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Meningkatkan Kreativitas Peserta didik dalam Menunjang Hasil Belajar Fisika dengan Model Pembelajaran Berbasis Projek

Increasing Student Creativity in Supporting Physics Learning Outcomes with a Project-Based Learning Model

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Abstrak

Telah dilakukan penelitian dengan tujuan untuk meningkatkan kreativitas peserta didik dalam menunjang hasil belajar fisika. Penelitian ini menggunakan model pembelajaran berbasis projek. Jenis penelitian yang dilakukan adalah penelitian tindakan kelas dengan tiga tahapan yaitu pra siklus, siklus 1, dan siklus 2. Penelitian dilakukan di MA Plus Nurul Islam Sekarbela pada 20 peserta didik kelas 12 Jurusan MIPA. Data yang diperoleh dalam penelitian ini terdiri dari data kuantitatif dan kualitatif. Data kuantitatif diperoleh melalui tes dengan pemberian soal untuk memperoleh data kreativitas peserta didik, sedangkan data kualitatif diperoleh melalui teknik pengumpulan data non tes yang dihasilkan melalui proses observasi dan dokumentasi mengenai aktivitas selama proses pembelajaran berlangsung. Berdasarkan analisis data dan pembahasan didapatkan kesimpulan bahwa terjadi peningkatkan rata-rata kreativitas dari nila 65 menjadi 75 serta persentase ketuntasan peserta didik dalam pembelajaran fisika dari 40 menjadi 70%. Selain itu setiap indikator kreativitas peserta didik terlihat mengalami peningkatan secara berkala seiring dengan setiap siklus yang diberikan.

Kata kunci: Pembelajaran fisika; Kreativitas peserta didik, Hasil belajar fisika; Model pembelajaran berbasis projek; Penelitian tindakan kelas.

Abstract

Research has been carried out with the aim of increasing student creativity in supporting physics learning outcomes. This research uses a project-based learning model. The type of research carried out was classroom action research with three stages, namely pre-cycle, cycle 1, and cycle 2. The research was conducted at MA Plus Nurul Islam Sekarbela on 20 Grade 12 students majoring in Mathematics and Natural Sciences. The data obtained in this research consists of quantitative and qualitative data. Quantitative data was obtained through tests by giving questions to obtain data on student creativity, while qualitative data was obtained through non-test data collection techniques that were produced through the process of observation and documentation regarding activities during the learning process. Based on data analysis and discussion, it was found that the average creativity rate increased from 65 to 75 and the percentage of student completion in physics learning increased from 40 to 70%. Apart from that, every indicator of student creativity appears to have increased periodically with each given cycle.

***Keywords**: Physics learning; Student creativity; Physics learning outcomes; Project-based learning model; Classroom action research.*

Introduction

Creativity is one of the important points emphasized in the learning process in the 21st century. This skill allows someone to be able to overcome an existing problem with the possibility of various ways so as not to be fixated on just one solution. This is in line with the statement put forward by Nurhayati et al. (2020) and Trisnawati & Sari (2019) that there are four skills that must be possessed and continuously developed by students during the learning process, namely critical thinking, creative thinking, collaboration, and communication. These four components are the main objectives of skills that at least must be possessed by students so that they can be used as a guide that can later be used when they have completed the demands of the learning program at the formal school level.

Creating a learning condition that can facilitate these conditions is certainly not easy. The use of a direct learning model where the teacher is the source of learning and students as recipients certainly has a small chance of being able to develop students' creativity during the learning process (Rizaldi, et al., 2022). This is certainly because the direct learning model emphasizes understanding more than developing high-level skills such as critical and creative thinking. The characteristics of current learning cannot be equated with previous learning conditions because of changes in the times, of course the demands of skills that must be mastered by students have also changed dynamically. So that the main source of learning that used to focus on teachers becomes ineffective if it is still implemented in the current learning process. Of course, with the existence of a learning paradigm, teachers must be able to use various learning models that have developed today. Each learning model certainly has its own advantages and is used according to the needs of teachers or students.

If referring to the skills to be developed in the form of creativity, then the appropriate learning model used must be able to facilitate students to be able to work independently and provide the freedom to be able to develop various ideas freely. One of the learning models that is able to facilitate these conditions is the project-based learning model (Rizaldi & Fatimah, 2023). Project-based learning is an innovative learning model that emphasizes contextual learning through complex activities such as giving students the freedom to explore, plan learning activities, carry out projects collaboratively, and ultimately produce products (Setyowati & Mawardi, 2018).

