Global Education Journal
Vol. 3, 3 (September-December, 2025), pp. 451-462
EISSN: 2808-5094, DOI: 10.59525/gej.v3i3.1273

Application of Project-Based Learning Model to Improve Students' Critical Thinking Skills

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ARTICLE INFO

Keywords:

Model;
Project;
Learning;
Skills;
Critical Thinking

Article history:

Received 2025-10-28
Revised 2025-11-26
Accepted 2025-12-31

ABSTRACT

Low critical thinking skills have a negative impact on the competence of graduate students. Students' low critical thinking skills are caused by one of the learning models that teach critical thinking skills are not used properly in every learning in the classroom. One of the learning models that is in accordance with critical thinking skills is Project Based Learning. The purpose of this study is to determine the level of students' critical thinking skills. The researcher uses a quantitative research paradigm with a quasi-experimental method carried out in the context of secondary education. The research instrument used is Non-equivalent Pretest-Posttest Design. The results of the study show that (1) The application of the Project Based Learning model can improve critical thinking skills; (2) Project-based learning is an effective model approach that focuses on critical thinking in solving problems; (3) The Project Based Learning model can create interaction between students and other students. The conclusion of this study is that the Project Based Learning model is an effective approach in developing students' critical thinking skills.

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1. INTRODUCTION

Education is an important factor that increases the level of progress of a nation. Quality education will certainly produce quality human resources, so that in the future the next generation will be able to compete in the era of globalization. However, on the other hand, if the results of this education fail, it is difficult to imagine how a nation can achieve progress in the field of education. Teachers always strive to create a conducive learning environment for their students. One way is to make students the center of activities to produce a generation that has attitudes, skills and critical thinking skills. Critical thinking skills are directing students to play an active role and explore their potential that exists in themselves, so that students are able to develop their way of thinking critically and analyzing to find and find answers to a problem on their own. Critical thinking is a thought process to criticize, choose,

solve and make decisions with rational and accountable reasons.

In the 21st century, the rapid development of technology has led to changes in the field of education. The integrity of information technology in education to enhance the learning experience and prepare students for the challenges of the 21st century. In teaching, teachers must try to activate students, besides that, teachers must also pay attention to other teaching principles, based on the above explanation, the researcher will apply the Project Based Learning learning model. Project-based learning is applied to motivate students to be more active and take the initiative to acquire the things they want both in terms of knowledge, understanding, and skills. In addition, project-based learning also conditions and forces students to look for problem-solving solutions in completing their projects. With a learning model like this, students will be helped and easier to write. Students no longer have difficulty listing things that need to be written based on the chosen topic, determining the ideas to be developed in the paper (based on observation or research), drafting the outline of the paper, and developing the framework into a whole paper. In project-based learning, a product is produced whose results are displayed or presented.

One of the preparations that can be made to increase the nation's competitiveness is to target the competence of graduates who have critical thinking skills. Critical thinking skills, one of the various skills needed in the 21st century, are life skills that need to be developed through the education and learning process as mandatory essential skills for graduates at every level of education (Agnesa, 2022). Project-based learning is a learning model that allows teachers to combine hands-on learning and project work in the classroom (Isriani and Puspitasari, 2015:5). According to this perspective, project-based learning is a student-centered learning model that involves teachers as facilitators. The students' ideas make up the PjBL project, which is intended to offer an alternative for students to learn to solve problems directly. In addition, this learning model is able to increase students' creativity and problem-solving skills (Majid & Chaerul, 2014)

The Project-Based Learning (PjBL) model has been identified as an effective approach in developing students' critical thinking skills. PjBL is a learning with long-term activities that involve students in designing, making, and displaying products to overcome real-world problems (Sani, 2014). The important characteristics of PjBL focus on important concepts, inquiry processes, related to real problems, producing products, constructive investigations, realistic projects and student-centered learning. Project-based learning is carried out to deepen the knowledge and skills gained by creating works or projects related to the teaching materials and expected competencies possessed by students.

