Cipanas was inseparable from the fact that this school is the only public school with a fairly large number of students in a remote area and has just implemented the Merdeka curriculum. In addition, there has been no research reporting on the effectiveness of PjBl on creative thinking in this school. The instruments used in this study were creative thinking ability tests, observation sheets, and student response questionnaires. The creative thinking ability test used an essay test consisting of 8 questions. The observation sheet used in this study was in the form of a checklist. This observation sheet functions to determine the achievement of each stage of learning, the questionnaire to determine students' perceptions of the PjBL learning model in environmental pollution learning. The creative thinking ability test used in this study was a descriptive test (essay) consisting of 8 questions referring to (Nurlaela *et al.*, 2019). The instruments can be seen in tables 1, 2, and 3.

Table 1. Creative thinking instruments**

Dimensions	Indicator	Question Indicator	Question Number	Number of Questions
Fluency	Producing various ideas, answers, and solutions to problems or questions, providing various ways or ideas for doing various things.	Able to explain solutions to environmental pollution.	1,3*	2
Flexibility	Observing a problem from a different perspective, looking for many ways to solve a problem, and being able to improve strategies or ways of thinking.	Able to predict if waste is not managed properly and able to find solutions to waste management problems.	4*	1
		Able to analyze the results of environmental pollution observations.	2*	1
Originality	Creating new and unique things that no one else has ever thought of	Creating new and unique things that no one else has ever thought of	6*	1
		Able to generate new ideas/concepts that have not been thought of by others in waste processing.	5*	1
Elaboration	Able to explore and develop ideas or products, detailing an object, idea, or context in detail so that it becomes more interesting.	Developing ideas/concepts in waste processing that cause environmental pollution by creating a project.	7*	1
		Develop ideas or concepts to reduce environmental pollution.	8*	1
				8

Note:
(*) = Valid.
(**) = adapted from Nurlaela *et al*. (2019)

Table 2. PjBL syntax grid based on teacher and student activities

No.	Stages	Teacher Activities	Student Activities
1	It starts with an essential question.	The teacher gives leading questions to the students.	Answering guiding questions in finding a problem to carry out the project.
		Directing students to formulate problems based on questions given by the teacher.	Formulate problems based on essential questions that have been answered.
2	Designing a project activity plan	Directing students to be able to identify dependent variables and independent variables based on research design.	Identifying dependent variables and independent variables based on the research design to be implemented.
		Ask students to determine the tools and materials for the research design that will be carried out..	Determining the tools and materials for the research design to be implemented
		Oversee the creation of a clear project implementation schedule.	Create a clear project implementation schedule.
3	Create an activity schedule	Guide students in creating backup plans related to existing projects and problems.	Create a backup plan related to existing projects and problems.
		Ask students to provide an explanation regarding the selection of the project design to be implemented.	Make an explanation regarding the selection of the project design to be implemented
4	Monitor the progress of student projects.	Supervise the implementation of projects carried out by students.	Carrying out projects under the supervision of teachers.
		Guiding at every stage of the project undertaken by students.	Carrying out each stage of the project until completion.
5	Conduct an assessment.	The teacher assesses the project reports made by students.	Project reports made by students are assessed by teachers.
		The teacher provides feedback on project reports made by students.	Project reports made by students receive feedback from teachers.
6.	Evaluation of experience.	Assess student project presentations based on observation results and explain environmental pollution prevention efforts..	Communicating the results of their observations and explaining efforts to prevent environmental pollution.
		Invite students to give their impressions and messages regarding the learning that has been carried out.	Providing impressions during the implementation of the project.

Table 3. Student response questionnaire grid

No.	Indicator	Item		
		Positive	Negative	Amount
1	Students' interest in learning biology using the PjBL learning model.	1, 2, 5, 7, 11, 19	1	7
2	Skills in learning are contained in the PjBL learning model.	4, 6, 10, 12, 16, 18, 20	-	7
3	Level of understanding in biology learning using the PjBL model.	8, 9, 13, 14, 15, 17	-	6
	Amount	19	1	20

In the preparation stage, determine the formulation of the problem to be discussed as the main topic in the research, create a creative thinking ability test instrument in the form of ten essay questions, non-test instruments in the form of observation sheets and questionnaires. Conduct validation with expert lecturers then make improvements. Conduct a trial of the test instrument and analyze the results of the instrument trial to obtain questions that have high validity and reliability. In the implementation stage, determine the class that will be used as the subject of the research, the implementation of learning begins with giving pretest questions to the experimental class and control class, the implementation of the second learning is continued with the learning process using the Project Based Learning (PjBL) model in the experimental class and the Discovery Learning model in the control class. At the second meeting, the researcher saw and observed the project worked on by the experimental class group to see the students' creative thinking abilities. At the third meeting, a posttest was conducted in the experimental class and control class after learning. Filling out the questionnaire by students. At the final stage, processing and analyzing research data and drawing conclusions. Data analysis techniques are used to test the hypothesis. In testing this hypothesis, namely using the t-sample test. Before conducting the t-sample test, there are prerequisite tests, namely normality using the Kolmogorov-Smirnov test and homogeneity test with SPSS version 25.