The main characteristics of this learning model can allow for increased student creativity because in this model students are involved in designing a learning condition that will be carried out in the future (Rizaldi, et al., 2022b). This means that students can create learning conditions that are fun for themselves. In addition, this model is also flexible because it can be applied not only during the formal learning process in class, but can also be used outside school hours (Santika, et al., 2022). By referring to student creativity, it will of course indirectly have an impact on the physics learning outcomes of students in class. The following is the syntax or stages of learning using the project-based learning model, including:

1. Start with the Essential Question
2. Design a Plan for the Project
3. Create a Schedule
4. Monitor the Student and the Progress of Project
5. Assess the Outcome
6. Evaluate the Experience (Rizaldi & Fatimah, 2023).

Student creativity will emerge if the learning conditions provide freedom for students to design and implement learning. This condition is certainly expected to be accommodated in the stages of project-based learning, especially in the second stage, namely designing a plan for the project. Teachers in learning will later only act as companions and provide input related to the plans or designs proposed by each group. Various inputs from teachers will be considered by students in implementing learning in the next meeting. Based on the problems above, the researcher is interested in conducting

research and developing a problem formulation, namely related to "How to Increase Student Creativity in Supporting Physics Learning Outcomes with Project-Based Learning Models?" The purpose of this research is certainly expected to be a reference for teachers, especially those who teach physics subjects, to be able to apply project-based learning models to several physics materials in class.

Method

The research conducted is a type of Classroom Action Research (CAR). The focus of this research is to increase creativity in students by using a project-based learning model. This research was conducted in the even semester of the 2022/2023 academic year. The research was conducted at MA Plus Nurul Islam Class 12 with 20 students. The data obtained in this study consisted of quantitative and qualitative data. Quantitative data was obtained through tests by giving questions to obtain data on student creativity, while qualitative data was obtained through non-test data collection techniques produced through the process of observation and documentation regarding activities during the learning process. The categories of creativity used in this study are as follows

Table 1. Categories of Student Creativity Indicators

No	Test Score Range	Category
1	90 - 100	Very creative
2	75 - 89	Creative
3	60 - 74	Quite Creative
4	45 - 59	Lack of creativity
5	< 45	Very Less Creative

(Source: Kamarudin & Yana, 2021)

This study consists of one pre-cycle and two treatment cycles. Each cycle goes through four processes, namely planning, acting, observing, and reflecting. The activities of each cycle at the beginning with the planning stage are by collecting various initial data and compiling a series of various activities carried out for the next stage, this stage needs to be considered as well as possible because it can increase the success of the research being carried out. The better the preparation that is prepared at the beginning of the meeting, the greater the opportunity for the planned results. The next stage is implementation where at this stage the teacher implements various plans that have been prepared in the previous stage. The third stage is supervision where the teacher conducts various forms of observation regarding various events encountered during the learning process in the classroom. This stage needs to be a special concern for teachers so that the data obtained is in accordance with the objectives of the classroom action research activities. In addition, the observation data will be the initial data to support the implementation of learning in cycle 2. The last stage carried out in each cycle is to reflect to determine the achievement of the objectives of the research.

Result and Discussion

The research activity was carried out by implementing the steps of the project-based learning model. This research was conducted from January to March 2023 in class 12 of the MIPA MA Plus Nurul Islam Sekarbela department. This research was conducted with the aim of seeing the level of creativity of students in learning physics using the project-based learning model. Description related to the implementation of classroom action research can be described as follow:

a. Pre-cycle Condition

At this stage, the researcher conducted an observation process related to the results of physics learning that had been carried out by grade 12 students majoring in Mathematics and Natural Sciences. The researcher's position as a physics subject teacher allows the researcher to be able to conduct observations and review directly related to the progress of the physics teaching and learning process. Referring to the learning model generally used, the researcher has implemented several cooperative models that allow for the formation of student-centered learning conditions. However, based on the results of the assessment carried out at the end of the learning, learning outcomes were still not optimal. To follow up on this condition, the researcher tried to measure the level of creativity of MA Plus Nurul Islam Sekarbela students majoring in Mathematics and Natural Sciences in solving various physics problems related to everyday life. Based on this treatment, the following initial data were obtained.

