Science Education and Application Journal (SEAJ)
Program Studi Pendidikan IPA
Universitas Islam Lamongan
http://jurnalpendidikan.unisla.ac.id/index.php/SEAJ

September 2023. Vol. 5, No.2
p-ISSN: 2656-6672
e-ISSN: 2656-8365
pp. 138-147

Improving Project-Based Skills and Science Learning Outcomes of Students through Project-Based Learning Model

[1]Cicik Wijayanti, [2]Tri Andari, [3]Nur Baity
[1]Student of Teacher Professional Education Study Programme, Universitas PGRI Madiun
[2]Lecturer of Mathematics Education Study Programme, Universitas PGRI Madiun
[3]Science Teacher SMP Negeri 1 Bojonegoro
Email Correspondence: cicikwijayanti92@gmail.com

Article Info
Article History
Received: 16 May 2023
Revised: 10 September 2023
Published: 25 September 2023
Keywords
Project-based skills, learning outcomes, Project-Based Learning (PjBL)model.

Abstract
This research was designed in accordance with classroom action research. The purpose of this study was to improve the project-based skills and science learning outcomes of students through the Project-Based Learning (PjBL) model in class VII-D SMPN 1 Bojonegoro. This research was conducted in two cycles, each cycle consisting of four stages, namely planning, implementation, observation, and reflection. In this study, data collection was carried out using observation techniques and giving tests at the end of the implementation. The focus of observation in this class action research is project-based skills and student learning outcomes. The research instruments used to determine the level of success of learners are project-based skills observation instruments and knowledge learning outcomes instruments. The results showed that there was an increase in the project-based skills of students classically, from cycle I of 2.43 or 60.75% with the predicate C to 3.4 or 86% with the predicate B in cycle II. There was also an increase in the completeness of students' learning outcomes classically, from cycle I of 78.10%, to 93.75% in cycle II. The conclusion of this study is that the application of the PjBL model can classically improve the project-based skills and science learning outcomes of students. The results of this study are expected to be a reference for Science Teachers at SMPN 1 Bojonegoro to improve the learning process and student learning outcomes through the PjBL learning model.

Citations: *Wijayanti et.al. (2023). Improving Project-Based Skills and Science Learning Outcomes of Students through Project-Based Learning Model. Science Education and Application Journal. 5(2). 138-147*

INTRODUCTION

Merdeka Curriculum has been implemented in nearly 2500 schools under the Mobilising Schools program since 2021 as part of a new paradigm of learning. The new paradigm of learning is learner-centered learning with the teacher's role as a facilitator. In new paradigm learning, the learning development framework is a continuous cycle. New paradigm learning includes mapping competency standards, learning independence, and Minimum Competency Assessment (MCA) so as to provide flexibility for teachers to design learning and assessment according to learning needs and learner characteristics. These three components influence each other, so it is expected that there will be continuous improvement and development in learning practices (Sufyadi, 2021).

One of the new paradigm learning principles in the Merdeka Curriculum is that learning is designed and implemented to build the capacity of students to become lifelong learners. One of the efforts that teachers can make to build the capacity of students to become lifelong

learners in accordance with the new paradigm learning principles in the Merdeka Curriculum is by training them in project-based skills.

According to Hamidah (2019) project-based skills are abilities carried out at each stage in the project-based learning model, starting from 1) planning, 2) data collection, 3) data processing, and 4) reporting. Meanwhile, according to Ariyana (2018), project-based skills are the ability in the form of a series of activities starting from 1) planning, 2) data collection, 3) organizing, 4) processing, 5) presenting data, and 6) reporting. Based on these opinions, it can be concluded that project-based skills are the skills possessed by students in carrying out a series of activities starting from planning, implementing, and reporting.

