



Increasing Student Participation in Science Learning Through Problem Based Learning Models

Izzatin Kamala^{1*}, Zulfi Idayanti¹, Tsaqifa Taqiyya Ulfah¹

¹Sunan Kalijaga State Islamic University Yogyakarta, Indonesia

Received: July 3, 2022

Revised: September 25, 2022

Accepted: October 24, 2022

Published: October 31, 2022

Corresponding Author:

Izzatin Kamala

izzatin.kamala@uin-suka.ac.id

© 2022 The Authors. This open access article is distributed under a (CC-BY License)



DOI: [10.29303/jppipa.v8i4.1850](https://doi.org/10.29303/jppipa.v8i4.1850)

Abstract: Science learning is a very important lesson for all people, especially elementary school students. Based on the 2013 curriculum, learning refers to students. Student activity in learning is very important, but based on the facts, student participation tends to be low. Observing this situation, the researcher adopted the Problem Based Learning (PBL) learning model. The research method used is Classroom Action Research (CAR) using the Kemmis and Taggart models with the research subject being the fourth grade students of SD Negeri Demangan totaling 25 students and 1 class teacher. This research was carried out in 2 cycles consisting of planning, implementation, observation and reflection. The research instrument consisted of observation sheets, learning tools, Student Worksheets (SW), post test grids and post test question sheets. The data collection technique used by the researcher is in the form of a test at the end of each cycle and non-test consisting of observation, interviews and documentation. Technical data analysis is in the form of qualitative data analysis about how the activities of students and teachers and quantitative analysis is about the learning outcomes achieved by students at the end of each cycle. The implementation of research actions is carried out in 5 stages, namely orientation of students to problems, organizing students to learn, guiding individual/group experiences, developing and evaluating problem solving processes. The results showed that after the implementation of the Problem Based Learning learning model, student participation during learning increased. This can be proven by the participation of students in cycle 1 meeting 1 showing an average of 75% in the high category. At the second meeting, it decreased 2% to 73% with the same category, namely high. Then it increased again in cycle 2 meeting 1 with an average of 84% in the very high category and increased again to 89%. This shows an escalation in the participation of Class IV students at SD Negeri Demangan in science learning. At the second meeting, it decreased 2% to 73% with the same category, namely high. Then it increased again in cycle 2 meeting 1 with an average of 84% in the very high category and increased again to 89%. This shows an escalation in the participation of Class IV students at SD Negeri Demangan in science learning. At the second meeting, it decreased 2% to 73% with the same category, namely high. Then it increased again in cycle 2 meeting 1 with an average of 84% in the very high category and increased again to 89%. This shows an escalation in the participation of Class IV students at SD Negeri Demangan in science learning.

Keywords: Science Learning; Learning Participation; Problem Based Learning

Introduction

Science learning has the aim of understanding nature and the events that occur in it, the learning process is obtained through the scientific method (Sulthon, 2016; Kelley & Knowles, 2016). With scientific method learners can learn to act like scientists (Kelley & Knowles, 2016). Scientific attitude teaches how to solve

a problem, draw conclusions, train critical thinking skills, grow self-confidence, learn discipline, sense of responsibility and respect the opinions of others (Wedyawanti & Lisa, 2019). The implementation of the science learning process involves components that are interrelated with each other (Janah & Widodo, 2018). If one component cannot interact and integrate, then the learning process will face obstacles that affect the

How to Cite:

Kamala, I., Idayanti, Z., & Ulfah, T.T. (2022). Increasing Student Participation in Science Learning Through Problem Based Learning Models. *Jurnal Penelitian Pendidikan IPA*, 8(4), 2068-2076. <https://doi.org/10.29303/jppipa.v8i4.1850>

learning objectives and learning outcomes (Khotimah, 2019).

Learning outcomes can be in the form of values, understanding, attitudes, appreciation, skills and patterns of action (Yasa & Bhoke, 2019). To obtain the desired learning outcomes, the teacher is obliged to create an effective learning process while still paying attention to the learning components and preparing scenarios that are careful and clear. An effective learning process can increase student learning participation. Participation in learning is very important for students in the learning process. In line with the theory contained in the research article written by Hilma which states that learning participation is important and needs to be considered in learning (Sadiyah, 2020). But on the other hand, there are teachers who still use traditional learning models so that learning runs less effectively and is still glued to the teacher (Jariah & Aminatun, 2022).

It can be said that it is important because it can determine the learning achievement of students in the learning process. Participation in learning aims to achieve goals in the form of satisfactory student learning outcomes (Ginjar et al., 2019). Participation is mental and emotional involvement in groups to support students to advance students' thinking skills and feelings for the creation of goals and responsibility for goals (Ismail, 2020). Involvement in the learning process is something that has urgency. The urgency of involvement in learning is part of the self and needs to be directed by learning resources (Ginjar et al., 2019).