Table 2. Initial Test Data related to Student Creativity Indicators

No	Indicator	Percentage of Results	Information
1	Flexibility	62%	Quite Creative
2	Originality	66%	Quite Creative
3	Elaboration	69%	Quite Creative
4	Fluency	64%	Quite Creative
Average		65%	Quite Creative

Based on the table, it can be seen that basically students of MA Plus Nurul Islam Sekarbela are classified into the fairly creative category. If it is connected with the completion of students in the current class, it reaches 40% with the condition that 8 out of 20 students achieve the KKM score for physics, which is 70. This illustrates that it is still necessary to carry out the identification process and find ways or solutions to be able to increase the percentage of student learning completion, especially in physics. So based on these conditions, researchers want to focus on increasing student creativity in supporting physics learning outcomes using project-based learning models.

b. Cycle 1 Condition

Cycle 1 is a condition where researchers begin to apply project-based learning models to physics learning situations in the classroom. At the beginning of each cycle, researchers and students discuss designing systematics and target achievements that students must achieve during the learning process. The selection of project-based learning is certainly to increase student involvement at each stage of learning for each meeting (Hikmah, 2020). By participating in planning the learning process, of course, the learning environment conditions are adjusted to the characteristics of the project and school facilities and infrastructure. This learning gives students the freedom to develop various products related to the learning material that is the topic. After the learning framework has been determined together, the role of researchers in the classroom is limited to mentoring to monitor the achievement of the project prospects being carried out. Each cycle has at least 5 meetings with a final test at the end of the meeting to determine the relationship between creativity and students' physics learning outcomes. Based on the implementation of cycle 1 that has been carried out, the creativity category of MA Plus Nurul Islam Sekarbela students in physics lessons is obtained as in the following table.

Table 3. Test Data Related to Student Creativity Indicators in Cycle 1

No	Indicator	Percentage of Results	Information
1	Flexibility	69%	Quite Creative
2	Originality	71%	Quite Creative
3	Elaboration	73%	Quite Creative
4	Fluency	70%	Quite Creative
	Average	71%	Quite Creative

After the mentoring process using the project-based learning model, it was seen that there was an increase in both creativity and the percentage of student learning outcomes. In the cycle 1 session, it was found that the average student creativity was included in the fairly creative category with a score of 71. This increase also had an impact on the percentage of student completion in learning physics, namely with a percentage reaching 60% where there were 12 out of 20 students who achieved the KKM score of 70 in physics. Although the average category of student creativity in cycle 1 was the same as the conditions in the pre-cycle, there was an average increase of around six points. Of course, any increase obtained becomes the researcher's evaluation material to be used as a reference for implementing learning in cycle 2. The evaluation stage is one of the most important components in classroom action research (Boonchom, et al., 2012). Assessment is used to measure the effectiveness of learning activities or strategies that have been carried out previously by researchers related to the use of the project-based learning model in physics learning. The data used certainly refers to tests related to student creativity indicators that have been carried out during cycle 1 of the research. This data is then analyzed to identify progress, challenges, or obstacles in implementing learning activities or strategies.

c. Cycle 2 Condition

Following up on the evaluation results from cycle 1, the researcher continued the physics learning process into cycle 2. In this cycle, the researcher and students focused on various shortcomings found during the learning process in cycle 1, especially those related to student involvement in each step of project-based learning. Each student who was appointed to be the group leader even openly stated that there were still students who had not been maximally involved during the discussion process. This kind of openness is needed during the learning process in the classroom (Adi, et al., 2019). By knowing each other's shortcomings, not only teachers are required to be able to find solutions to existing problems. Students, especially group members, are also able to find the best solution to each problem found. Based on the learning implementation process in cycle 2, data on student creativity in participating in physics learning can be seen in the following table.

Table 4. Test Data Related to Student Creativity Indicators in Cycle 2

No	Indicator	Percentage of Results	Information
1	Flexibility	73%	Quite Creative
2	Originality	75%	Creative
3	Elaboration	78%	Creative
4	Fluency	73%	Quite Creative
	Average	75%	Creative

Based on the table above, it can be seen that the average creativity of students has reached the creative category with a score of 75. This is certainly a good achievement for teachers and students, which proves that basically if the process or each stage of the project-based learning model is implemented optimally by involving all components in it, it can provide positive results. However, of course, this result cannot be said to be optimal because the percentage of KKM achievement on average in the class is 70% where there are 14 out of 20 students who achieve the KKM score in physics. This means that there are still 6 students in the class who have not reached the minimum score of 70. In general, the comparison of the creativity indicator test score and the average percentage of student learning outcomes can be seen in the following graph.

