



# Analysis of the Application of the Project Based Learning (PjBL) Learning Model on Increasing Student Creativity in Science Learning in Elementary Schools

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**Abstract:** This study aims to determine the application of the Project Based Learning (PjBL) model to increase students' creativity in learning science at SDN 143 Inpres Ge'tengan. The research design used is qualitative research using descriptive methods, namely describing and expressing the processes and results of learning creativity. The results of this study indicate that the application of the PjBL model in science learning at SDN 143 Inpres Ge'tengan provides a good process improvement and learning outcomes in increasing students' creativity in learning. The PjBL model is not only required to express opinions but in PjBL it is also required to solve problems through giving assignments to make projects so that students' creativity and creative thinking abilities increase.

**Keywords:** Creativity Project Based Learning, Science

## Introduction

Education is the most important aspect in efforts to empower humans. Through education, the development of potential, personality, intelligence, skills, and noble character of students can be formed and directed. The education system today has progressed very rapidly. Various methods have been introduced and applied in the learning process with the hope that the teaching and learning process will be more interesting and meaningful for students. The main goal expected of a teacher is how the subject matter can be conveyed as a whole to students. In a learning process, teachers are also required to be creative in conveying learning so that students do not feel bored.

The diversity of subjects in schools aims to improve the quality of human resources and improve the quality of education. Increasing student learning creativity is the essence of the Project Based Learning (PjBL) approach which involves active students in the learning process, students work together by forming groups in solving

problems and producing a project in the learning process. The PjBL approach is an innovative approach that focuses on contextual learning through complex activities. Complex activities based on questions and problems that are very challenging and require students to design, solve problems, make decisions and provide opportunities for students to work independently (Setiawati, 2013).

The PjBL learning model invites students to create a project that can produce products and students' ideas independently. So that in the implementation of learning students will show their creativity and the results of student understanding will be accepted and will produce maximum learning outcomes (Nugraha, 2018). Solving problems and producing something new are complex activities and are closely related to one another. A problem generally cannot be solved without thinking, and requires new solutions for individuals or groups. Producing something object, new idea, creating something, including problem solving. Mastery of information is needed to obtain concepts and principles

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that must be remembered and considered in problem solving and creative action. The PjBL model allows students to learn in a pleasant atmosphere, and feel they have the ability to gain new knowledge, reduces feelings of fear and tension that students feel when participating in the learning process. Learning using the Project Based Learning method also allows students to interact and work well with other students (Gunawan et al, 2018).

Creativity is one of the abilities students need to help solve problems and find new concepts. Creativity is the ability of students to create new things in their learning either in the form of the ability to develop formation abilities obtained from the teacher in the process of teaching and learning knowledge so that they can make new combinations in their learning (Titu, 2015). Creativity is the ability to think divergently or how to solve a problem using various alternative answers to the same problem. Student creativity as a student's ability to produce various ideas through broad and diverse thought processes. This PjBL model does not only focus on the end result, but places more emphasis on the process of how students can solve their problems and finally produce a product. This model allows students to gain invaluable experience by actively participating in the project. This is of course more challenging than just sitting quietly listening to the teacher's explanation or reading a book and then doing a quiz or test. Student learning creativity is the ability of students to create new things in their learning either in the form of the ability to develop information obtained from teachers in the teaching and learning process in the form of knowledge so that they can make new combinations in their learning (Rizkasari et al, 2022).

Innovative learning does not always mean completely new learning methods but more than changes that occur from conventional learning to interactive learning (Syofyan, 2018). Students who participate actively in the learning process will try to develop all their potential to achieve the expected learning goals. The most important component in this process is the role of the teacher and students. In learning, the teacher must make students active and dominant in a classroom atmosphere that is conducive to the learning process. Innovative and varied learning models are needed to support the achievement of the expected science learning objectives. Because the selection of the right learning model will be able to attract the attention of students to actively participate in the learning process. Students who actively participate in the learning process will try to develop all their potential to achieve the expected learning goals (Simbolon et al, 2022).