Based on the results of interviews that researchers have conducted with Mrs. Sukma Nur Mitasari S.Pd as a fourth grade teacher at SD Negeri Demangan. Mrs. Mita stated that the experience experienced during online or online learning activities through google meet was only attended by no more than half the number of students in the class so it was less effective. Some students become less independent and disciplined in learning, especially for students who lack assistance from their parents at home. Meanwhile, limited face-to-face learning activities (known with PTMT) using a group system also slow down the pace of learning because several times the teacher has to repeat the material at least twice. Teacher supervision of the achievement of the learning process of students during the pandemic is weak, it is not even uncommon for teachers to meet students whose learning outcomes when brave and face-to-face learning are much different so that it has an impact on unstable student learning outcomes (Master class, interview, 7 February 2022).

Student learning outcomes tend not to reach the minimum completeness criteria. Three times the learning evaluation conducted in the even semester concluded, in the first evaluation 24% of students met the Minimum completeness criteria (known with KKM), 60% had not met the KKM, and 16% did not take the

evaluation. The second evaluation, 36% of students met the KKM, 60% did not meet the KKM, and 48% did not take the evaluation. The third evaluation, 32% of students met the KKM, 56% did not meet the KKM, and 12% did not follow the evaluation. The average of the three data is 31% of students who reach the KKM, 59% of students do not reach the KKM, and 25% of students do not take the evaluation. The large percentage of students who do not reach the KKM and do not take part in the evaluation shows the low participation of students. The results of observations from the homeroom teacher showed the high and low learning outcomes of students due to the participation and learning motivation of each student. In addition, the scope of the material is wide and students tend to rely on rote memorization so that they forget the basic concepts plus teachers who have not sufficiently applied learning models that are in accordance with the characteristics of science.

Adjustment of the learning model with the character of science and learning objectives is very important. So that the learning participation of students in learning science can increase. One of them is the Problem Based Learning (PBL) learning model. Learning Model Problem Based Learning (PBL) is an interactive learning model, centered on learners (Savery, 2006), facilitate students to learn to solve problems (Savery, 2006; Orozco & Yangco, 2016; Anggraini et al., 2022) through the scientific method (Savery, 2006; Amir, 2013).

The PBL model encourages students to participate in the lifelong learning process (Selçuk, 2010). Implementation of the Problem Based Learning (PBL) model can be done directly or based on technology (Rahmadita et al., 2021) by providing factual, contextual, and authentic problems through providing authentic problems according to students' daily lives and then the problems are solved in groups (Ramadha & Zuhaida, 2021). Thus, students do not easily forget what they have learned (Anggareni, et.al, 2022). So that it can encourage students to participate actively during learning takes place (Inayati & Kristin, 2018; Khairunnisa et al., 2022, Selviyana et al., 2022).

In science learning, the PBL model can improve participation and student learning outcomes (Nuraini & Kristin, 2017) improve the skills and participation of students in solving problems so that they can take place actively (Selviyana et al., 2022) and think critically (Neswary & Prahani, 2022; Amin et al., 2020; Akhdinirwanto et al., 2020). The PBL model is also effective and practical to use in improving literacy skills (Mutiaramses & Fitria, 2022; Puspita et al., 2022) and affect the ability to think creatively (Khairunnisa et al., 2022; Nuswowati et al., 2017).

The PBL model can also increase student learning participation because it focuses on recognizing problems, analyzing, and solving problems. It can

improve critical thinking skills, skills in investigating something, improve skills in solving problems (Aufo et al., 2022). In addition, it creates cooperation and interaction so that it can maximize and increase student participation in learning, especially in science learning (Sugiyanto, 2019). The PBL model tends to encourage students to be active in learning activities through problem solving activities. In addition, students get the opportunity for students to build their own knowledge through investigation or experimental activities (Setiowati, 2017).

PBL habituation must be started from an early age to equip students' skills at higher education levels (Hung, 2011). Observing this, the PBL learning model in science learning is interesting to study. So the purpose of this study is to find out how to increase student participation in learning science through the Problem Based Learning model.

Method

This study uses the type of Classroom Action Research or classroom action research (CAR) by adopting the Kemmis and Taggart models. CAR is a practical, systematic research that follows certain procedures about classroom situations based on the problems at hand and have not found a solution (Hanifah, 2014). CAR talks about how teachers can organize teaching and learning activities from their own experiences on the conditions and problems faced in a class (A Suharsimi, 2015). This research was carried out at SD Negeri Demangan in the even semester which lasted for 1 month, starting from 1-28 February 2022 FY 2021/2022. The research subjects used were 25 students of class IV A SD Negeri Demangan and 1 class teacher who also taught the subject (IPA). Data collection techniques used in this study consisted of test and non-test. The test used is in the form of giving a post test at the end of each cycle. While non-test data collection in the form of observation, interviews and documentation.

Broadly speaking, the Kemmis and Taggart models based on 4 main components which are also the stages of implementation (Mawardi, 2020) namely: the planning stage, the implementation stage, the observation stage, and the reflection stage. The planning stage is carried out to develop a plan, determine the material and focus of the problem and develop data acquisition instruments in the implementation of the action. The implementation phase includes the implementation and implementation of the research action. The observation stage is carried out by observing the implementation of the action as a whole and the next stage runs continuously based on the results of previous observations. The reflection stage is a reflection on the implementation of the action (Suharsimi, 2015).