Project Based Learning (PjBL), an innovative learning model that fosters critical thinking in students and provides a meaningful learning experience. Applying the study of Dywan and Airlanda (2020), the use of PjBL includes a learning model that functions to make it easier for students to understand the topic. In PjBL, students directly practice, analyze, respond, and find solutions to each problem. PjBL learning is a student-centered, long-term, and problem-solving learning model. This model provides students with a significant learning experience (Rohana, 2017). In addition, this stage of the PjBL learning model begins with students concentrating on questions or issues that determine the project topic, planning the final stages of the project, setting a schedule for project implementation and completion, asking for teachers' guidance during the project, compiling reports, publishing project results, and assessing the project's progress and outcomes. PjBL learning combines learning materials with real situations in the student environment (Kristiani, 2018).

One of the learning models that is in accordance with scientific character and abilities critical thinking, namely Project Based Learning (PjBL). The PJBL Learning Model is a model learning that applies problems is the first step in obtaining New knowledge based on concrete life activity experiences (Fahrezi et al., 2020). PJBL is a learning process that focuses on the system relatively long learning, concentrate the problem and combine the concepts of the several components, both in terms of knowledge, and discipline (Pratiwi et al., 2018). From some of the statements above, the PJBL learning model when applied can improve students to think critically because in the application of this model it can encourage creativity, questioning skills, independence, sense of responsibility, confidence, and ability think. In its application, this is not spared from planning that adjusts to characteristics and

background of students.

The application of the PJBL learning model has several advantages, namely:
a) increase student learning motivation,
b) train student confidence,
c) train collaboration between students,
d) students become more active in learning activities,
e) form students to be able to processing sources of information (Azizah et al., 2018).

On the application of the learning model PJBL has steps that distinguish it from other learning models, namely:
1) determining fundamental questions related to the material,
2) designing the project,
3) planning the project creation schedule,
4) overseeing the progress of the project,
5) project assessment,
6) evaluation of the experience of making projects (Yulianto et al., 2017).

From some explanations above about the PJBL model, the researcher believes that the application of this model can be used in improving students' ability to think critically. Zubaidah (2017) explained that the implementation of project-based learning is a suitable model to meet the needs of the educational goals in the 21st century, because it involves the 4C principles, namely: critical thinking, collaboration, creativity, as well as communication. Therefore, this research is important because it is a efforts made to improve critical thinking skills. One of the learning models that is in accordance with scientific character and abilities critical thinking, namely Project Based Learning (PjBL). The PJBL Learning Model is a model learning that applies problems is the first step in obtaining New knowledge based on concrete life activity experiences (Fahrezi et al., 2020). PJBL is a learning process that focuses on the system relatively long learning, concentrate the problem and combine the concepts of the several components, both in terms of knowledge, and discipline (Pratiwi et al., 2018). From some of the statements above, the PJBL learning model when applied can improve students to think critically because in the application of this model it can encourage creativity, questioning skills, independence, sense of responsibility, confidence, and ability think. In its application, this is not spared from planning that adjusts to characteristics and background of students.

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One of the characteristics of creative thinking is the ability of students to solve problems. Creating a more meaningful and enjoyable learning experience where students can optimally participate and develop their creative thinking is the goal of this learning model. PjBL helps students achieve the desired knowledge, understanding, and skills by assisting them in project planning, implementation, and presentation of results is a tangible benefit of PjBL in education. Critical thinking is a process of thinking that manages the way of thinking more deeply, not the way of thinking hard, but for the ability to think critically is processed more precisely, something that is made concrete. Therefore, each student has a different thinking pattern because of his or her knowledge process that is critical in perspective.

In education, critical thinking skills play an important role in helping students understand and master the subject matter. The indicator of critical thinking skills expected in 21st century education between the ability to identify and interpret information based on knowledge and experience draws conclusions about the credibility of information and self-regulation (Zulyusri et al., 2023). Critical thinking skills also help students become strong and independent individuals. Directed thinking independence makes students not easily influenced by other people's opinions or information that has not been proven to be true. They have the ability to objectively sift through data, analyze arguments with proper logic and make decisions based on solid data and facts.