The project-based skills that students have will enable them to collaborate with other people, be able to design and create a project, be able to carry out investigations independently, be able to communicate by reporting project results through presentations or written reports and be able to carry out evaluations. Project-based skills also make a person able to complete projects independently and work together in teams in dealing with problems or problems that exist in the real world or work environment, so that it will make it easier to adjust to the real world or work environment later. This is in accordance with Purnomo's opinion (2019) which states that the benefits of having project-based skills include 1) enhancing qualities in imagination and creativity, 2) acquiring human values, 3) developing potential, 4) developing critical thinking, 5) develop a committed and responsible person, and 6) helps to adjust to problems that exist in the real world or future work environment

An alternative learning model that teachers can use to train students' project-based skills is to use the Project-Based Learning (PjBL) model. The PjBL learning model is a learning model that involves students actively solving problems to be poured into a project product through scientific stages, which are carried out in groups or independently with a certain time limit to be presented to others (Ariyana, 2018).

The characteristics of the PjBL Learning Model include: (1) tasks are carried out in groups or independently starting from the planning, and implementation, to product presentation stages; (2) learners take full responsibility for the project; (3) projects involve the role of peers, teachers, parents, and even the community;(4) Exercising creative thinking skills; and (5) the classroom situation is very tolerant of flaws and the development of ideas.

The PjBL learning model can be used to train students' project-based skills and can also be used to improve their learning outcomes. Majid (2014) explains that the PjBL learning model gives learners the opportunity to explore concepts or learning materials using various ways that are meaningful to them. The opportunities provided by teachers to learners to learn the material in various meaningful ways, engage in problem-solving and engage in product design activities in PjBL learning can make learners' knowledge and skills more developed so that learners better understand the material studied and this will have an influence on improving learners' learning outcomes.

Based on the facts found in the field during lesson observations in class VII-D SMP Negeri 1 Bojonegoro and interviews with science teachers in the class, information was obtained that the ability of students to solve problems, collaborate and communicate to report the results of discussions both through presentations and written descriptions was still very lacking. It can be seen during group discussions and presentations of discussion results that only one or two learners in a group are active in these activities, while other group members tend to be passive. Learners also have difficulty making conclusions on practicum results or discussions as a form of evaluation activity. In addition, the teacher has also never applied the Project-Based Learning (PjBL) model in science learning in this class, so this also affects students' project-based skills, such as their lack of ability in problem-solving analysis, collaboration, and communication to report the results of the discussion/practicum.

The learning outcomes of students in the initial condition (pre-cycle) show in Table 1 below.
Table 1. Learner learning outcomes in the initial condition (pre cycle)

Number of Learners	Completed	Not Completed	Average Value
32	21	11	69,38

Based on the Table 1, it can be seen that 21 people or 65.63% of students in class VII-D have completed, while 11 people, or 34.38% of other students must be remedial. The completeness of student learning outcomes at SMP Negeri 1 Bojonegoro is determined by the value of the Criteria for Achieving Learning Objectives (CALO), which is 70. If the score obtained is below 70, then the students are said to be incomplete and must be remedied. Based on the acquisition of data on learning outcomes, it can be seen that classically class VII-D is said to be incomplete because it has not reached a value of more than 80% of students who are complete. This is what motivates the author to improve learning in the classroom.

Based on the background of the problem above, the purpose of this study is the application of the Project-Based Learning (PjBL) model to improve the project-based skills and science learning outcomes of students in class VII-D SMP Negeri 1 Bojonegoro in the 2022/2023 academic year.

METHODS

This research is Classroom Action Research (CAR). According to Widayati (2008), CAR is a research activity conducted in the classroom to solve learning problems, improve and enhance the quality of learning and try new things in learning. This research is also descriptive research because it describes how a learning technique is applied and how the desired results can be achieved. In CAR the teacher acts as a researcher and is fully responsible for the research. CAR is carried out systematically on various actions taken by teachers who are also researchers through teaching and learning activities, from planning to assessing real actions in the classroom (Nanda, 2021).