The application of a student-centered learning process or student-centered learning can make students more active and focused in taking lessons. Therefore,

good classroom management is needed in order to attract students' interest and willingness to take part in learning. One of the steps that can be taken is to choose the right learning method. The project-based learning model that class teachers assume that the project-based learning model is able to make students learn independently, can increase student activity because this learning emphasizes students to be active and is able to make students actively discover concepts independently so that later students get an understanding of material concepts. mature (Nisah et al, 2021). The learning method has a very important role in the learning process. The method used must be in accordance with the objectives to be achieved. One of the learning methods that is considered suitable to be applied to basic graphic design subjects is the project-based learning method or what is often called (Christian, 2021). This learning model is an excellent learning model in developing various basic skills that students must have including thinking skills. This learning model is an excellent learning model in developing various basic skills that students must have including thinking skills. This learning model is an excellent learning model in developing various basic skills that students must have including thinking skills. Project Based Learning (PBL) learning is very important to improve the quality of student activities and contains several different learning processes.

The PjBL model provides opportunities for students to freely carry out experimental activities, review literature in the library, browse the internet, and collaborate with teachers. Therefore, learning resources become more open and varied, including in exploring the environment. As a result, students will learn with full sincerity because they are motivated by the desire to answer the questions that have been asked so that learning becomes more effective and meaningful (Pradita et al, (2015). This learning model is a very good learning model in developing various basic skills that students must have including thinking skills. This learning model is an excellent learning model in developing various basic skills that students must have including thinking skills,

The PjBL model is very helpful in the learning process because it can deepen students' knowledge, this model is packaged in making projects and forming groups where students here directly practice how to make the product to be made. This model is also very helpful for students in socializing, because with group work students can discuss and issue student opinions to produce better products. In addition to discussing and practicing directly making products, students are also trained to speak in front of their classmates or in the school environment, so that the experience experienced

by students increases, in this model students do not only seek information from textbook sources, Learning model Students participating in the M-STEM-PjBL curriculum actively assist peer learning and initiate active teacher-student interactions. Teachers and student participants improve their practical skills throughout the process. Students in maker science classes have more positive attitudes toward science and science learning and change the attitudes of their peers in regular science classes (Chen, at all, 2019).

Based on the observations and interviews that I have conducted, science learning outcomes are still low. Science learning in class still uses lecture and assignment methods, this causes science learning to become monotonous and less varied, in addition to using less varied learning methods, the use of media and visual aids has not been widely applied in science learning. The conventional learning model makes the teacher the center of activity and students are left passive. Student activity will emerge if the teacher provides opportunities for students to want to develop their mindset, and want to develop ideas (Sihwinedar, 2015). Learning that is expected to be able to overcome these problems is through the PjBL (Project-Based Learning) learning model which is supported by constructivist theory which relies on the idea that students build their own knowledge in the context of their own experiences. Constructivism is a widely accepted learning theory that rests on the idea that students construct their own knowledge within the context of their own experiences (Milla et al, 2014). Seeing this elaboration, the purpose of this study is to describe students' creative abilities using the PjBL model in learning science in class V SDN 143 Inpres Getengan.

## Method

The research method used in this research is qualitative research. The qualitative research method is research based on postpositivism or interpretive philosophy, which is used to study the condition of natural objects, where the researcher is the key instrument. This type of research is qualitative descriptive research. Descriptive research is intended to systematically and accurately describe the facts and characteristics of a study (Sugiyono, 2012). This study seeks to describe the level of student creativity. The sample in this study were fourth grade students at SDN 143 Inpres Ge'tengan.

Data collection techniques through observation, interviews, questionnaires and documentation. The data analysis technique of this research uses a qualitative descriptive analysis technique. The steps used according to the Miles and Huberman model are data reduction, data display (data presentation, and verification).