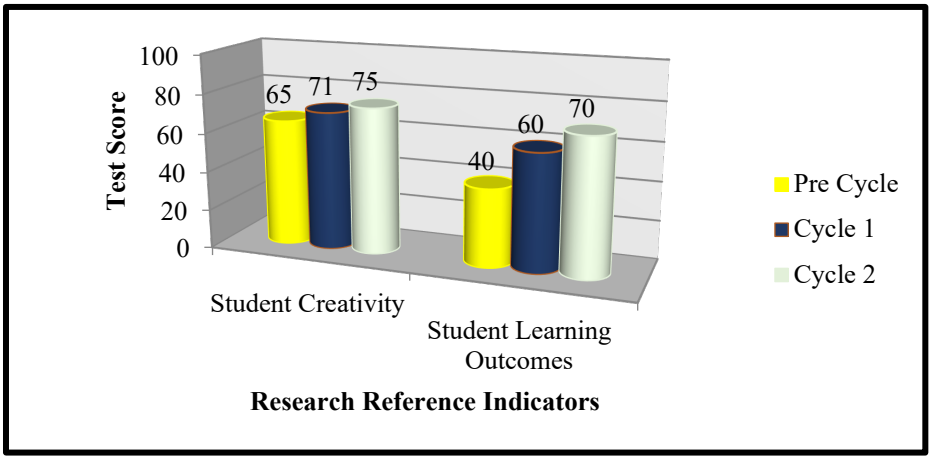

Figure 1. Comparison of Average Creativity Test scores and Percentage of Physics Learning Outcome Completion

If we refer to each indicator of student creativity, this can be seen in the graph below.

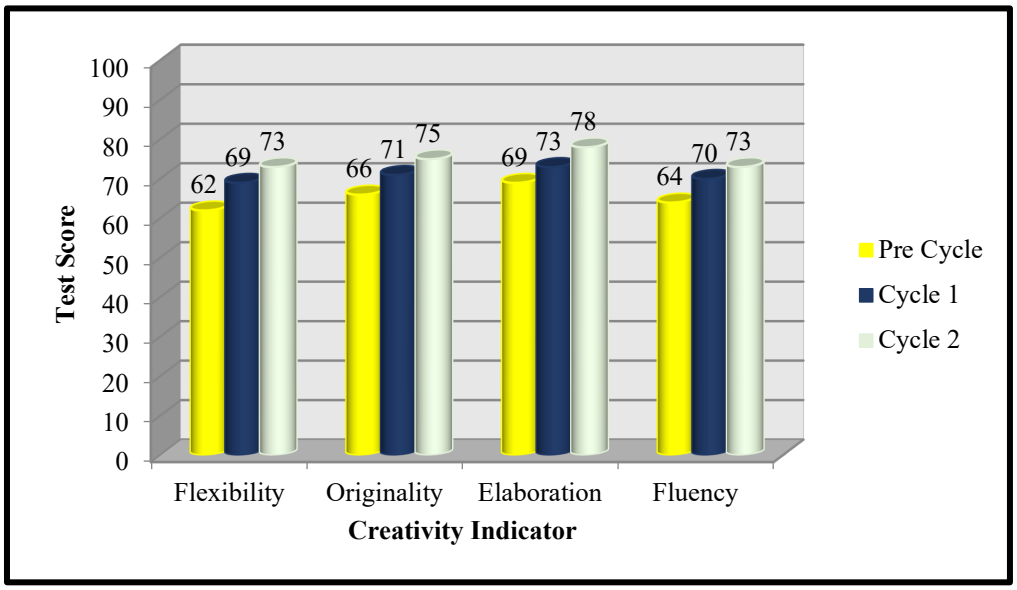

Figure 2. Comparison of Test scores Based on Student Creativity Indicators

Classroom action research is one of the steps that can be taken by teachers to improve the quality of learning carried out in the classroom due to low learning outcomes. These problems can be identified and formulated using project-based PTK so that teaching and learning activities can run

effectively and can simultaneously increase student creativity. Classroom action research is one of the abilities that must be possessed and carried out by teachers to maintain professionalism in their performance. With project-based classroom action research, it is possible to improve the quality of learning in schools which will ultimately gradually improve the quality of national education (Fitria, et al., 2019; Wahid, et al., 2021). Thus, classroom action research is one of the efforts that can be made by teachers to improve the quality of education (Azizah, 2021; Septantiningtyas, et al., 2019).