Students' low critical thinking skills are caused by a learning model that teaches critical thinking skills are not used properly in every learning in the classroom. In fact, according to Sugiarti and Bija (2012), the quality of education can be obtained through the development of students' thinking skills, so that teachers are expected to be able to choose the right learning model to be applied in the teaching and learning process. A learning model that is suitable for training students' critical thinking skills is the PjBL Model. Critical thinking is thinking that has a purpose (proving a certain intention, interpreting, and solving problems), but critical thinking can be done collaboratively and competitively (Facione, 2013). Critical thinking is thinking that aims to solve problems, formulate conclusions, calculate possibilities, and make decisions.

The project-based learning model includes problem-solving, decision-making, questioning and work skills. Students should focus on solving problems or questions that will help them understand the concepts and principles of the project. Each study group can propose a different project to solve the identified problem. The role of the teacher is to assist students in planning project work, analyzing sketches or project plans at the request of the group, and identifying the need for possible collaboration. Students understand that in this case the project learning model is very appropriate because the essence of the learning model is for students to "work" on what they learn to improve learning outcomes in terms of knowledge, skills and attitudes.

Project-based learning, also known as project-based learning, is a learning model that uses activities or projects as a way to learn attitudes, knowledge, and skills (Fathurrohman, 2016). In fact, a project can be considered a dense job that consists of many tasks and requires the collaboration of a supervisor to complete it. Project-based learning is intended to be applied to complex problems that require a deep understanding of the student. Project-based learning is a learning model that allows teachers to combine hands-on learning and project work in the classroom (Isriani and Puspitasari, 2015). According to this perspective, project-based learning is a student-centered learning model that involves teachers as facilitators. The students' ideas make up the PjBL project, which is intended to offer an alternative for students to learn to solve problems directly. In addition, this learning model is able to increase students' creativity and problem-solving skills (Majid & Chaerul, 2014).

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a more meaningful and enjoyable learning experience where students can optimally participate and develop their creative thinking is the goal of this learning model. PjBL helps students achieve the desired knowledge, understanding, and skills by assisting them in project planning, implementation, and presentation of results is a tangible benefit of PjBL in education. This method is in accordance with the foundations of contemporary education. One of the important things to keep in mind while in class is group work that focuses on the student's individual abilities and materials, regardless of the number of activities that must be done. Develop student activities, creativity, and experiences. Therefore, the theory and practice of academic activities and community life form a single unit.

In the PjBL learning model, there are stages of PjBL planning in detail from Majid (2014) as follows:

a) Educators and students choose the study topic together, taking into account curriculum standards, local resources and students' interests.
b) The teacher explains to the students what they have understood and helps them formulate questions that will be answered later.
c) Educators provide students with learning resources and opportunities to work in this field.
d) Educators equip students with learning resources and opportunities to work in the field.
e) Students share their experiences and results, then each student reports the results of his research and finally participates in the evaluation of the project.

Problems arise in daily life, and creative thinking is the ability to create something new as well as find solutions to the problem (Rohana, 2017). Applying learning in the real world is one way to practice creative thinking (Yusnaeni, 2017). PjBL learning is a student-centered, long-term, and problem-solving learning model. This model provides students with a significant learning experience (Rohana, 2017). In addition, this stage of the PjBL learning model begins with students concentrating on questions or issues that determine the project topic, planning the final stages of the project, setting a schedule for project implementation and completion, asking for teachers' guidance during the project, compiling reports, publishing project results, and assessing the project's progress and outcomes. PjBL learning combines learning materials with real situations in the student environment (Kristiani, 2018)

Project-based learning is simply defined as instruction that tries to connect technology to a student's known everyday problem or a project undertaken by a school or college. The students conduct research on their own and with their respective groups to improve the group's research skills that are beneficial to the development of their academic skills. Students plan and carry out research, problem-solving, decision-making, and research activities on their own, as well as create projects to apply their ideas to real-world situations. Models, objects, scientific papers, movies, videos, CDs, or DVDs are examples of the final results of a project.