According to Nanda (2021), CAR not only aims to reveal the causes of various learning problems, such as students' difficulties in learning certain material concepts but also to provide problem-solving solutions in the form of certain actions in the teaching and learning process to improve the quality of learning and students' learning outcomes. The main objective of this CAR is to improve the project-based skills and science learning outcomes of learners in the classroom. Teachers are fully involved in the research from planning, implementation, observation, and reflection. Djajadi (2019) suggests the main steps in the CAR cycle are 1) action planning, 2) implementation of the action, 3) data collection observation), and 4) reflection (analysis, and interpretation).This class action research was conducted at SMP Negeri 1 Bojonegoro. The research subjects were students of class VII-D SMP Negeri 1 Bojonegoro, in the even semester, 2022/2023 academic year with a total of 32 students.

Learning Improvement in this study was carried out in two cycles. Each cycle has the same flow and learning model, namely the Project-Based Learning (PJBL) model, and ends with a test in each of the improvement cycles. At the end of each cycle, reflection was also conducted. Reflection is carried out based on the results of the data that has been collected in each cycle. At this stage of reflection, the teacher as a researcher together with colleagues assessed the success of the action, evaluated the stages of action, and determined the results of the action in each cycle. If the results of data processing have met the target, namely 80% of students are categorized as having project-based skills at least predicate B in each aspect of project-based skills assessment in that cycle, and 80% of students get scores above the Criteria for Achieving Learning Objectives (CALO) of 70, then the cycle can be stopped, but if it has not reached the target then the action is continued in the next cycle for improvement.

In collecting data, the teacher (researcher) was assisted by peers. Data collection was carried out during the process and results of the implementation of cycles I and II. In this study, data collection was carried out using observation techniques and giving tests at the end of the implementation. The focus of observation in this class action research is project-based skills and student learning outcomes.

The research instruments used to determine the level of success of learners are project-based skills observation instruments and cognitive or knowledge learning outcomes instruments. Project-based skills observation instrument is a tool to observe and assess students' project-based skills. The form of assessment is in the form of an observation sheet or observation of project-based skills assessment for each learning cycle with an assessment score using a Likert Scale of 1-4 with information as shown in table 2 below.

Table 2. Project-based skills scoring guidelines

Predicate	Score Range
SB (Very Good)	3,51 - 4,00
B (Good)	2,51 - 3,50
C (Enough)	1,51 - 2,50
K (Less)	1,00 - 1,50

Permendigbud No.104 (2014)

To calculate the average value of project-based skills of students classically using the formula.

Equation classical project-based skills average = $\frac{The\ average\ score\ obtained}{Maximum\ score} \times 100$

Cognitive learning outcomes or knowledge instruments are tools for obtaining data on student learning outcomes in the form of written tests in the form of post-test questions at the end of each learning cycle. To calculate the completeness of student learning outcomes classically using the formula.

Equation Classical learning completeness = $\frac{The\ number\ of\ students\ completed}{The\ total\ number\ of\ students} \times 100$

Data analysis of project-based skills observation and students' science learning outcomes were obtained by calculating the class average scores from cycle I and cycle II using qualitative descriptive statistical analysis using the percentage formula. The research was declared successful if 80% of students in class VII-D SMP Negeri 1 Bojonegoro classically had project-based skills at least with the predicate B in each aspect of project-based skills assessment, and if 80% of students classically scored science learning outcomes above the Criteria for Achievement of Learning Objectives (CALO) which is 70.

RESULTS AND DISCUSSION

Project Based Skills

A recap of the results of observing students' project-based skills using the PjBL learning model in cycle I can be seen in Table 3 below.

