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Implementation of Audio-Visual Media Assisted by PBL (Problem Based Learning) Model to Increase Student Activeness in the Human Respiratory System Subject

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Abstract: This study aims to improve student activity in learning the human respiratory system using the Problem Based Learning (PBL) model assisted by audio-visual media in class V of SD Negeri 152/X Sungai Sayang in the 2023/2024 academic year. This Classroom Action Research (CAR) was conducted in three cycles, each consisting of planning, implementation, observation, and reflection stages. The data collected included student activity in asking questions, discussing, and expressing opinions. The results of the study showed a gradual increase in student activity. In the first cycle, student activity was still low with a percentage of asking questions of 48%, discussing 60%, and expressing opinions 40%. In the second cycle, student activity increased to 72%, 80%, and 68% for each aspect. At its peak in the third cycle, student activity reached a high category with a percentage of asking questions of 88%, discussing 92%, and expressing opinions 80%. The use of audio-visual media has proven effective in attracting students' attention and facilitating their understanding of the material. In addition, teacher guidance plays an important role in encouraging students to be more confident and active during learning. The conclusion of this study is that the PBL model assisted by audio-visual media is effective in increasing student activity while helping them understand the material in depth. This approach is recommended to be applied to learning in various other subjects that require interaction and conceptual understanding.

Keywords: Audio-visual; Human respiratory system; Problem Based Learning; Student activeness.

Introduction

Basic education plays an important role in forming the foundation of students' knowledge and skills. One of the challenges faced by educators is to increase student activeness in the learning process, especially in complex materials such as the human respiratory system. Student activeness in learning is very important because it is directly related to understanding the material and optimal learning outcomes. Many efforts have been made to improve the quality of education in Indonesia, such as the many innovations made in learning, the use of various models, strategies, and learning methods (Janmariando et al., 2023). In addition, the teaching materials prepared by the teacher must be truly prepared according to the students' needs and the mathematical concepts they will learn must be as related as possible to the situations that the students will experience directly (Sinaga, 2023). Asmedy (2021) argues that to achieve the points of educational objectives, it is necessary to be preceded by an adequate educational process. The Problem Based Learning (PBL) learning model has been recognized as one of the effective approaches to increasing active student

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participation. This model is in the form of problem solving, students are faced with problems directly and then asked to find solutions, this method can encourage them to think creatively to overcome existing problems (Adiilah & Haryanti, 2023). PBL emphasizes real-world problem solving as a context for students to learn to think critically and acquire new knowledge. In the context of elementary school learning, the application of PBL can help students understand abstract concepts more concretely (Pahmi et al., 2025). Natural Sciences (IPA) is a subject that plays an important role in ensuring that students have a comprehensive understanding of the universe and its environment (Parikesit & Damiyanti, 2020). Science is very important to be taught in elementary schools (Rahmasari, 2019).

The use of audio-visual media as an aid in the PBL model further enriches students' learning experiences (Marlina et al., 2025). Audio-visual media can present information in a more interesting and easy-to-understand way, so that it can increase students' interest and activeness in learning. Studies by showing that the application of the PBL model assisted by audio-visual media can increase students' interest in learning thematic learning in grade V of elementary school (Astuti & Jamilah, 2024) .

In Natural Sciences (IPA) subjects, especially the human respiratory system, the concepts presented are often abstract and complex for fifth grade elementary school students (Wulandari et al., 2023). Therefore, a learning method is needed that can facilitate students' deeper understanding. The application of the PBL model supported by audio-visual media is expected to be an effective solution in increasing students' activeness and understanding of this material (Khoirulloh et al., 2024).

Research by Atminingsih et al. (2019), shows that the use of PBL models assisted by audio-visual media is effective in improving science learning outcomes of grade III elementary school students. These results indicate the positive potential for applying similar methods to human respiratory system material in grade V. Thus, the integration between the PBL model and audio-visual media can be an innovative and effective learning strategy (Arianatasari, 2019).

In addition, the use of audio-visual media in learning can help students who have visual and auditory learning styles. This media is able to present information in the form of images, videos, and sounds that can make it easier for students to understand the material presented (Zulvira et al., 2021). The PBL model assisted by audio-visual media is effective in improving students' reasoning abilities (Dewi et al., 2023).