RESULT AND DISCUSSION

Based on the research that has been conducted, the results of the pre-test and post-test data for each class, the average value, and standard deviation are obtained in Table 4.

Table 4. Average score pretest-posttest

	Pre-Test		Post -Test	
	Experiment	Control	Experiment	Control
Average	62,05	55,42	14,39	6,26
Maximum	81,00	72,00	90,00	76,00
Minimum	45,00	42,00	62,00	50,00
Standar Deviasi	6,56	7,12	6,97	6,76

Based on table 4, it shows that the pretest scores of the experimental class and the control class have different initial knowledge. The number of classes used for the study was 2 classes, the experimental class used the PjBL learning model for the learning process, while the control class used the Discovery Learning (DL) model for the learning process. The results of the normality test showed that the pretest-posttest scores had a significance value of the experimental class greater than 0.200> 0.05. The significance value of the posttest score of the experimental class was 0.091 while the pretest score of the control class was 0.200. The significance value was> 0.05, namely (0.921> 0.05). It was

concluded that the variance of the posttest of the experimental class and the posttest of the control class were the same. This meets the basic assumption of homogeneity so that the requirements for data analysis through parametric statistics have been met. The results of the normality and homogeneity tests for the pretest and posttest scores in Tables 5 and 6 below

Table 5. Normality test results

Class	Sig	α	Conclusion
Experiment			
Pretest	0,200		Normally Distributed
Posttest	0,091		Normally Distributed
Control		0,05	
Pretest	0,200		Normally Distributed
Posttest	0,200		Normally Distributed

Table 6. Homogeneity test result

Data	Sig.	α	Conclusion
Class Experiment and Control	0,921	0,05	Homogen

The results of the creative thinking test based on creative thinking indicators on environmental pollution and waste material in Table 7 below:

Table 7. Results of students' creative thinking abilities

Creative Thinking Indicators	Experiment		Control	
	Pretest	***Posttest***	***Pretest***	***Posttest***
Fluency	71.84%	89.21%	58.68%	67.63%
Flexibility	68.16%	87.63%	55.53%	65.00%
Originality	66.40%	77.19%	55.35%	64.47%
Elaboration	53.29%	67.11%	54.61%	56.58%

In Table 7. it is known that the pretest for the Fluency indicator has the largest presentation score among other indicators in both treatment classes with each score of 71.84% in the experimental class and 58.68% in the control class. The Flexibility indicator for the experimental class presentation is 55.53% and the control class is 68.16%. The Originality indicator is 66.40% in the experimental class and 55.35% in the control class. The Elaboration indicator has the lowest percentage value compared to other indicators, namely in each treatment class, namely 53.29% in the experimental class and 54.61% in the control class.

The fluency indicator of the experimental and control treatment classes has the largest percentage compared to the other 3 indicators. The experimental class obtained a percentage score of 89.21% and the control class 67.63%. In the flexibility indicator, the experimental class got a percentage of 87.63% and the control class 65%. The Originality indicator obtained a score of 77.19% for the experimental class and 64.47% for the control class. The Elaboration indicator obtained 67.11% for the experimental class and 56.58% for the control class.

Table 8. Analysis of the n-gain of creative thinking ability of students in experimental class and control class

No.	Class	N. Gain	Catagories
1	Experiment	0, 67	Midle
2	Control	0, 21	Low

Hypothesis testing shows that there is a significant difference in the average score between the experimental post-test score and the control post-test score, the experimental class uses the PjBL model and the control class uses the DL model. Learning using the PjBL model provides students with experience in learning and managing a project, providing a learning experience that involves students in groups, which is designed to solve concrete problems so that the learning atmosphere becomes enjoyable (Sari & Angreni, 2018; Baran *et al.*, 2021; Andriani, 2022). Based on the indicators of creative thinking on environmental pollution and waste materials, it shows that in the experimental class, the originality indicator (original thinking) did not experience a significant increase in the average, namely in the pretest of 9.96 and the posttest of 11.58 with an increase of 1.62. The results of this study can provide information about the application of the PjBL model in learning, especially in improving students' creative thinking skills. Teachers can use this learning model by referring to the syntax and guidelines for implementing the learning model according to the research that has been done. Especially the conditions of schools that are left behind according to the criteria of this study will be very suitable for its application in learning.