Table 3. Recap of Cycle I Project-Based Skills Assessment Results

No	Aspects Skills	Indicators	Average Valueof Each Indicator	Predicate
1.	Planning	1. Analyse the fundamental question	2,13	C
		2. Design the project	2,38	C

No	Aspects Skills	Indicators	Average Valueof Each Indicator	Predicate
		3. Develop a project implementation Schedule	2,63	B
	Average Value of Planning Skill Aspect Assessment		2,38	C
2.	Implementation	4. Monitor project activity and progress	2,47	C
	Average Value of Skill Aspect Assessment Implementation		2,47	C
3.	Reporting	5. Testing the project results	2,38	C
		6. Evaluating the learning experience	2,50	C
	Average Value of Reporting Skills Aspect Assessment		2,44	C
Average Value of Project-Based Skills (Cycle I)			2,43	C

Some pictures of the results of students' projects with their groups in cycle I can be seen in Figure 1 and 2 below.

Figure 1.

Figure 2.

Figure 1 and 2. The results of students' projects with their groups in cycle I: making campaign videos as an effort to prevent threats to biodiversity in Indonesia.

The recap of the results of observing students' project-based skills using the PjBL learning model in cycle II can be seen in Table 4.

Table 4. Recap of Cycle II Project-Based Skills Assessment Results

No	AspectsSkills	Indicators	Average Valueof Each Indicator	Predicate
1.	Planning	1. Analyse the fundamental question	3,38	B
		2. Design the project	3,25	B

No	AspectsSkills	Indicators	Average Valueof Each Indicator	Predicate
		3. Develop a project implementation schedule	3,88	SB
	Average Value of Planning Skill Aspect Assessment		3,50	B
2.	Implementation	4. Monitor project activity and progress	3,38	B
	Average Value of Skill Aspect Assessment Implementation		3,38	B
3.	Reporting	5. Testing the project results	3,50	B
		6. Evaluating the learning experience	3,38	B
	Average Value of Reporting Skills Aspect Assessment		3,44	B
Average Value of Project-Based Skills (Cycle II)			3,44	B

Some pictures of the results of students' projects with their groups in cycle II can be seen in Figure 3 and 4 below.

Figure 3

Figure 4

Figure 3 and 4. The results of students' projects with their groups in cycle II: making a simple water purification tool as an effort to conserve the ecosystem.

The recap results of student's project-based skills from cycle I to cycle II in science learning using the PjBL model show in Figure 5.

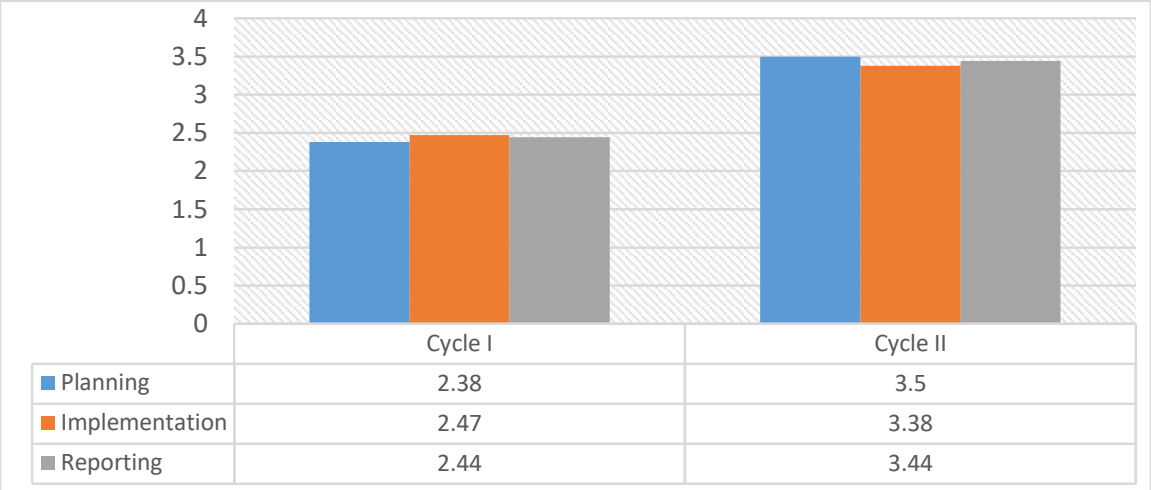

Figure 5. Learners Project-Based Skills from Cycles I and II.