Each study group can propose a different project to solve the identified problem. The role of the teacher is to assist students in planning project work, analyzing sketches or project plans at the request of the group, and identifying the need for possible collaboration. Students understand that in this case the project learning model is very appropriate because the essence of the learning model is for students to do "what they learn to improve learning outcomes in terms of knowledge, skills and attitudes. It can be concluded that the concept of project learning is a learning model in which students participate in the completion of a project under the full guidance and supervision of the teacher. Project-based learning as a learning model that aims to improve students' writing and critical thinking skills, responsibility and independence in their projects.

Steps of the Project Based Learning Model

The stages of the Project Based Learning learning model according to Widiarso (2016) can be implemented with the following steps:

a) Determination of fundamental questions

Learning begins by asking relevant questions to complete the task. The topic is realistic and relevant to the student and starts with thorough research.

b) Develop a project plan

Planning takes place in collaboration between teachers and students. Therefore, students are

expected to feel that they are the "owners" of the project. Planning involves the rules of the game, choosing activities that support answering relevant questions, the integration of various possible topics and knowledge of tools and materials that will help the implementation of the project.

c) Plan a schedule

Teachers and students agree on a schedule of activities to complete the project. At this stage, activities include:

1. Create a schedule (deadline) to complete the project.
2. Set a deadline for completing the project.
3. Encourage students to plan in new ways
4. Guide students as they form habits that are not related to the project, and
5. Ask students to explain (justify) the choice.

d) Monitor learners and project progress

The teacher is responsible for supervising student activities during the completion of the project. Supervision is carried out by guiding students in each process. In other words, teachers play the role of guides for student activities. To make the monitoring process easier, columns are created to record all important actions.

e) Testing the results

The purpose of the assessment is to help teachers measure standard achievement, participate in evaluating each student's progress, provide feedback on students' levels of understanding, and help teachers develop additional learning strategies. f) Evaluate experience

At the end of the lesson, teachers and students reflect on the activities and results of the completed projects. Reflection is carried out both individually and in groups. The application of the PJBL learning model has several advantages, namely: a) increasing student learning motivation, b) training student confidence, c) training collaboration between students, d) students becoming more active in learning activities, e) forming students to be able to process information sources (Azizah et al., 2018). In the application of the PJBL learning model, there are steps that differ from other learning models, namely: 1) determining basic questions related to the material, 2) designing the project, 3) planning the project making schedule, 4) supervising the progress of the project, 5) project assessment, 6) evaluating the experience of making the project (Yulianto et al., 2017). From some of the explanations above about the PJBL model, the researcher believes that the application of this model can be used in improving students' ability to think critically. Zubaidah (2017) explained that the implementation of project-based learning is a suitable model to meet educational goals in the 21st century, because it involves the 4C principles, namely: critical thinking, collaboration, creativity, and communication.

Therefore, this research is important because it is an effort made to improve critical thinking skills. PjBL encourages students to actively engage in the learning process through projects that require them to plan, implement, and evaluate solutions to real-world problems. This approach not only improves critical thinking skills, but also students' collaboration, communication, and creativity skills (Telaumbanua, 2024). The implementation of learning can shape students' ability to think critically. According to Greenstein (Fitri et al., 2018) that in the 21st century, the critical thinking skills needed are critical thinking, creativity, and problem-solving. According to Unaenah (2019), critical thinking is a skill in thinking by using the process of analyzing and evaluating a problem so as to produce the right decision in solving the problem.

The need for critical thinking skills in learning will have an impact on students to face problems in daily life (Ridho et al., 2020). Normadhita (2018) indicators that must be achieved by students in critical thinking are: a) able to ask questions, b) able to answer questions, c) ability to draw conclusions, d) able to express opinions/arguments, e) able to solve problems, and f) able to evaluate and assess the results of critical assessments. Therefore, the ability to think critically is an ability that should be possessed by students.