In its implementation, the Kemmis and Taggart models combine observation and action. This combination forms a cycle that will be used in one lesson (Muparok, 2013). The design of the Kemmis and Taggart models can be explained in the following figure:

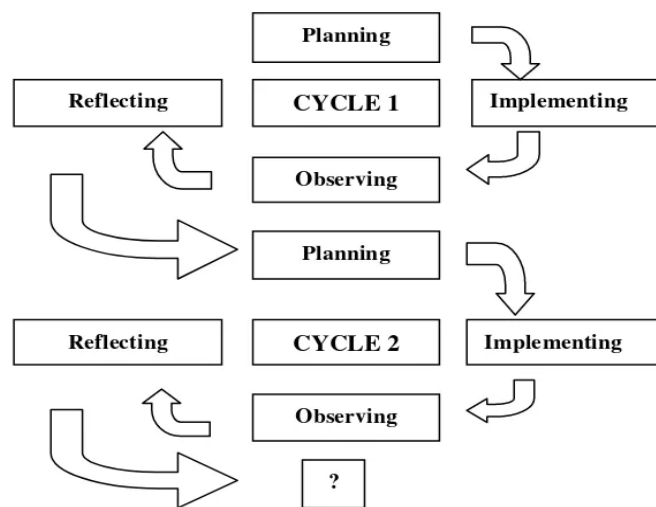


Figure 1. The Kemmis and Taggart Classroom Action Research Design

Results and Discussion

The researcher applies the Problem Based Learning (PBL) learning model. The research implementation took place in 2 cycles. Each cycle goes through 5 stages of learning. These five stages were adapted from the PBL learning model, including problem introduction, organizing, guiding the learning experience, developing and evaluating the learning process. In implementing the action in the classroom, the teacher delivers learning materials and teaching materials based on the lesson plans that have been prepared. While the researchers made observations on the learning process. The PBL model was chosen with the hope of increasing student activity in the classroom, training the ability to discuss and express opinions. To measure the increase in students' science learning outcomes,

Application of the PBL learning model

The research implementation for both cycle 1 and cycle 2 was carried out in accordance with the lesson plans and the stages of the PBL learning model as follows:

Stage 1: Orientation of students to the problem,

At this stage the teacher conveys apperception in the form of an overview of the material and teaching materials that will be discussed and studied, asking questions related to problems that are often encountered and faced in the surrounding environment. In addition, the teacher also relates it to the concept of learning (Mustikasari & Harida, 2020). The results of observing

student activities for cycle 1 showed 83% at the first meeting and increased to 94% at the second meeting with a total attendance of 18 students. In cycle 2, both for the first and second meetings, each showed a percentage of 100% with a total attendance of 18 students. This shows that the teacher's skills in apperception for all meetings have been seen and are said to be successful (Purnamasari et al., 2014).

Stage 2: Organizing students to learn

At this stage the teacher conditions the classroom and forms a discussion group. The group division aims to practice discussion skills and get the opportunity to express ideas related to problem solving that is carried out together (Ariesti, 2021). The results of the student activity observation sheet showed a percentage of 100% for all meetings, both cycle 1 and cycle 2. Then the teacher gave the Student Worksheet (SW) for each group to be discussed. SW contains a series of questions containing pictures and systematic materials that are used with the aim of developing various aspects and practicing problem-solving skills in accordance with learning objectives (Palupi et al., 2020).

Stage 3: Guiding individual/group experiences,

During the discussion activities, the teacher gives the opportunity for students to dig deeper and find their own solutions to the problems they find in the SW. However, the teacher still accompanies and directs if there are students who are confused or ask questions related to these problems. In this case, the students were enthusiastic enough to have discussions with the SW that had been distributed for both cycle 1 and cycle 2.

The activities of students who carried out discussions in cycle 1 of meeting 1 were only 14 students from the total attendance of 18 students or 77%. Then it increased at the second meeting to 100% and again decreased in cycle 2 of the first and second meetings, each of which became 17 students from 18 students who attended or 94%. In the implementation of the discussion, there were several students who expressed opinions and asked questions. In the first cycle of the first meeting there were 16 students (88%) who responded to the questions given by the teacher, then decreased at the second meeting to 10 students (55%). In cycle 2 of the first meeting, there was an increase again to 12 students or 66% and became very active at the second meeting, namely 18 students with a percentage of 100%.

Stage 4: Developing the work

At this stage, each group has the opportunity to present the results of the discussion in the form of a direct presentation in front of the class. This stage develops the skills of speaking in front of others, being confident and expressing opinions. In addition to the

presenter group, other groups serve as discussion participants and are encouraged to have opinions and ask questions. In cycle 1, meeting 1, there were 13 students (72%) who asked questions and it decreased to 7 students (38%) at the second meeting. Then it increased again in cycle 2 of the first meeting, namely there were 13 students (72%) who asked questions and increased again at the second meeting to 14 students (77%). During the presentation and question and answer session, the teacher provided revisions and input on the results and the process of obtaining the results of the discussion.