From the results of observations of students' project-based skills in cycle I it was found that in the aspect of planning skills which included analyzing fundamental questions, designing projects, and preparing project implementation schedules obtained an average score of 2.38 with the predicate C, this was because students were not yet accustomed to conducting analyses, designing project designs, and preparing project implementation schedules. For the aspect of implementation skills, it obtained an average score of 2.47 with a predicate of C, this was also because students still needed a lot of guidance to carry out projects according to the plans they had made and the time limit that had been determined. In the aspect of reporting skills which includes testing project results and evaluating learning experiences obtained an average score of 2.44 with a predicate of C, this is because on average students still have difficulty in testing the results of the projects they have made, namely writing the contents of the video project results on the student worksheets is still not very clear and complete, the ability to present the video project results is also still lacking, and the video project results are not in accordance with the learning objectives to conduct a campaign or invitation. Based on the data from the observation of students' project-based skills in cycle I above, it can be concluded that the average value of students' project-based skills in cycle I received a score of 2.43 with the predicate C or classically 60.75% of students have project-based skills with the predicate C. This achievement can be due to the fact that students have never done project assignments in science learning, and teachers have also never implemented project-based learning in science learning, so their project-based skills also still need to be improved at least to reach predicate B. Project-Based Learning (PjBL) is a learning model that uses projects/activities as a medium. Learners perform exploration, assessment, interpretation, synthesis, and information to produce various forms of learning outcomes. Project-based learning (PjBL) also provides opportunities for teachers to manage learning in the classroom by involving project work (Suwito, 2021).

From the observation of students' project-based skills in cycle II, it was found that in the aspect of planning skills which included analyzing fundamental questions, designing projects, and preparing project implementation schedules obtained an average score of 3.50 with the predicate B, this was because students had started to do well in conducting analyses, designing project designs, and preparing project implementation schedules. In the aspect of

implementation skills, it obtained a score of 3.38 with the predicate B., this was also because students had begun to be able to carry out the project properly in accordance with the plans they had made and the time limit that had been determined. For the aspect of reporting skills which includes testing the results of the project and evaluating the learning experience obtained an average score of 3.44 with the predicate B., this is because on average students have begun to be able to test the results of the projects they have made properly. Based on the data from the observation of students' project-based skills in cycle II above, it can be concluded that the average value of project-based skills in cycle 2 obtained a value of 3.44 with the predicate B or classically 86% of students in class VII-D have project-based skills with the predicate B, this can be because students are getting used to doing project assignments in science learning using the PjBL learning model so that their project-based skills have also increased. Project-based learning can be applied to improve students' skills (Amalia, 2021).

The results of improving project-based skills from cycle I to cycle II using the PjBL learning model are in line with research conducted by Humisar (2022) in his research to improve project-based skills and student learning outcomes through the PjBL learning model in plant reproduction material in class IX.2 SMP Negeri 6 Batam, showing an increase in classical student project-based skills, from 44.51% in cycle I to 71.88% in cycle II. These results are also in accordance with research conducted by Supriyadi (2018) in his research entitled "Efforts to Improve Project Based Skills and Science Learning Outcomes by Implementing the Project Based Learning (PjBL) Learning Model on Plant Reproduction Material in Class IX of SMP Negeri 1 Stabat" which shows as a result, there was an increase in students' project-based skills in cycle I all groups got the sufficient category, and in cycle II all groups got the Very Good category.

Learning Outcomes

The results of students' science learning outcomes by using the PjBL learning model show an increase from cycle I to cycle II as seen in Figure 6.