Critical thinking is a reflective and rational critical thinking skill in deciding on the right action, involving analytical, and evaluative cognitive processes. Critical thinking skills include analysis, interpretation, inference, explanation, evaluation, and self-regulation (sefl-regulation). Critical thinking

is a skill that involves the process of reflective and rational thinking to make informed decisions, and includes various cognitive processes such as analysis, interpretation, inference, explanation, evaluation and sefl-regulation. Critical thinking is not only an intellectual process, but also involves an emotional aspect, and a mental attitude, in which one is open to new possibilities, is skeptical of existing assumptions and has a willingness to dig the truth through and deep analysis. In fact, critical thinking skills in junior high school still haven't reached what was expected. Mastery of several indicators of thinking skills critical students are still lacking.

2. METHODS

This study uses a quasi-experimental method. The quasi-experimental method was chosen because the researcher could not fully control the existing variables, such as random assignments. In this study, the researcher could only observe the phenomenon that occurred in the classroom with certain interventions, namely the application of the Project Based Learning learning model to measure its influence on students' critical thinking skills.

This research was conducted in the context of Cibatu secondary school (SMPN 3). Using quasi-experimental methods allows researchers to work in real-world conditions without the need to change existing classroom structures or impractical interventions. This makes the results of the research more relevant and applicable to the educational context in the school. With quasi-experimentation, research can still be carried out in a real educational environment, where students learn in an existing classroom and there is no need for too much manipulation of the existing system.

The research instrument used is Pretest-Posttest Non-Equivalent (Non-equivalent Pretest-Posttest Design). In this design, there are two groups used, namely the experimental group and the control group. However, the two groups were not randomly formed. The Experimental Group is a classes applied with the Project - Based Learning learning model. While the control group is a class that the expository model is applied to.

The researchers administered a pretest and a posttest to measure changes before and after treatment in both groups. The pretest is used to measure the initial condition of a student's critical thinking skills. Posttest was used to measure the final outcome after the application of the intervention (PjBL) in the experimental group and conventional learning in the control group. In this way, researchers can measure changes in critical thinking skills that may occur as a result of the treatment given. These results can provide quite valid information about the influence of PjBL on the development of students' critical thinking skills in grade VIII.

Research instruments help researchers accommodate and process various research information. Research instruments are basically measurement performance, and tools used to measure observable natural and social phenomena (Sugiyono, 2018). In conducting this research, there are several instruments used, namely the main instrument and supporting instruments. The main instrument of primary data is a person or researcher using the five senses when observing field observations, asking questions and listening during interviews with teachers and students, and asking questions and obtaining data from research information through various necessary documents. The main instrument produces transcripts of interview results and observation results in the PjBL learning process in the form of a description. In this case, interview guidelines are needed in the form of a collection of questions or a question framework. Researchers need to get valid data to not only ask for one source. Therefore, the condition of the informant must also be clear according to the needs of the data so that the authenticity of the data can be known.

The supporting instruments used by the researcher are documents to be prepared, namely teacher and student interview guidesheets, observation guidesheets, observation instrument sheets for the implementation of learning models containing the realization of PjBL steps in the review text material, assessment instrument sheets and assessment criteria for the results of the project writing review texts, recording tools, and stationery to record all the necessary information.

3. FINDINGS AND DISCUSSION

Project-Based Learning (PjBL) is a student-centered learning model. In this model, learners are actively involved in projects that are relevant to real life and are personally meaningful. Students work on projects over a long period of time from a week to a semester that involves them in solving real-world problems or answering complex questions. They demonstrate their knowledge and skills by creating products or public presentations for a real audience. As a result, students develop in-depth knowledge of content as well as critical thinking, collaboration, creativity, and communication skills.

Project-Based Learning is an infectious creative synergy between students and teachers. The learning process has a habit of only understanding concepts, so students will easily forget and only survive in the short term and that makes students not have preparation if there is a problem that must be solved and no one has an interest in creating a product. In *Project-Based Learning*, students learn in real problem situations, which can give birth to permanent knowledge and organize projects in learning. *The Project-Based Learning* model encourages students to be more active, independent and critical in solving a problem (Safitri et al, 2018). A model that is able to change students' habits is the *Project-Based Learning* learning model or often referred to as PjBL

Project-based learning is an effective approach model that focuses on critical thinking, problem-solving, and interaction between students and other students so that they can create something and have modern knowledge. Project-based learning is a learning model that uses problems as the first step in collecting and integrating new knowledge based on experience in real activities (Elisabet et al., 2019).