Stage 5: Evaluating the problem solving process,

After the presentation and question and answer activities were completed, the teacher explained again the results of the discussion and the questions asked. This is intended to straighten understanding if it has not been understood and answer the learning objectives. After that the teacher asks students to make conclusions based on their own understanding and language. However, there are no students who are confident to convey conclusions in cycle 1. Students are confident to convey learning conclusions in cycle 2 of the second meeting, namely 2 students with a percentage of 11%.

Student participation during the PBL learning process

The participation of class IV students at SD Negeri Demangan during the implementation of the PBL learning model in science learning has decreased and increased as seen from the results of observations at each meeting. The following are the details of the data that have been obtained in cycle 1 and cycle 2:

Cycle 1

1. Cycle 1 meeting 1

At this stage, there were 18 students from a total of 25 students. Activities that occur during the learning process do not involve all of the students present from the beginning of learning to closing activities. The material discussed in this meeting is the definition and types of styles that begin with giving apperception by the teacher regarding daily activities that use style.

Students and their discussion groups have discussions regarding the definition and various styles based on the SW. The SW is in the form of a systematic guide that helps students to develop various aspects needed according to learning indicators (Haryati et al., 2021). SW for cycle 1 meeting 1 for both group 1 and group 2 is equipped with pictures to make it easier for students to identify styles and understand the language of the questions so that the material presented can be conveyed properly (Putri, 2021).

The results of the student worksheets show active activities during discussion activities. There were 14 students (77%), who expressed opinions during discussions (72%) and who responded to their friends'

opinions when discussing there were 16 students (88%). There were 11 students (61%), and students who asked questions when discussing the opinion of their friends (72%). At this stage, there are no students who are confident in concluding the results of group discussions (0%), student activities in cycle 1 meeting 1 with an average of 75% are in the high phase.

2. Cycle 1 meeting 2

At the second meeting there were several activities that had not been carried out optimally as in the first meeting with the same number of attendance, namely 18 students. Just like meeting 1, the teacher is used to carrying out the learning process without the preparation of the previous lesson plans, so that in this condition the teacher intends to convey general learning objectives within the scope of the material presented. At this stage the teacher continues the scope of the material at the beginning of the lesson by being more focused on the material to be studied, namely the definition of muscle style, activities that use muscle style and examples of the use of muscle force. There were 6 students (33%) who actively answered the questions given by the teacher. Next, students have a discussion with their respective group friends.

In its application, SW based on the PBL learning model encourages and requires students to find out independently related to their own concepts and knowledge (Palupi et al., 2020). The results of the student worksheets show active activities during discussion activities. All students carried out discussion activities (100%), expressed opinions when discussing there were 11 students (61%), responding to opinions when discussing there were 10 students (55%). Appreciating and respecting the opinions of friends there are 13 students (72%) and asking questions when discussing there are 7 students (38%). At this stage, it is still the same as the previous meeting where there are no students who are confident in concluding the results of group discussions (0%). The activity of students in cycle 1 meeting 2 experienced a decrease in the average value from the previous meeting to 73.8 with the same phase, namely high.

Cycle 2

1. Cycle 2 meeting 1

There were 18 students who attended this meeting out of a total of 25 students. Unlike the meeting in cycle 1, in cycle 2 the teacher has distinguished between the delivery of the initial material and the learning objectives. At this stage, the teacher continues the scope of the material at the beginning of the lesson by being more focused on the material to be studied, which is related to electric forces and various kinds of electric forces. There were 10 students (55%) who actively answered questions posed by the teacher.

After that, the students discussed with their respective group friends. SW results show active activities during discussion activities. There were 17 students (94%), students who expressed opinions during discussions, 13 students (72%), who responded to opinions, there were 12 students (66%). the activity of respecting and respecting the opinions of friends there are 18 students (100%) and students who ask questions when discussing there are 13 students (72%). At this stage, it is still the same as the previous meeting where there are no students who are confident in conveying conclusions regarding the results of group discussions (0%). The activity of students in this cycle has increased from the previous meeting with an average of 84.7% and is in a very high phase.

2. Cycle 2 meeting 2

At this meeting, it was seen that there were 18 students who attended from a total of 25 students. Learning activities begin with responding to greetings from the teacher. At this stage the scope of the material to be studied is related to electronic devices and their benefits for everyday life. Next, students have a discussion with their respective group friends.

The results of the student worksheets show active activities during discussion activities. There are 17 students (94%), who express opinions during discussions (94%), responding to opinions when discussing 18 students (100%), respecting and respecting the opinions of friends, there are 18 participants. students (100%) and there were 14 students (77%) who asked questions. Different from previous meetings, at this meeting there were 2 students (11%) who were confident in conveying their learning conclusions in front of their friends. The activity of students in this cycle with an average of 89.1% was in a very high phase so that the implementation of learning in cycle 2 meeting 2 had increased from cycle 1 which was in a high phase and had reached the desired criteria, so the research process ended at this meeting.