According to Susilowati (2018), classroom action research is an action research whose implementation can be felt, seen, and experienced. So, then the question arises whether the learning that has been carried out so far has high effectiveness. By giving homework to students is not able to stimulate students to think, it can be concluded that it is necessary to improve this situation through the PTK procedure where the research is related to the problem of daily learning practices faced by teachers in schools (Widayati, 2008; Aqib & Chotibuddin, 2018). For example, if educators face the problem of low learning outcomes caused by low interest in reading and lack of variation in learning, in the sense of monotony, by using classroom action research, various actions can be tried in the form of certain learning programs, such as trying to use project-based learning, so that students are required to think creatively. From the learning program designed as a form of classroom action research, it can improve the problems in the classroom.

Based on Figure 2, it can be seen that all creativity indicators have increased along with the treatment of each cycle given during the physics learning process in the classroom by implementing a project-based model. The study was said to be successful with changes in the percentage of student learning outcomes from the pre-cycle stage, cycle 1 and cycle 2 with achievements in creativity indicators at the flexibility, originality, elaboration and fluency stages which can be seen in the picture above. Creativity is related to the discovery of something that produces something new by using something that already exists, either in the form of actions or behavior and others (Hasanah, et al., 2021; Maslahah & Rofiah 2022). This theory tends to emphasize that new creativity will emerge if something already exists (Sudibjo & Lukas, 2020).

Flexibility is the ability to use a variety of approaches to solving problems. Creative people are creative in thinking; they can easily abandon old ways of thinking and replace them with new ways of thinking (Nisa, 2020). The ability to not be fixated on old thought patterns is very necessary. This can be done with spontaneous and adaptive flexibility. Spontaneous flexibility is the ability to convey various ideas about anything without fear of being wrong. While adaptive flexibility is the ability to convey various ideas about anything while still paying attention to the truth of the idea. These characteristics can be seen when someone gives various interpretations of a picture, story, or problem, applies a concept in different ways, considers the situation, which is different from that given by others, and, in discussing or discussing a situation, always has a different or conflicting position from the majority of the group. If given a problem, usually think of various different ways to solve it, being able to change the direction of thinking spontaneously.

Originality is the creativity of students in producing new expressions (Fatma, 2021). The results of the study showed that students were able to think of ways that were not easily understood, although they could not be said to be perfect, to express a term or explain something. This can be proven by the answers given by students in answering test questions where students prefer to explain in their own language and terms. In addition, it seems that students also have a strong will to solve the questions, even though the answers are still lacking, they have tried not to leave the answers provided by their subject teachers blank.

Elaboration is the ability of students to respond to questions enthusiastically, actively, and enthusiastically when completing test questions (Lubis, 2018). From the results of the study, elaboration is the most prominent test score from the pre-cycle stage, cycle I, and cycle II, with the highest score obtained by students, namely from quite creative to creative when compared to other indicators, both in the pre-cycle, cycle I, and cycle II (Figure 2). This can be proven from the test

results, where students seem happier finding practical ways or methods of answering questions. Student activity in each project-based learning procedure provides an opportunity for students to further understand the context of the material they are observing and working on. The more active students are in the learning process, of course, it illustrates that the higher the motivation of the students to follow the ongoing learning. Students who have a high level of involvement during the learning process have better analytical and understanding abilities when compared to other friends who are not yet optimally able to follow each step in the project-based learning model.

Fluency is the creativity of students in generating many answers, ideas, and solving problems or questions given (Huliatunisa et al., 2020). According to the results of the study, fluency did not change in the pre-cycle and cycle I but could balance other indicators after going through cycle II learning. In addition, independence in student learning and curiosity in several questions also show that students have good fluency after being in cycle II. Overall, the percentage of each of these creativity indicators shows an increase from pre-cycle to cycle I and from cycle I to cycle II, and there is no significant difference between these indicators.

Classroom learning management is a competency that must be possessed by a teacher in managing or coordinating the teaching and learning process in order to achieve the desired learning goals (Helsa & Hendriati, 2017). Teachers have a very important role in determining the quantity and quality of teaching that they do, which will have an impact on the final results of students, both in terms of learning outcomes and creativity. Therefore, teachers have a very difficult task, namely having to think about and design planning to increase learning opportunities and improve the quality of their teaching (Zein, 2016; Sanjani, 2020).