The application of the PBL model assisted by audio-visual media can also encourage students to be more active in discussing, asking questions, and expressing opinions (Samsudin et al., 2023). This activity is important in developing students' social and communication skills. Thus, in addition to improving understanding of the material, this method also contributes to the development of other essential skills for students.

In SD Negeri 152/X Sungai Sayang, the application of the PBL model assisted by audio-visual media on the human respiratory system material is expected to increase the activeness and learning outcomes of fifth grade students. By utilizing technology and innovative learning approaches, teachers can create a more interactive and enjoyable learning environment for students.

However, the application of this method requires thorough preparation, both in terms of materials, media, and teacher skills in managing learning. Teachers need to be trained in the use of audio-visual media and the application of the PBL model in order to optimize the learning process. In addition, the availability of supporting facilities and infrastructure such as audio-visual devices is also a determining factor in the success of this method.

Evaluation of the effectiveness of the application of the PBL model assisted by audio-visual media needs to be carried out periodically (Khairani & Aloysius, 2023). It is important to know to what extent this method can improve student activity and learning outcomes, and to make necessary improvements and adjustments. Thus, the learning process can continue to be improved according to the needs and characteristics of students (Rahayu, 2021).

In addition, parental involvement in supporting home learning is also an important factor. Parents can help by providing a conducive learning environment and supporting the use of audio-visual media as an additional learning tool. Collaboration between teachers and parents will have a positive impact on student motivation and activeness in learning. Learning models that use real problems in everyday life and dn need a lot of relevant and appropriate information to find the problem-solving process in learning (Maqbullah et al., 2018)

In the long term, the implementation of the PBL model assisted by audio-visual media is expected to equip students with critical and creative thinking skills and problem-solving abilities (Putra & Milenia, 2021). The Problem Based Learning (PBL) learning model helps students develop problem-solving skills, improve understanding and knowledge, and be active in gaining knowledge. These skills are very important as provisions for students in facing future challenges. Therefore, innovations in learning methods like this

need to be continuously developed and adjusted to technological developments and educational needs.

Overall, the implementation of the PBL model assisted by audio-visual media is one of the efforts to improve student activity and learning outcomes in the human respiratory system material in class V of SD Negeri 152/X Sungai Sayang. With thorough preparation, adequate support facilities, and collaboration between teachers, students, and parents, it is hoped that this method can provide a positive contribution to the quality of learning in elementary schools.

Method

This research is a type of classroom action research (CAR) which aims to improve classroom learning practices. The subjects of this study were 5 students in grade V at SD Negeri 152/X Sungai Sayang. The research was conducted in the odd semester of the 2023/2024 academic year (Khairi & Miaz, 2023). This research was conducted using two cycles, each cycle was carried out with 1 meeting (Gusteti & Neviyarni, 2022). This research focuses on students' collaborative activities in solving problems in learning activities (Septian et al., 2020). The data collection technique used in this study is observation. Observation is the collection of data that is observed in real terms. This observation is used to see what things are needed by students in improving student learning activities while the questionnaire is used to collect data used to see student learning deficiencies. The research procedure in this study is described as follows:

Cycle I. This classroom action research is conducted continuously. In this classroom action research, researchers can determine the effectiveness of implementing the problem based learning model to increase student activity (Suparsawan, 2021). This study only limits 2 cycles that are implemented with the hope that improvements will be seen that are implemented by implementing this problem-based learning model. Planning, including the preparation of lesson plans, determining the material that will be applied using the problem based learning model; Preparation of learning devices; Preparation of observation sheets for each science learning process; Preparation of test questions that will be given in each cycle; and Implementation of Actions, at this stage the teacher will carry out problem based learning that has been planned in accordance with the guidelines that have been made and stated in the lesson plan and adjusted to learning activities.

The observation stage is carried out by observing the learning process in groups with observers of the activities carried out by students and teachers. This activity is carried out during the learning process using observation sheets that have been prepared in advance. In the reflection stage, the researcher assesses and studies the results of the data evaluation in relation to the performance indicators of Cycle I. Reflection for this stage is carried out by collecting data from the results of observations and field notes, then discussing them between the teacher and the observer, then formulating a plan for the second cycle. Evaluation of assessment data is in the form of a formative test to assess the results or impact of the application of the problem-based learning model in increasing student activity (Arikunto et al., 2018).