The implementation of the PBL learning model not only requires students to be active, but also trains discussion skills. Students begin to be trained to listen, appreciate and be confident to express opinions and input in front of their friends. However, it takes quite a long time to continue to familiarize students with discussion skills and abilities. This is because discussion skills need to be continuously trained and accustomed, so that students tend to express their questions, opinions and ideas in front of others. In addition, learning activities with the PBL model prioritize group discussions that encourage students to be more active and practice problem solving skills and improve learning outcomes in accordance with learning objectives (Maqbullah et al., 2018). The following is a graph of the results of student observations:

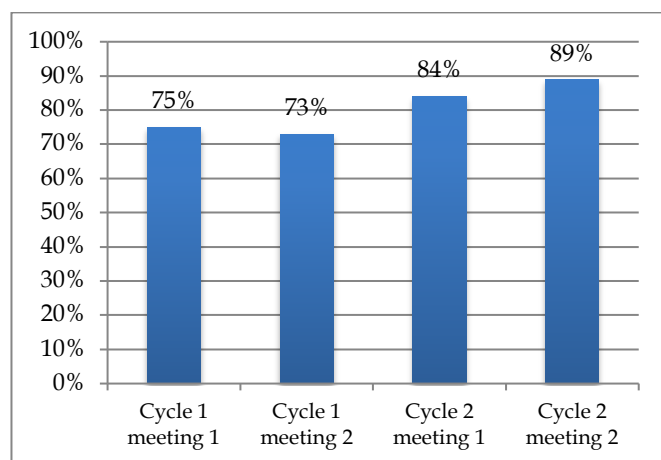


Figure 2. Graph of student observations

Based on the graphic above, it can be seen that the activity of students has increased and decreased. The results of observations in cycle 1 of meeting 1 as a whole showed that there were 18 students who were present and 7 others were unable to attend. Each of 10 students from group 1 and 8 students from group 2. At this meeting the average percentage showed 75% in the high category. At the second meeting of cycle 1 with the same number of attendance, namely 18 students, consisting of 13 students from group 1 and 5 from group 2. At this meeting there was a decrease in the percentage of student activity by 2% in the same category, namely high.

In cycle 2, meeting 1, it increased again by 11% to 84% with a different category, namely very high, with the attendance of 18 students. 11 students in group 1 and 7 students in group 2. At the second meeting of cycle 2 again experienced an increase of 5% to 89% and remained in the same category which is very high, with the attendance of 18, 11 students in group 1 and 7 students in group 2. Overall the number of attendance in cycle 1 and cycle 2 is the same, namely 18 students. However, there are changes and increases in student activity in each cycle (Tarigan et al., 2021). This shows that the application of the PBL learning model can increase the activity of fourth grade students at SD Negeri Demangan in science subjects as evidenced by the increase in the average percentage and the classical percentage of students in cycle 2 which reaches 88% (Putri et al., 2021).

The results of the research described above are also supported by several previous studies. Sugiarto in his research stated that the participation of students in the initial conditions in learning was still low with an average score of 51. Then Sugiarto applied the PBL model cycle 1 and cycle 2 in learning which could result in increased student participation. The average score of student participation in cycle 1 with an average score of 63. While the average score in cycle 2 is 74, so it can be

said that student participation can increase (Sugiarto, 2022).

Likewise with the opinion of Sadiyah and his friends in their research. They stated that students in the initial conditions had low participation power because students did not have the confidence to express their opinions and had not been able to formulate ideas independently. Therefore, there is a need for student-centered learning, so that the PBL learning model is appropriately applied in learning. Problem-based learning tends to stimulate the curiosity and activeness of students in solving problems. In addition, it can increase students' learning participation, so that student learning outcomes also increase with the average value from 63.17 increasing to 83.43.

In line with the statement above, Dian and colleagues in their research also stated that before the implementation of the PBL model, student participation in learning was still uneven. Based on the data, the completeness of the three aspects of student participation only reached 12.5%. Observing this, the research we did with them had the same thing as applying the PBL model. However, there are also differences, Elsy and friends combined the PBL model and the think pair share (TPR) model, so that there was a significant increase. In cycle 1, the percentage of student participation was 46.88%. While in cycle 2, the percentage of student participation reached 81.25%. Based on the data above, the percentage of student participation has increased by 34.47% (Dian et al., 2016).

Conclusion

The implementation of the Problem Based Learning (PBL) learning model in science learning for class IV SD Negeri Demangan is carried out in 5 stages, namely introducing problems, organizing, guiding experiences, developing and evaluating. The participation of fourth graders at SD Negeri Demangan after using the PBL learning model in science learning decreased and increased. Student participation in cycle 1 meeting 1 showed an average of 75% in the high category. At the second meeting, it decreased 2% to 73% with the same category, namely high. Then it increased again in cycle 2 meeting 1 with an average of 84% in the very high category and increased again to 89% at meeting 2 with the same category which is very high. So that the participation of students has increased by a percentage of 14%. Based on the statement above, it can be concluded that after the implementation of the PBL model, the participation of students in science learning has increased.