In PjBL learning activities, students carry out several stages of activities. At the Project Planning stage which includes the first Development of Planning Skills: students can learn to plan and organize their work. The second stage is Initial Involvement; students feel more involved because they participate in designing the project (Saenab *et al.*, 2019; Kaushik, 2020; Saepul *et al.*, 2023). In the third stage, Clear Objectives; students and teachers can ensure that all group members understand the goals and expectations. At the Research and Information Collection stage, the first benefit is in Research Ability, students can develop work skills in the form of research analysis and information analysis. Second, in Information Literacy Skills, students can improve their ability to evaluate information sources and draw conclusions according to what is learned together. At the Development and Implementation stage, students get the first benefit from the Collaboration Skills stage, students can improve their ability to work in teams and communicate well. At Technical Skills Practice; students can apply technical and creative skills in real contexts according to the Pancasila profile. At the Problem-Solving stage, students can carry out activities to practice solving problems and making decisions according to the teacher's questions that have been given. At the Presentation and Assessment stage, students get the first benefit, students will have Presentation Ability skills, especially developing public speaking skills and conveying information effectively (Nurhidayah *et al.*, 2019; Juuti *et al.*, 2021; Fitriani *et al.*, 2022). At the Critical Skills Improvement stage, students can learn to give and receive constructive feedback. Evaluation and Reflection. At this stage, students will get the opportunity to learn from their experiences and improve their skills for the next project. Students can also do Self-Assessment which helps students to critically evaluate their own and their team's performance (Kaushik, 2020; Ahwan & Basuki, 2023; Saepul *et al.*, 2023).

The smallest increase was due to the ideas given by some students being almost the same as other friends, this shows that students are fully capable of original thinking, this is in accordance with the revised Bloom's taxonomy or Anderson's taxonomy which places creating as the highest level in the thinking pyramid (Kusumaningrum & Djukri, 2016; Marhamah, 2021; Guntur *et al.*, 2020). The experimental class experienced a moderate increase in the Flexibility indicator, which only had a score difference of 1.94, an average pretest of 6.82, and a posttest of 8.76. This is because in this section students can observe problems from various perspectives, find many solutions in solving problems. Flexibility indirectly shows the ease of obtaining information and reduced rigidity (Cahyasari & Haryanti, 2016; Rahardjanto *et al.*, 2019; Alfaeni *et al.*, 2022). For the Elaboration indicator in the

experimental class, the average indicator was 21.32 and the posttest for Elaboration was 26.84. In this aspect, students can explore and develop ideas or products. However, in this aspect, students are less detailed in detailing an object, in the Elaboration aspect, students are less trained in daily learning activities, as a result, students are less able to develop ideas and are less detailed (Saenab *et al*., 2019; Ahwan & Basuki, 2023; Saepul *et al*., 2023).

This is proven by the results of the questionnaire which stated that 10 students (26.32%) strongly agreed and 28 students (73.68%) agreed with the statement "I am very happy to follow Biology learning using the PjBL model on environmental pollution material. Furthermore, the results of the questionnaire showed that 21 students (55.26%) strongly agreed and 17 students (44.74%) agreed with the statement that the PjBL model makes me more active in discussing with friends". Then the results of the questionnaire also showed that there were 4 students (10.53%) who strongly agreed and 17 students (44.74%) stated that there were 4 students (10.53%) who strongly agreed and 34 students (89.47%) agreed with the statement "Biology learning using the PjBL model makes me understand the subject matter given better. Thus, it can be concluded that the student response to learning using the PjBL model on environmental pollution material is positive. Based on the percentage criteria of student response questionnaire scores, it can be said that student learning responses using the PjBL model are "quite good". This is indicated by the large number of students who enjoy using the PjBL learning model, because students are enthusiastic in participating in learning, discussing project design, working on projects in groups, and are calmer (Kristanti *et al*., 2016; Nurhidayah *et al*., 2019; Fadhil *et al*., 2021). In addition when students do the project directly on the observation venue like beach, mountain, lake, or even laboratorium can also maximise the result (Ratih *et al.*, 2021; Triacha *et al*., 2021; Laurenza *et al*., 2023; Putri *et al*., 2023). Although there are still some students who still complain that they do not understand, it turns out that their achievement results have improved. Although the use of the PjBL learning model in the learning process still has several weaknesses, it has been able to improve students' creative thinking skills and receive positive responses from students, meaning that in total the use of the PjBL learning model has had a positive influence on students' creative thinking skills.

CONCLUSION

This study concludes that the implementation of the PjBL model has a significant influence on the creative thinking skills of senior high school students. The experimental class using the PjBL model has more creative thinking skills than the control class. This finding provides information related to the implementation of learning models to improve students' learning experiences. The implications of the results of research activities that can be used include teachers are expected to be able to use the PjBL model in biology learning to strengthen the Pancasila profile.

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