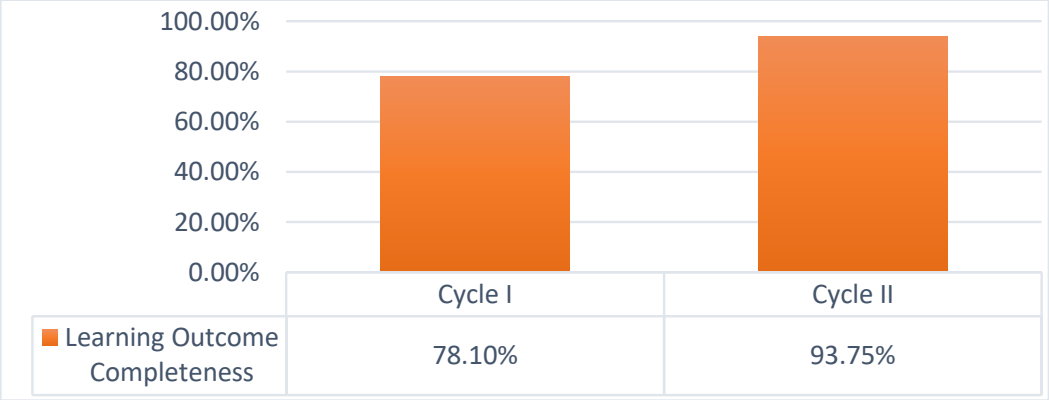

Figure 6. Percentage of completion of student learning outcomes from cycles I and II.

In cycle I, it can be observed that learning science using the Project-Based Learning (PjBL) model to improve learning outcomes, out of 32 students, 25 students were obtained who were complete with a percentage of 78.10%, and 7 students who were not complete with a presentation of 21.90%. This learning outcome completeness is still lacking if measured from classical completeness, which is at least 80% of students get science learning outcomes above the Criteria for Achieving Learning Objectives (CALO), which is 70. The lack of completeness of students' classical learning outcomes can be caused because students are not familiar with project-based learning in science learning, and because teachers have also never applied the PjBL learning model in science learning. There are two factors that can affect students' learning outcomes, namely internal factors which include physical (health), psychological (intelligence,

attention, interest, and talent as well as students' learning readiness), etc. As well as external factors which include family and economic background, as well as the school environment (learning methods, curriculum, school discipline, infrastructure), etc. (Slameto, 2010).

In cycle II it can be observed that learning science using the Project-Based Learning (PjBL) model to improve learning outcomes, out of 32 students, 30 were obtained who were complete with a percentage of 93.75%, and 2 people who were not complete with a presentation of 6.25%. These learning outcomes are sufficient when measured from classical completeness, namely at least 80% of students get a science learning outcome score above the Criteria for Achievement of Learning Objectives (CALO), which is 70. Based on the acquisition of this learning outcome data, it can be concluded that learning in cycle II by applying the PjBL learning model was successful, with an increase that has passed classical completeness. The increase in student learning outcomes from cycle I to cycle II using the PjBL learning model is in accordance with the results of research conducted by Ayunda (2023) in his research improving science learning outcomes through the Project-Based Learning (PjBL) learning model in class 4 of SDN Mojoangung Soko-Tuban obtained results in the pre-cycle, only 16% completed learning, then carrying out cycle I obtained an increase in results to 67% and in cycle II learning outcomes students were able to improve 83%.

CONCLUSION

Based on the results of the data above, it can be seen that there has been an increase in the project-based skills of students classically, from previously in cycle I of 2.43 or 60.75% with the predicate C to 3.44 or 86% with the predicate B in cycle II. There was also an increase in the completeness of students' science learning outcomes classically, from cycle I of 78.10%, to 93.75% in cycle II. These results can be influenced by internal and external factors such as physical, psychological, family and economic background, the school environment, etc.

Based on the results of this study, it can be concluded that using the PjBL learning model in science subjects can improve project-based skills and learning outcomes of students classically in class VII-D SMP Negeri 1 Bojonegoro in the 2022/2023 academic year.

SUGGESTION

Suggestions for researchers, it is hoped that this research can be used as a lesson to be better for future research. Suggestions for science teachers, teachers should arrange learning by paying attention to the characteristics of students and the material presented so that student learning outcomes increase. Suggestions for students, should be more creative and brave to develop their potential by expressing ideas, opinions, and submitting rebuttals in learning.