Some products that have been produced by students relate to the use of project-based learning models in physics learning, such as the development of physics pop-up books, the development of simple physics practicum guides, and the development of short learning videos. Various student products related to physics learning projects are uploaded and displayed on the Dedi Riyan Rizaldi YouTube channel or can be accessed at the link https://youtube.com/@dediriyanrizaldi72?si=NeI3oPE98qiQbfYJ .

Learning management is a teacher's ability in the learning process, which can be the ability to plan, implement, and evaluate existing learning activities. Every learning method, including the project-based learning model, has unique difficulties when it comes to field application. The largest obstacle to successfully integrating the project-based learning paradigm into physics instruction at MA Plus Nurul Islam Sekarbela is managing students, particularly with regard to their extracurricular activities. With the project-based learning model, students engage in both formal education at the madrasah and extracurricular activities in their homes. Of course, it is your responsibility as a teacher to go above and beyond to make sure that students continue working on this project after madrasah hours in order to complete it on time.

Conclusion

1. Conclusion

Based on the results of the study, it can be concluded that the implementation of learning using a project-based model can improve students' creativity, which includes three stages, namely pre-cycle, cycle 1, and cycle 2. The data obtained in this study consisted of quantitative and qualitative data with the results obtained, namely an increase in the average creativity from a value of 65 to 75 and the percentage of student completion in physics learning from 40 to 70%. In addition, each indicator of student creativity was seen to increase periodically along with each cycle given. So, it can be said that project-based classroom action research is said to be successful in improving student creativity.

2. Recommendation

Recommendation for further researchers related to classroom action research certainly require better time management, and the intensity of the treatment cycle can be increased so as to obtain maximum results. In addition, in terms of material, it can be varied on various other topics.

References

Adi, N. P., Yulianto, R. A., & Zaini, M. Z. (2019). Menumbuhkan Sikap Ilmiah (Kolaborasi, Keterbukaan Diri, dan Tanggung Jawab) Melalui Pembelajaran Konstektual. *Spektra: Jurnal Kajian Pendidikan Sains*, *5*(2), 140-149.

Aqib, Z., & Chotibuddin, M. (2018). *Teori dan Aplikasi Penelitian Tindakan Kelas:(PTK)*. Deepublish.

Azizah, A. (2021). Pentingnya Penelitian Tindakan Kelas Bagi Guru dalam Pembelajaran. *Auladuna: Jurnal Prodi Pendidikan Guru Madrasah Ibtidaiyah*, *3*(1), 15-22.

Boonchom, S. A., Nuchwana, L., & Amorn, M. (2012). The Development of Standards, Factors, And Indicators For Evaluating The Quality Of Classroom Action Research. *Procedia-Social and Behavioral Sciences*, *69*, 220-226.

Fatma, H. (2021). Kreativitas Peserta Didik dalam Pembelajaran Bioteknologi Dengan PjBL Berbasis STEAM. *Pedagonal: Jurnal Ilmiah Pendidikan*, *5*(1), 7-14.

Fitria, H., Kristiawan, M., & Rahmat, N. (2019). Upaya Meningkatkan Kompetensi Guru Melalui Pelatihan Penelitian Tindakan Kelas. *Abdimas Unwahas*, *4*(1).

Hasanah, A., Hikmayani, A. S., & Nurjanah, N. (2021). Penerapan Pendekatan STEAM dalam Meningkatkan Kreativitas Anak Usia Dini. *Jurnal Golden Age*, *5*(2), 275-281.

Helsa, H., & Hendriati, A. (2017). Kemampuan Manajemen Kelas Guru: Penelitian Tindakan di Sekolah Dasar dengan SES Rendah. *Jurnal Psikologi*, *16*(2), 89.

Hikmah, M. (2020). Penerapan Model Project Based Learning Untuk Meningkatkan Partisipasi Dan Hasil Belajar Pemrograman Dasar Peserta Didik. *Jurnal teknodik*, 27-38.

Huliatunisa, Y., Wibisana, E., & Hariyani, L. (2020). Analisis Kemampuan Berfikir Kreatif Matematis Siswa dalam Menyelesaikan Soal Pemecahan Masalah. *Indonesian Journal of Elementary Education (IJOEE)*, *1*(1).