Interviews were conducted with class IV teachers at SDN 143 Ge'tengan Inpres.

### *Analyze*

At this stage, preliminary research was carried out to obtain data related to problems in learning science in elementary schools, to find out the learning model in schools, and to find out opinions from education regarding the learning model used. This stage also determines the competency standards to be achieved and determines the learning model to be used.

### *Design*

The design phase begins with designing projects that will be used in learning. The project design stage is adjusted to the PjBL stages, the types of practice questions given, competency tests, and learning videos.

## Results and Discussion

Changes in the level of student learning creativity can be seen, which at first only referred to the material presented by the teacher and available student worksheets and textbooks, can be even better with discussion activities, making project assignments in the form of products directly with direction and guidance from the teacher. The increase in student learning creativity that occurs in each cycle is that students solve learning problems by getting ideas or ideas and conveying them in the process of learning activities. Creativity is an ability that reflects fluency, flexibility, and originality in thinking as well as the ability to elaborate on an idea.

The PjBL model can meet learning demands in terms of cognitive learning outcomes according to Bloom's taxonomy which consists of six parts, namely knowledge, understanding, application, analysis, synthesis, and evaluation which can assist students in learning solid and meaningful knowledge and skills. through assignments and authentic work (Insyasiska, 2017). In addition, the PjBL model can also broaden knowledge through learning activities that carry out planning activities and can build knowledge through real-world experiences that take place in a collaborative work atmosphere. Cognitive abilities are closely related to creative and rational thinking processes (especially higher order thinking). moreover, it is said that there is a close relationship between remembering and understanding and between understanding and thinking creatively and rationally. Students who have the ability to think creatively and rationally show that they really understand and vice versa by understanding they will be able to think complexly. Thus it appears that remembering and understanding are the basis for complex thinking.

The characteristics of the project-based learning model include that students are able to make decisions about a framework, there are problems or challenges posed to students, students design processes to determine solutions to problems or challenges posed, students are collaboratively responsible for accessing and managing information to solve problems, the evaluation process is carried out continuously, students periodically reflect on the activities that have been carried out; the final product of the activity will be evaluated qualitatively, and the learning situation is very tolerant of errors and changes (Daryanto 2014). In project-based learning, students are encouraged to be more active in learning. The teacher as a facilitator, evaluates the results of student work that is displayed in the results of the projects being worked on, so as to produce real products that can encourage student creativity. This opinion is in line with this research that in learning activities that involve students playing an active role in producing a product or project, it will encourage students' ability to understand a knowledge or add insight. In addition, student learning outcomes can increase in each cycle because by using the Project Based Learning learning model students can participate in learning activities well so that students can understand the material being studied and in evaluating learning outcomes it is expected to meet the minimum Completeness Criteria (known with KKM). This is in line with learning outcomes which are the pinnacle of student learning success against predetermined learning objectives.

#### *Design of Implementing a Project-Based Learning Model to Increase Student Creativity*

The paradigm of the PjBL model is student-centered and independent learning, directed at solving complex problems by investigating and understanding them, focused on students (focus on authentic skills), carried out in team work (collaborative), and facilitated by educators (with a facilitator). The PjBL model is an innovative learning model and is in accordance with the 2013 curriculum applied in elementary schools, because through the PjBL model it can encourage elementary school students to be more active in participating in the learning process so that learning can be centered on students (student center). In addition, students can solve problems and build their knowledge independently, develop their creativity and build good cooperation between elementary school students to produce a quality project (Fahrurrozi, 2020). Implementation of learning with the PjBL model in an effort to increase activity and learning outcomes, is a learning activity by practicing mastering the material by working on projects. Learning activities are different from usual, integrated with the real world, student-centered, and

take a long time. Mastery of student material on the concepts and principles of knowledge as well as increasing student knowledge and technology should present material related to social and technology that exists in society. An approach that is in accordance with the demands of science and technology development with the PjBL approach because this approach allows students to play an active role in learning and can display the role of science in community life (Farida et al, 2018).