REFERENCES

Adryani, R. (2016). *Instrumen Penilaian Proyek dan Perangkat Pembelajaran Keterampilan Berpikir Kreatif* . Yogyakarta: PPs Pendidikan IPA.

Amalia, Y. e. (2021). The Effectiveness of using the Project-Based Learning Module Viewed from The SEPs Skills of Students. *Science Education and Application Journal, 3(1)*, 52-59.

Anggraena, Y. d. (2022). *Pembelajaran dan Asesmen Pendidikan Anak Usia Dini, Pendidikan Dasar dan Menengah.* Jakarta: Badan Standar, Kurikulum dan Asesmen Pendidikan Kementrian Pendidikan, Kebudayaan, Riset dan Teknologi Republik Indonesia .

Ariyana, Y. d. (2018). *Buku Pegangan Pembelajaran Berorientasi pada Keterampilan Berpikir Tingkat Tinggi.* Direktorat Jenderal Guru dan Tenaga Kependidikan Kementerian Pendidikan dan Kebudayaan.

Ayunda, A. F. (2023). PENINGKATAN HASIL BELAJAR IPAS MELALUI MODEL PEMBELAJARAN PROJEK BASED LEARNING (PJBL) PADA KELAS 4 DI SDN MOJOANGUNG SOKO- TUBAN. *Didaktik : Jurnal Ilmiah PGSD STKIP Subang, 9 (2)*, 1406 - 1416.

Dewi, I. S. (2023). Implementation of Animation Video Media with the help of the Animeker Application to Improve Student Learning Outcomes. *Science Education and Application Journal, 5(1)*, 16-25.

Djajadi, M. (2019). *Penelitian Tindakan Kelas (Classroom Action Research).* Yogyakarta: Arti Bumi Intaran.

Doppelt, Y. (2003). Implementation and Assessment of ProjectBased Learning in a Flexible Environment. *International Journal of Technology and Design Education, 13*, 255–256.

Fikri, H. (2020). Penilaian Keterampilan Proyek. *Borneo : Jurnal of Islamic Studies, 3(2)*, 156-165.

Gülbahar, Y. &. (2006). Implementing Project-Based Learning And E-Portofolio Assessment In an Undergraduate Course. *Journal of Research on Technology In Education, 38*, 309–327.

Hamidah, H. d. (2019). *Modul Model Pembelajaran Berbasis Proyek Berorientasi HOTS.* Jakarta: SEAMEO QTEP.

Humisar. (2022). Meningkatkan Keterampilan Berbasis Proyek dan Hasil Belajar Siswa Melalui Model Pembelajaran Project Based Learning (PjBL) Dalam Materi Reproduksi Tumbuhan di Kelas IX.2 SMP Negeri 6 Batam. *BIODIDAK, 2 (2)*, 100-109.

Made, N. S. (2016). Pengaruh Model Project-Based Learning Berbantuan Media Virtual Terhadap Penguasaan Konsep Peserta didik pada Materi Alat-alat Optik. *Jurnal Pendidikan Fisika Dan Teknologi, II (2)*, 73–79.

Mahasneh, A. M. (2018). The Effect of Project Based Learning on Student Teacher Self-efficacy and Achievement. *International Journal Of Intruction, 11(3)*, 511–524.

Majid, A. (2014). *Penilaian Autentik: Proses dan Hasil Belajar*. Bandung: PT Remaja Rosdakarya.

Majid, A. R. (2014). *Pendekatan ilmiah dalam Implementasi Kurikulum 2013.* Bandung: PT Remaja Rosdakarya.

Mihardi, S. H. (2013). The Effect of Project-Based Learning Model with KWL Worksheet on Student Creative Thinking Process in Physics Problems. *Journal of Economics and Sustainable Development, 4(18)*, 93–107.