Kamarudin, K., & Yana, Y. (2021). Meningkatkan Kreativitas Belajar Peserta didik Melalui Metode Pembelajaran Learning Start A Question Di Sekolah Dasar. *Edukatif: Jurnal Ilmu Pendidikan*, *3*(1), 213-219.

Lubis, F. A. (2018). Upaya Meningkatkan Kreativitas Siswa Melalui Model Project Based Learning. *PeTeKa*, *1*(3), 192-201.

Maslahah, W., & Rofiah, L. (2022). Meningkatkan Kreativitas Melalui Metode Project Based Learning di dalam Perkuliahan Sejarah Lokal. *Edukatif: Jurnal Ilmu Pendidikan*, *4*(3), 5014-5024.

Nisa, F. (2020). Kesiapan Siswa MTsN 2 Pesisir Selatan untuk Menghadapi Era Society 5.0 Ditinjau dari Aspek Kreativitasnya. *PROCEEDING IAIN Batusangkar*, *1*(3), 99-106.

Nurhayati, E., Rizaldi, D. R., & Fatimah, Z. (2020). The Effectiveness of Project-Based Learning with The Blended Learning System To Improve 21st Century Skills During The COVID-19 Pandemic. *Journal Scientia*, *9*(2), 46-52.

Rizaldi, D. R., Fatimah, Z., Susilawati, S., & Makhrus, M. (2022). Student Responses related to Face-to-Face Learning Policies to Overcome Learning Loss Condition. *Journal of Science and Science Education*, *3*(1), 9-16.

Rizaldi, D. R., Sudarsono, S., & Fatimah, Z. (2022b). Integrasi Pendekatan Re-SEAT (Religion, Science, Engineering, Art, And Technology) dalam Proses Pembelajaran Fisika Abad Ke-21. *Widyadewata*, *5*(2), 138-150.

Rizaldi, D. R., & Fatimah, Z. (2023). Efforts to Create an Interesting and Meaningful Physics Learning Environment with a Project-Based Learning Model. *AMPLITUDO: Journal of Science and Technology Innovation*, *2*(1), 7-13.

Sanjani, M. A. (2020). Tugas Dan Peranan Guru dalam Proses Peningkatan Belajar Mengajar. *Serunai: Jurnal Ilmiah Ilmu Pendidikan*, *6*(1), 35-42.

Santika, I. G. N., Suastra, I. W., & Arnyana, I. B. P. (2022). Membentuk Karakter Peduli Lingkungan Pada Peserta Didik Sekolah Dasar Melalui Pembelajaran IPA. *Jurnal Education and Development*, *10*(1), 207-212.

Septantiningtyas, N., Jailani, M. D., & Husain, W. M. (2019). *PTK (Penelitian Tindakan Kelas)*. Penerbit Lakeisha.

Setyowati, N., & Mawardi, M. (2018). Sinergi Project Based Learning Dan Pembelajaran Bermakna Untuk Meningkatkan Hasil Belajar Matematika. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *8*(3), 253-263.

Sudibjo, N., Sari, N. J., & Lukas, S. (2020). Penerapan Pembelajaran Berbasis Projek Untuk Menumbuhkan Perilaku Kreatif, Minat Belajar, Dan Kerja Sama. *Akademika*, *9*(1), 1-16.

Susilowati, D. (2018). Penelitian Tindakan Kelas (PTK) Solusi Alternatif Problematika Pembelajaran. *Jurnal ilmiah edunomika*, *2*(01).

Trisnawati, W. W., & Sari, A. K. (2019). Integrasi Keterampilan Abad 21 dalam Modul Sociolinguistics: Keterampilan 4C (Collaboration, Communication, Critical Thinking, Dan Creativity). *Jurnal Muara Pendidikan*, *4*(2), 455-466.

Wahid, A., Afni, N., Jumrah, A. M., & Hastati, S. (2021). Pelatihan PTK Bagi Guru Untuk Meningkatkan Kualitas Pembelajaran SD Negeri Mamajang II Kota Makassar. *Madaniya*, *2*(1), 87-91.

Widayati, A. (2008). Penelitian Tindakan Kelas. *Jurnal pendidikan akuntansi indonesia*, *6*(1).

Zein, M. (2016). Peran Guru dalam Pengembangan Pembelajaran. *Inspiratif Pendidikan*, *5*(2), 274-285.