In an effort to improve the quality of learning, it is necessary to create a pleasant learning atmosphere so as to motivate the development of student creativity. Planning is an action step. Planning is carried out in the implementation of the PjBL model. The planning development stage includes: introduction and planning of the team in the PjBL model project, starting the steps in the project research or information gathering process, making, developing, initializing the evaluation, and designing or planning the project in the form of a results report, designing and building the project according to the steps -steps that have been prepared beforehand, final presentation. Innovative learning with the Project Based Learning model has many advantages. are as follows: motivating students to learn in making projects, making students creative and innovative in learning and problem solving, increasing collaboration between students, cultivating scientific attitudes such as being honest, conscientious, responsible, and creative (Yani et al, 2020). Science learning for fifth grade students at SDN 143 Inpres Ge'tengan with student food chains resulted in a project in the form of an image of a food chain ecosystem in the school environment such as garden ecosystems, ponds and so on.

#### *Implementation of the Application of Project-Based Learning Models to Increase Student Creativity*

Based on the results of observations and interviews that have been conducted with science teaching teachers for grade V at SDN 143 Inpres Ge'tengan, they have implemented the Project Based Learning model. In this learning process students are divided into several groups to create and produce projects related to ecosystem food chains. The application of the PjBL Model in the science learning process in class V of SDN 143 Ge'tengan Presidential Instruction was effective, because it can be seen from the learning process the students were active in learning activities. Project-based learning is one of active learning by involving students independently with the criterion that in this learning it will also increase students' thinking power towards metacognitive such as critical thinking about projects that will be done through problems found by students. This project-based learning is authentic, so that indirectly this learning will involve students in

constructive investigations (Insyasiska et al, 2017). Learning is carried out more meaningful because students are required to be active and creative from the activities outlined in student worksheets.

Student worksheets are all forms of activities and materials that assist teachers in carrying out the process of learning activities so that activities in the learning process run effectively and coherently according to plan, (Sari et al., 2020). In Hots-based learning it is very important to use worksheets. In addition to directing activities, a good student worksheet can also help students' creativity and independence in creating work according to the steps of the student worksheet instructions. Therefore, the use of student worksheet is very suitable to be combined with the HOTS-based learning model and is innovative in the project-based learning model.

In the second stage of the PJBL model, children are directed to form 4 groups consisting of 5-6 children. Students are formed in groups to be able to work independently with their groups to deal with a problem to be solved. Working in groups will facilitate their assignments, besides that it will increase the enthusiasm of students to do assignments because it is done together through discussion also from the thoughts of many people in group members will add to a good creation because the results of work come from the thoughts of many students who are collected and summarized into one goal and product. Group discussion is an activity of thinking together, which means that the activity produces creative abilities in a realistic sense.

In the next stage students work on the worksheets that have been described previously and students are given teaching materials as a guide for students when working on the worksheets. Teaching materials are very important to be given to students, because with teaching materials students can find out questions or activities that are difficult for students to understand. Teaching materials are an important part of the learning process and are a part of teaching resources which can be interpreted as something that contains learning messages that are both specific and general in nature which are used for learning purposes (Magdalena, 2020). Entering the next phase of the PJBL model, there is a schedule preparation phase that focuses on the length of time the project will take.

In the next stage, namely monitoring students and progress in the PJBL learning model and guiding problem investigations, namely student activities working on worksheets by discussing starting to follow the steps in the worksheets. Discussion activities with groups and working on questions in student worksheet. And at the stage of testing PJBL results and developing and presenting PJBL work results, students actively

convey the results of their discussions to other groups and other groups respond and comment on each other.