In this PjBL model, students are required to be creative to make a product that is in accordance with existing problems and can be solved with a group or independently. PjBL is a learning that directs students to work in groups in order to make or carry out a project together, and present the results of the project in front of other students. In the opinion of the experts above, the researcher concluded that the PjBL model is a teaching and learning process that creates products that are made to prioritize the experience of students to get a solution to a problem that is related to environmental conditions to train critical thinking skills.

1. Characteristics of *the Project-Based Learning* (PjBL) Learning Model

The Project-Based Learning *learning model* is a different delivery model from other learning models because this learning model has its own characteristics, including:

1. The learning model in the classroom involves projects.
2. Project work contains complex tasks based on problems.
3. Collect and integrate new knowledge based on experience in real activities.
4. According to students to carry out activities to design, solve problems, make decisions, and carry out investigative activities.
5. Providing opportunities for students to learn independently or in groups.

The characteristics of the PjBL model are able to make it easier for students to solve an existing problem. Solving this problem occurs if there is a process that improves the relationship between students in conveying ideas or ideas that can listen to the ideas of other students. This relationship activity with other students can foster the process of knowledge development in students. Social interaction also occurs with the surrounding environment, including the school environment where they are a source for seeking knowledge.

Steps of *the Project-Based Learning* learning model in the *context of Project-Based Learning*. Erni Murniarti in the journal Application of *the Project-Based Learning* Method in . The steps of *Project-Based Learning*, include:

1. Students are divided into small groups and each group carries out a real project (connecting the problem).
2. Each group is given an explanation of the tasks and responsibilities (setting the structure) that must be carried out by their group in practice.
3. Students in each group try their best to

4. Identify the business problem (visiting the problem) faced according to the knowledge they have. First, identify the problem carefully to find the core of the business problem being faced. Second, identify ways to solve problems.
5. Students in each group seek information from various sources (books, guidelines and other sources) or ask the accompanying experts to gain an understanding of the problem (revisiting the problem). Armed with the information obtained, students cooperate and discuss with each other in understanding the problem and finding solutions (*produce the product*) to the problems faced and immediately applied. The coach acts as a companion.
6. Each group socializes their experience in solving problems to the other group to get input and evaluation from the other group.

b. Application of the PjBL Learning Model

Project-Based Learning is a learning model that uses real projects in daily life to help students solve problems. In this model, students play the role of professionals who try to solve problems collaboratively. At the junior high school level, in order to create an active, creative and critical teaching and learning process, it can use a learning model that has its own characteristics, such as *the Project-Based Learning model*, the application of this project model can create a learning process that pays attention to students' critical thinking skills.

4. CONCLUSION

The application of the learning model (*Project-Based Learning)* as a strategy that is considered effective in encouraging critical thinking skills in students. By describing the steps and characteristics of *Project-Based Learning*, this study shows that *the Project-Based Learning* approach can be a strong foundation for improving students' critical thinking skills. Involving students in real-life related projects can provide a deeper learning experience.

Learning is no longer just about understanding concepts, but also applying that knowledge in real life and creating opportunities for critical thinking. The application of *the Project-Based Learning* learning model has great potential to improve and help develop students' critical thinking skills. The application of *the Project-Based Learning* learning model has an influence on students' critical thinking skills, the PjBL learning model also has a positive effect on students' critical thinking skills. Once educators understand the value and implications of this model, educators can use the *Project-Based Learning* model effectively to create a learning environment that encourages students to think critically.

Project-based learning can be carried out starting from Class VIII. Of course, the higher the value, the more complex the project will have to be completed. Project-based learning is based on constructivist theory and is student centered learning. Project-based learning allows teachers to "learn from students" and "learn with students". The purpose of project-based learning is to deepen the knowledge and skills gained through work or projects related to the learning material, as well as the competencies expected of students.

REFERENCES

Agnesa, O. S. (2022). Model problem-based learning sebagai upaya peningkatan keterampilan berpikir kritis pada pembelajaran biologi.Journal on Teacher Education 3.3 : 65-81.