References

- Akhdinirwanto, R. W., Agustini, R., & Jatmiko, B. (2020). Problem-Based Learning With Argumentation As A Hypothetical Model To Increase The Critical Thinking Skills Fir Junior High School Students. *Jurnal Pendidikan IPA Indonesia*, 9(3), 340-350. <https://doi.org/10.15294/jpii.v9i3.19282>
- Amin, S., Utaya, S., Bachri, S., Sumarmi, & Susilo, S. (2020). Effect Of Problem-Based Learning On Critical Thinking Skills And Enviromental Attitude. *Journal For The Education Of Gifted*, 8(2), 743-755. <https://doi.org/10.17478/jegy.650344>
- Anggraini, H., Jayati, R. D., Harmoko, & Hayati, N. (2022). Analysis of Science Learning Outcomes Of Class VIII Students Of Air Satan State Junior High School: Impact Of Problem Based Learning Models. *JPPIPA: Jurnal Penelitian Pendidikan IPA*, 8(3), 1055-1060. <https://doi.org/10.29303/jppipa.v8i3.1262>
- Ariesti, N. M. (2021). Penerapan Metode Diskusi Kelompok Kecil Sebagai Upaya Peningkatan Hasil Belajar Pendidikan Agama Hindu Siswa Kelas IV SD Negeri 36 Mataram. *Jurnal Ilmiah Sangkareang Mataram*, 8(1), 1-5. Retrieved from <https://sangkareang.org/index.php/SANGKAREANG/article/view/358>
- Aufa, M. N., Rusmansyah, Hasbie, M., Jaidie, A., & Yunita, A. (2022). The Effect Of Using E-Module Model Problem Based Learning (PBL) Based On Wetland Environment On Critical Thinking Skills And Enviromental Care Attitudes. *JPPIPA: Jurnal Penelitian Pendidikan IPA*, 7(3), 401-407. <https://doi.org/10.29303/jppipa.v7i3.732>
- Birgili, B. (2015). Creative And Critical Thinking Skills In Problem-Based Learning Environment. *Journal Of Gifted Education and Creativity*, 2(2), 71-80.
- Dian, E., Sunnarmi, & Suhadi. (2016). Dian, E., Sunnarmi, & Suhadi. (2016). Penerapan Model Pembelajaran Think Pair Share Problem Based Learning Utuk Meningkatkan Partisipasi dan Pemahaman Konsep Siswa. *Jurnal Pendidikan Biologi*, 7(2), 52-60. <http://dx.doi.org/10.17977/um052v7i2p52-60>
- Ginjar, E. G., Darmawan, B., & Sriyono. (2019). Faktor-faktor yang Mempengaruhi Rendahnya Partisipasi Belajar Peserta Didik SMK. *Journal of Mechanical Engineering Education*, 6(2), 206-219. <https://doi.org/10.17509/jmee.v6i2.21797>
- Hanifah, N. (2014). *Memahami Penilaian Tindakan Kelas, Teori dan Aplikasi*.
- Haryati, N., Sudaryanto, & Dian, D. (2021). Discovery Learning Berbantuan Lkpd Interaktif Pada Siswa Kelas Vi Sd Negeri Banyuurip 1 Turi. *Prosiding Pendidikan Profesi Guru*, 1332-1343.
- Hung, W. (2011). Theory To Reality: A New Issues In Implementing. *Education Tech Research Dev*, 59, 529-552. <https://doi.org/10.1007/s11423-011-9198-1>
- Inayati, B. F., & Kristin, F. (2018). Peningkatan Partisipasi dan Hasil Belajar Tematik Melalui Model Problem Based Learning Siswa Kelas 1 SD. *Holistika: Jurnal Ilmiah PGSD*, II(2), 85-93. Retrieved from <https://jurnal.umj.ac.id/index.php/holistika/article/view/3286>
- Ismail, S. N. (2020). Penerapan Pembelajaran Kontekstual Tematik Untuk Meningkatkan Partisipasi dan Hasil Belajar Siswa Kelas X IPS MA Raudhotul Huffaz Kediri Tabanan Semester II Tahun Pelajaran 2015/2016. *Jurnal Pendidikan Dan Ekonomi*, 5(2), 197-211. <https://doi.org/10.53958/wb.v5i2.61>
- Janah, M. C., & Widodo, A. T. (2018). Pengaruh Model Problem Based Learning Terhadap Hasil Belajar Dan Keterampilan. *Jurnal Inovasi Pendidikan Kimia*, 12(1), 2097-2107. <https://doi.org/10.15294/jipk.v12i1.13301>
- Jariah, S. A., & Aminatun, T. (2022). Implementation Of The Socio-Scientific Issues Approach With The Investigative Group Learning Model To Improve Students' Critical Thinking Skills On Environmental Change Materials. *JPPIPA: Jurnal Penelitian Pendidikan IPA*, 8(3), 1042-1048. <https://doi.org/10.29303/jppipa.v8i3.1197>
- Kelley, T. R., & Knowles, J. G. (2016). A Conceptual Framework For Integrated STEM Education. *International Journal of STEM Education*, 3(1), 11. <https://doi.org/10.1186/s40594-016-0046-z>
- Khairunnisa, Abdullah, Khairil, Hasanuddin, & Rahmatan, H. (2022). The Influence Of Problem Based Learning Models Combined With Flashcard Media On Creative Thinking Skills Of Students. *JPPIPA: Jurnal Penelitian Pendidikan IPA*, 8(1), 247-251. <https://doi.org/10.29303/jppipa.v8i1.1154>
- Khotimah, A., Kuswandi, D., & Sulthoni, S. (2019). PENGARUH MODEL PROBLEM BASED LEARNING TERHADAP HASIL BELAJAR PKN SISWA. *JKTP: Jurnal Kajian Teknologi Pendidikan*, 2(2), 158-165. <http://dx.doi.org/10.17977/um038v2i22019p158>
- Maqbullah, S., Sumiati, T., & Muqodas, I. (2018). Penerapan Model Problem Based Learning (Pbl) Untuk Meningkatkan Kemampuan Berpikir Kritis Siswa Pada Pembelajaran Ipa Di Sekolah Dasar. *Metodik Didaktik*, 13(2), 106-112. *Metodik Didaktik*, 13(2), 106-112. <https://doi.org/10.17509/md.v13i2.9500>
- Mawardi B, P. (2020). *Penilaian Tindakan Kelas, Penilaian Tindakan Sekolah Dan Best Practice. (Suatu Panduan Praktis Bagi Guru Dan Kepala Sekolah)*. Retrieved from