Nanda, I. d. (2021). *Penelitian Tindakan Kelas untuk Guru Inspiratif.* Indramayu: Penerbit Adab.

Nurazmiyati. (2019). Pengembangan Penilaian Proyek Untuk Mengukur Keterampilan Pemecahan Masalah Peserta Didik Di Kelas V Mi Darul Hikmah Makassar. *Jurnal Ilmiah Madrasah Ibtidaiyah, 1(1)*, 8-15.

Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 104 tahun 2014 tentang Penilaian Hasil Belajar oleh Pendidik pada Pendidikan Dasar dan Pendidikan Menengah. (2014). Jakarta: Kementerian Pendidikan dan Kebudayaan.

Purnomo, H. &. (2019). *Tutorial Pembelajaran Berbasis proyek.* Yogyakarta: K-Media.

Ratnawati, H. d. (2017). *Menyusun Laporan Hasil Asesmen Pendidikan di Sekolah: Referensi untuk Pendidik, Mahasiswa, dan Praktisi Pendidikan.* Yogyakarta: UNY Press.

Ruhimat, L. W. (2018). Pengembangan Model Penilaian Projek untuk Mengukur Aspek Psikomotor pada Mata Pelajaran Geografi. *Jurnal Pendidikan Ilmu Sosial, 27(1)*, 76-86.

Septaria, K., & Fatharani, A. (2022). Manga versus webtoon: Alternative science learning module based on Dr Stone. *Jurnal Inovasi Pendidikan IPA*, *8*(1), 11-22.

Septaria, K., Fatharani, A., & Yasa, A. D. (2022). COVID-19 is a Conspiracy Disease? Diagnostic Mental Models and Students' Cognitive Abilities. *Jurnal Penelitian Dan Pengkajian Ilmu Pendidikan: E-Saintika*, *6*(1), 18-32.

Septaria, K. (2023). MEDIA ULAR TANGGA DAN LITERASI: ANALISIS PENGARUH PADA MATERI MITIGASI BENCANA BANJIR PADA SISWA SEKOLAH MENENGAH PERTAMA. *SPEKTRA: Jurnal Kajian Pendidikan Sains*, *9*(1), 1-13.

Septaria, K., & Dewanti, B. A. (2022). Analisis kepuasan mahasiswa Pendidikan IPA menggunakan learning management system Brightspace pada matakuliah Mitigasi Bencana. *JIPVA (Jurnal Pendidikan IPA Veteran)*, *6*(1), 19-33.Slameto. (2010). *Belajar dan Faktor-Faktor yang Mempengaruhinya.* Jakarta: Rineka Cipta.

Sufyadi, S. d. (2021). *Pembelajaran Paradigma Baru.* Jakarta: usat Asesmen dan Pembelajaran Badan Penelitian dan Pengembangan dan Perbukuan Kementerian Pendidikan, Kebudayaan, Riset dan Teknologi.

Supriyadi. (2018). paya Meningkatkan Keterampilan Berbasis Proyek dan Hasil Belajar IPA dengan Menerapakan Model Pembelajaran Project Based Learning (PjBL) Materi Reproduksi Tumbuhan di Kelas IX SMP Negeri 1 Stabat. *Jurnal Pelita Pendidikan, 6(4)*, 274-278.

Suwito, D. (2021). Penerapan Model Pembelajaran Project Based Learning (PjBL) untuk Meningkatkan Aktivitas Dan Hasil Belajar Siswa pada Kompetensi Dasar Aksi Dan Reaksi Gaya SMK Negeri 7 Surabaya. *JTPM, 11(1)*, 38-43.

Widayati, A. (2008). Penelitian Tindakan Kelas. *Jurnal Pendidikan Akuntansi Indonesia, 6(1)*, 87-93.

Winda A, N. S. (2021). Program Merdeka Belajar, Gebrakan Baru Kebijakan Pendidikan. *Jurnal Pendidikan Tambusai, 5(1)*, 1977-1982.