Project-based learning is a strategy to empower students to solve problems ranging from skills in analyzing, researching, making products to presenting the projects they make. The weakness in communicating/presenting the results of this discussion was that students were found to be embarrassed when presenting their project results in front of the class (Setiawan 2021). Making projects trains students to think creatively and can train students to be independent and active in learning, implementation of learning affects the learning outcomes obtained and affects students' ability to understand the material provided (Maisyarah, 2020). In the learning process this model shows that student activity increases because students are invited to think actively and creatively in discussions about making projects/products. In the PjBL model students are active and happy when making a product that is produced in group discussions. Students are creative in compiling the products they make, to be able to increase student learning creativity in learning science. Then students design, solve problems, carry out decision making and investigative activities by creating projects (Candra, 2019).

The Project Based Learning (PjBL) learning model is very helpful in the learning process because it can make students' knowledge deeper, this model is packaged to make a project and form a group where students here directly practice how to make the product to be made. This model is also very helpful for students in socializing, because with group work students can discuss and issue student opinions to produce better products. In addition to discussing and practicing directly making products, students are also trained to speak in front of their classmates or in the school environment, so that the experience students experience increases, in this model students do not only seek information from textbook sources.



**Figure 1.** Student activities with group 1 work on projects



**Figure 2.** Student activities with group 2 work on projects



**Figure 3.** Student activities with group 3 do

From the results of interviews obtained from teachers stated that the PJBL model is an innovative model that can be applied in class. Because learning in schools is accustomed to using the lecture method learning model which makes learning activities centered on the teacher so that students get bored easily. With innovative learning, PJBL will be able to make changes to the learning process in class because it increases students' creativity and creative thinking in improving student learning outcomes (Wulandari, 2019). The PJBL learning model is a model that can increase student activity. In addition, this model is able to make children think creatively in responding to existing problems.

In applying this model, it is better to add the use of the Technological Pedagogical Content Knowledge (TPACK) model so that learning is more interesting and as a communication link. In the analysis of the results of the process in learning activities it was found that students tended to be more active and enthusiastic in the core activities of the PJBL model, especially in composing and making activities. project. This is supported by the student observation sheet in the form of a questionnaire that on average students are more interested in PJBL activities. The application of the PJBL learning model requires students to think more creatively. This is indicated by the increasing number of students asking questions, expressing opinions and answering teacher questions. In PJBL, students are not

only required to be able to express their ideas, but students are also required to be able to solve problems through giving projects so that students' creativity in thinking increases (Surya, 2018). The project-based learning model is able to make students achieve good cognitive ability criteria by understanding learning concepts and is also able to make students think creatively. In the PJBL model, students are required to use all their potential in solving problems in completing assignments. The application of the PJBL model invites students to produce products so that they can increase student creativity (Ardianti, 2017).

The Project Based Learning model allows students to learn in a pleasant atmosphere, and feel they have the ability to acquire new knowledge, reducing feelings of fear and tension that students feel when participating in the learning process. Learning using the Project Based Learning method also allows students to interact and work well with other students (Taupik et al, 2021). In addition, the teacher also instills in students the importance of observing the real world in testing a scientific statement (hypothesis). Observation of daily events that require scientific evidence, quantitative thinking exercises that support science learning activities, namely as the application of science to real problems related to natural events.

## Conclusion

The application of the PJBL model in science learning at SDN 143 Inpres Ge'tengan provides improved learning processes and outcomes in making students active, creative and creative. The PJBL model can improve good cooperation in problem solving activities that exist during discussions. The application of PJBL is able to improve public speaking skills in conveying arguments through presentation and response forums. From the analysis of the results of the learning process and analysis of student learning outcomes it is known that the average student score has increased and student creativity has also increased.

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## Author Contributions

The author's contributions include Julien Chintya: conducting validation tests, and writing original drafts; Sri Haryani and Suharto Linuwih: focus on methodology, supervision, and

review of writing; Putut Marwoto: guidelines for writing scientific papers.

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#### Conflict of Interest

The authors declare no conflict of interest.

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