- <https://books.google.com/books?id=Te...HekzC1MQ6AF6BAgHEAI>
- Muparok, A. (2013). *Meningkatkan Hasil Belajar Peserta Didik Tentang Mempertahankan Kemerdekaan RI Melalui Media Visual Pada Pembelajaran IPS*. Bandung: Perpustakaan UPI.
- Mustikasari, R., & Harida, R. (2020). Apersepsi Pembelajaran Melalui Stand-Up Comedy Untuk Meningkatkan Motivasi Belajar Mahasiswa dengan Metode Ceramah di STKIP PGRI Ponorogo. *Jurnal Pendidikan*, 21(2), 111-121. <https://doi.org/10.33830/jp.v21i2.960.2020>
- Mutiaramses, & Fitria, Y. (2022). Development Of Problem Based Learning(PBL) Oriented Digital Comics To Improve Students' Science Literacy. *JPPIPA: Jurnal Penelitian Pendidikan IPA*, 8(2), 699-704. <https://doi.org/10.29303/jppipa.v8i2.1349>
- Neswary, S. B. A., & Prahani, B. K. (2022). Profile Of Students' Physics Critical Thinking And Application Of Problem Based Learning Models AssistedByDigital Books In Physics Learning In High School. *JPPIPA: Jurnal Penelitian Pendidikan IPA*, 8(2), 781-789. <https://doi.org/10.29303/jppipa.v8i2.1444>
- Nuraini, F., & Kristin, F. (2017). Penggunaan Model Problem Based Learning (PBL) untuk Meningkatkan Hasil Belajar IPA Siswa Kelas 5 SD. *E-Jurnal Mitra Pendidikan*, 1(4), 369-379. Retrieved from <http://www.e-jurnalmitrapendidikan.com/index.php/e-jmp/article/view/82>
- Nuswowati, M., Susilaningih, E., Ramlawati, & Kadarwati, S. (2017). Implementation Of Problem-Based Learning With Green Chemistry Vision To Improve Creative Thinking Skill And Students' Creative Action. *Jurnal Pendidikan IPA Indonesia*, 6(2), 221-228. <https://doi.org/10.15294/jpii.v6i2.9467>
- Orozco, J. A., & Yangco, R. T. (2016). Problem-Based Learning: Effects On Critical And Creative Thinking Skills In Biology. *Asian Journal Of Biology Education*, 9, 2-10.
- Palupi, M T, Istihapsari, V., & Afriady, D. (2020). Peningkatan Motivasi Dan Hasil Belajar Siswa dalam Pembelajaran Tematik Dengan Metode DIscovey Learning Berbantuan LKPD Di Kelas IV SD Kanisius Beji Tahun 2020/2021. *Prosiding Pendidikan Profesi Guru*, 5(3), 1227-1236.
- Palupi, Maria Tyas, Istihapsari, V., & Afriady, D. (2020). Peningkatan Motivasi dan Hasil Belajar Siswa dalam Pembelajaran Tematik dengan Metode DIscovey Learning Berbantuan LKPD di Kelas IV SD Kanisius Beji Tahun 2020/2021. *Prosiding Pendidikan Profesi Guru*, 5(3), 1227-1236.
- Purnamasari, W., Prasetyaningtas, F. D., & Abidin, A. Z. (2014). Penerapan Model Quantum Learning Menggunakan Teori Apersepsi Untuk Meningkatkan Kualitas Pembelajaran Pkn Pada Siswa Kelas Iv A Sdisulaechah Semarang. *Joyful Learning Journal*, 3(1), 38-45. <https://doi.org/10.15294/jlj.v3i1.5895>
- Puspita, Y., Hardeli, Oktavia, B., & Kurniawati, D. (2022). The Development Of An Integrated E-Module Of Scientific Literacy And Video Demonstration Using A Problem-Based Learning Model For High School Students On Acids And Bases. *JPPIPA: Jurnal Penelitian Pendidikan IPA*, 8(2), 452-462. <https://doi.org/10.29303/jppipa.v8i2.1306>
- Putri, F. P. W., Koeswanti, H. D., & Giarti, S. (2021). Perbedaan Model Problem Based Learning Dan Project Based Learning Terhadap Hasil Belajar Siswa Sekolah Dasar. *Edukatif: Jurnal Ilmu Pendidikan*, 3(2), 496-504. <https://doi.org/10.31004/edukatif.v3i2.356>
- Putri, R. C. C. C. (2021). Implementasi Pembelajaran Berbasis Lembar Kerja Peserta Didik Digital (Lkpd-D) Untuk Meningkatkan Prestasi Belajar Sejarah Siswa Kelas Xi Ipa 2 Sma Pangudi Luhur Sedayu. Universitas Sana Dharma Yogyakarta.
- Rahmadita, N., Mubarak, H., & Prahani, B. K. (2021). Profile Of Problem Based Learning (PBL) Model Assisted By PhET To Improve Critical Thinking Skills Of High School Students In Dynamic Electrical Materials. *JPPIPA: Jurnal Penelitian Pendidikan IPA*, 7(4), 617-624. <https://doi.org/10.29303/jppipa.v7i4.799>
- Ramadhya, I. E., & Zuhaida, A. (2021). Peningkatan Hasil Belajar IPA melalui Model Pembelajaran Problem Based Learning dengan Media Flash Card. *Journal of Classroom Action Research*, 3(2), 2656-3460. <https://doi.org/10.29303/jcar.v3i2.834>
- Sadih, H. H. (2020). The Effectiveness of Civic Education Online Learning Participation of Students in Garut. *Journal Civicsand Social Studies*, 4(1), 81-94.
- Savery, J. R. (2006). Overview Of Problem-Based Learning: Definition And Distinctions. *Interdisciplinary Journal Of Problem-Based Learning*, 1(1), 9-20.
- Selçuk. (2010). The Effects Of Problem-Based Learning On Pre-Service Teachers' Achievement, Approaches And Attitudes Towards Learning Physics. *International Journal Of The Physical Science*, 5(6), 711-723.
- Selviyana, Yusrizal, Halim, A., Syukri, M., & Elisa. (2022). Application Of Problem Based Learning (PBL) Model To Improve Problem Solving Skill From Critical Thinking Skill Students On Dynamic Fluid Materials. *JPPIPA: Jurnal Penelitian Pendidikan IPA*, 8(2), 521-527. <https://doi.org/10.29303/jppipa.v8i2.1329>