Aristawati, A. N. R., & Munir, S. (2024). Efektivitas Penerapan Model Project Based Learning pada Pelajaran Ekonomi dalam Meningkatkan Critical Thinking Siswa Kelas X SMAN 1 Papar. *Research and Development Journal of Education*, 10(2).

Azizah, & Naniek. (2018). *Konsep Belajar Menggunakan Model Project Based Learning*. 36–51

Dywan, A. A., & Airlanda, G. S. (2020). Efektivitas model pembelajaran project based learning berbasis STEM dan tidak berbasis STEM terhadap kemampuan berpikir kritis siswa. *Jurnal Basicedu*, *4*(2), 344-354.

Elisabet, E., Relmasira, S. C., & Hardini, A. T. A. (2019). Meningkatkan Motivasi dan Hasil Belajar IPA

dengan Menggunakan Model Pembelajaran Project Based Learning (PjBL). *Journal of Education Action Research*, *3*(3), 285-291.

Fahrezi, I. … Nafia'ah, N. (2020). Meta-Analisis Pengaruh Model Pembelajaran Project Based Learning Terhadap Hasil Belajar Siswa Pada Mata Pelajaran IPA Sekolah Dasar. *Jurnal Ilmiah Pendidikan Profesi Guru*, *3*(3), 408. https://doi.org/10.23887/jippg.v3i3.28081.

Fathurrohman, M. (2016). Model Pembelajaran Inovatif: Alternatif Desain Pembelajaran Yang Menyenangkan. Yogyakarta: Ar-Ruzz Media Group.

Fitri, H., Suharjo, S. (2018). Pengaruh Model Project Based Learning (PjBL) Terhadap Kemampuan Berpikir Tingkat Tinggi Ditinjau dari Motivasi Berprestasi Siswa Kelas IV Sekolah Dasar. *Briliant: Jurnal Riset Dan Konseptual*, *3*(2), 201. https://doi.org/10.28926/briliant.v3i2.187.

Hardani, Helmina dkk, 2020. Penelitian Kualitatif Dan Kuantitatif. Yogyakarta : Pustaka Ilmu Grup.

Isriani & Puspitasari, D. (2015). Strategi Pembelajaran Terpadu: Teori, Konsep & Implementasi. Yogyakarta: Relasi Inti Media Group Kurikulum 2013. Bandung: PT Remaja Rosdakarya.

Khumairok, W. e. (2021). Profil keterampilan berpikir kritis siswa SMP pada materi getaran gelombang dan bunyi menggunakan soal berbantuan prompting question. *Natural Science Education Research (NSER) 4.1*, 35-44.

Komara, E., Berliana, B., Firman, M., & Gunawan, U. (2023). Implementation of Project-Based Learning Model to Improve Students' Critical Thinking Skills. *Economic Education Analysis Journal*, 12(3), 192–198.

Kristiani, N., Hasanah., Hunaenah, N., Moroki, E.S.G.,Kadariyah, N., & Ibayati, Y. (2018). Manajemen Implementasi Kurikulum 2013. Direktorat Jenderal Pendidikan Dasar Dan Menengah, Kementerian Pendidikan Dan Kebudayaan 60 Kriyantonno, Rachmat. (2014). Teknis Praktis Riset Komunikasi. Jakarta: Kencana

Majid, Abdul & Chaerul Rochman. (2014). Pendekatan Ilmiah Dalam Implementasi Kurikulum 2013. Bandung: Pt Remaja Rosdakarya.

Normadhita, R. (2018). Peningkatan Kemampuan Berpikir Kritis dan Hasil Belajar Siswa kelas IV Pada Pembeajaran IPA Melalui Metode Eksperimen Di SDN Tegalrejo 2. *Yogyakarta: Universitas Sanata Dharma*, (3), 9.

Pratiwi, C. D., Anugraheni, I. (2018). Penerapan Model Pembelajaran Project Based Learning (PjBL) Berbantuan Media Mind Map Untuk Meningkatkan Keaktifan dan Hasil Belajar Siswa Kelas IV SD. *Jurnal Guru Kita (JGK)*, *2*(3), 116–125.