- Setiowati, R. (2017). Upaya Meningkatkan Hasil Belajar IPA Materi Daur Air Melalui Model Pembelajaran Problem Based Learning. *Jurnal Dinamika Pendidikan Dasar*, 10(1), 21-27.
- Sugiarto. (2022). Penggunaan CGA dan PBL untuk Meningkatkan Hasil Belajar serta Partisipasi Siswa pada Materi Limit Fungsi. *JPSP: Jurnal Penelitian Sains Dan Pendidikan*, 2(1), 26-32. <https://doi.org/10.23971/jpsp.v2i1.3465>
- Sugiyanto, R. (2019). Penerapan Model Problem Based Learning untuk Meningkatkan Partisipasi dan Hasil Belajar IPS-1 Mahasiswa PGSD Universitas Palangka Raya. *Indonesian Journal of Educational Science (IJES)*, 1(2), 89-94. <https://doi.org/10.31605/ijes.v1i2.253>
- Suharsimi, A. (2015). *Penelitian Tindakan Kelas (Edisi Revisi)*. Jakarta: Bumi Aksara.
- Suharsimi, Arikunto. (2015). *Penelitian Tindakan Kelas (Edisi Revi)*. Jakarta: Bumi Aksara.
- Sulthon. (2016). Pembelajaran IPA yang Efektif dan Menyenangkan bagi Siswa Madrasah Ibtidaiyah (MI). *ELEMENTARY*, 4(1), 38-54. <http://dx.doi.org/10.21043/elementary.v4i1.1969>
- Tarigan, E. B., Simarmata, E. J., Abi, A. R., & Tanjung, D. S. (2021). Peningkatan Hasil Belajar Siswa Dengan Menggunakan Model Problem Based Learning Pada Pembelajaran Tematik. *Edukatif: Jurnal Ilmu Pendidikan*, 3(4), 2294-2304. <https://doi.org/10.31004/edukatif.v3i4.1192>
- Weddyawanti, N., & Lisa, Y. (2019). *Pembelajaran IPA Di Sekolah Dasar*. Yogyakarta: Deepublish Publisher
- Yasa, P. A. E. M., & Bhoke, W. (2019). Pengaruh Model Problem Based Learning Terhadap Hasil Belajar Matematika Pada Siswa Sd. *Journal of Education Technology*, 2(2), 70. <https://doi.org/10.23887/jet.v2i2.16184>