Pertiwi, A. D. (2022). Menerapkan metode pembelajaran berorientasi student centered menuju masa transisi kurikulum merdeka. *Jurnal Pendidikan Tambusai 6.2*, 8839-8848.

Ridho, S., Marwoto, P. (2020). Analisis Kemampuan Berpikir Kritis Siswa Pokok Bahasan Klasifikasi Materi dan Perubahannya. *Jurnal Penelitian Pendidikan IPA*, *6*(1), 10–15. https://doi.org/10.29303/jppipa.v6i1.194.

Rineksiane, N. P. (2022). Penerapan Metode Pembelajaran Project Based Learning Untuk Membantu Siswa Dalam Berpikir Kritis. *Jurnal Pendidikan Manajemen Perkantoran*, *7*(1), 82–91. https://doi.org/10.17509/jpm.v7i1.43124.

Rohana, R.S & Wahyudin, D. (2017). Project Based Learning Untuk Meningkatkan Berpikir Kreatif Siswa Sd Pada Materi Makanan Dan Kesehatan. Jurnal Penelitian Pendidikan.Vol. 16(3), Hal: 235-243.

Safitri, N. L., Zubaidah, S., & Kuswantoro, H. (2018). Pengembangan LKS Project Based Learning Berbasis Penelitian Perlakuan Perbedaan Dosis Fosfat pada Genotipe Kedelai. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, *3*(4), 518–523. https://doi.org/10.17977/jptpp.v3i4.10813

Saidah, (2017). Penilaian Hasil Proses Belajar Mengajar. Bandung : Remaja Rosdakarya.

Sani, Ridwan Abdullah. 2014. Pembelajaran Saintifik untuk Implementasi Kurikulim 2013. Jakarta: PT Bumi Aksara.

Sugiyono. (2015). Metode Penelitian Pendidikan Bandung. Bandung.

Sugiyono.(2018). Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, Dan R&D. Bandung: Alfabeta.

Suharyanto H. Soro.(2024). Kata Siapa Pendidikan itu Penting?Penerbit: Inkara. PT Innovasi Karya Mahendra. Anggota IKAPI.

Telaumbanua, R. (2024) *Penerapan Model Project Based Learning (PjBL) Terhadap Critical Thinking Skills Siswa Terintegrasi Higher Order Thinking Skills (HOTS).* S1 thesis, Universitas Jambi.

Unaenah, E., & Rahmah, N. (2019). Pengaruh Model Learning Cycle Terhadap Kemampuan Berpikir Kritis Matematika Siswa Kelas V Sekolah Dasar. *Jurnal Cakrawala Pendas*, *5*(2), 1–12. https://doi.org/10.31949/jcp.v5i2.1319.

Widiarso, E. (2016). Strategi Dan Metode Mengajar Siswa Diluar Kelas (Outdoor Learning) Secara Aktif, Kreatif, Inspiratif, Dan Komunikatif. Yogyakarta: Ar-Ruzz Media Group.

Yulianto, A. K. (2017). Pembelajaran Projekct Based Learning Berbasis Lesson Study untuk Meningkatkan Keaktifan. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, *3*(2), 448–453.

Yusnaeni, Y., Corebima, A. D., Susilo, H., & Zubaidah, S. (2017). Creative Thinking Of Low Academic Student Undergoing Search Solve Create And Share Learning Integrated With Metacognitive Strategy. International Journal Of Instruction. Vol. 10 (2), Hal : 245–262.

Zulyusri, Z. e. (2023). Literature study: Utilization of the PjBL model in science education to improve creativity and critical thinking skills. *Jurnal Penelitian Pendidikan IPA 9.1*, 133-143.

Zubaidah, S. (2017). Keterampilan Abad Ke-21: Keterampilan Yang Diajarkan Melalui Pembelajaran. *Seminar Nasional Pendidikan Dengan Tema "Isu-Isu Strategis Pembelajaran MIPA Abad 21*, (Desember), 1–17