Cycle II Based on the results of the reflection on cycle I, the planning of cycle II includes the following activities: Identifying problems in cycle I and determining alternative solutions to problems; determining the main topics of science learning content, Creating teaching modules using the problem-based learning model; and Developing learning scenarios, preparing learning resources, developing learning evaluation formats. The implementation of actions is carried out by improving actions in accordance with the learning scenario that has been refined. Based on the results of the reflection on cycle I, in forming groups, students are divided into more groups than cycle I so that group members are fewer, monitoring developments in learning. The observation stage is carried out by observing the learning process (student and teacher activities) (Saragih, 2022). Observation is directed at the observation guideline points that have been prepared by the researcher. Continued in the reflection stage, the researcher conducts an assessment and review of the results of the data evaluation in relation to the performance indicators of Cycle II. Formative assessment is carried out to assess the results that have been implemented in cycle II. The indicator of success in this learning outcome is that 70% of students achieve a score above the KKM. The KKM score in science lessons at SDN 152/X Sungai Sayang is 70.

Result and Discussion

The results of the study showed that the implementation of the Problem Based Learning (PBL) model gradually increased student activity in the learning process. In the first cycle, student activity was still relatively low. Only 48% of students actively asked questions, while 60% of students participated in discussions, and only 40% dared to express their opinions. These results reflect that students are still in the adaptation stage to the PBL learning method. Many students appear passive and lack confidence, especially in expressing their ideas or opinions.

In the first cycle, the obstacles faced were quite diverse. Most students did not understand the PBL learning mechanism which required them to actively ask questions, discuss, and find solutions. Dependence on group friends was also still high, so that contributions to the discussion were uneven. Teachers need to provide clearer directions and guide students so that they can follow the learning flow properly.

Based on the results of the study with the application of the Problem Based Learning model in the science content in class V SDN 152/X Sungai Sayang in the odd semester of the 202/2023 academic year, it is presented in Table 1.

Table 1. Research Results of Problem Based Learning Model to Increase Student Activeness

Cycle	Observed Aspects of Activeness	Number of Active Students	Percentage of Activity (%)	Category	Information
I	Asking questions related to the material	12 of 25	48	Low	There are still many students who are passive in asking questions and only a few are enthusiastic.
	Participating in discussions	15 of 25	60	Medium	Some students began to actively contribute to group discussions.
	Expressing opinions	10 of 25	40	Low	Students still tend to be shy and lack confidence in expressing their opinions.
II	Asking questions related to the material	18 of 25	72	Medium	More students began to actively ask questions with teacher guidance.
	Participating in discussions	20 of 25	80	High	Discussion activities increased significantly with teacher guidance.
	Expressing opinions	17 of 25	68	Medium	Students are more confident in expressing their opinions compared to the previous cycle.

In the second cycle, there was a significant increase in student activity. The percentage of students who actively asked questions increased to 72%, while participation in discussions reached 80%. In addition, students who dared to express their opinions also increased to 68%. This increase shows that students are starting to understand and get used to the PBL-based learning flow. They also seemed more comfortable in actively participating during the learning process.

The improvement in the second cycle was influenced by the use of audio-visual media that successfully attracted students' attention. This media helped students understand the material more easily, so they were encouraged to ask questions and discuss. The teacher also provided intensive motivation and direction, which helped students feel supported and more confident. In addition, group discussions became more structured, so that students could more easily understand their respective roles.

In the third cycle, the results of the study showed that student activity reached a very high level. The percentage of students who actively asked questions increased to 88%, participation in discussions reached 92%, and 80% of students dared to express their opinions. Students began to show independence in learning, including in asking relevant questions without relying too much on teacher guidance. This shows the success of the implementation of the PBL model in increasing student activity.

Group discussions in the third cycle were more dynamic. Students seemed more able to work together, help each other, and provide input in completing group assignments. Teachers who previously had to actively facilitate discussions now only need to supervise because students have been able to manage discussions independently. This change shows that PBL not only increases the activeness, but also the students' cooperation skills. The Problem Based Learning (PBL) model has a positive impact, which is an increase in terms of activity and learning outcomes of grade V Elementary School students after being implemented. (Paratiwi & Ramadhan, 2023).

Students' confidence in expressing their opinions also increased significantly in the third cycle. If previously many students were hesitant or shy, now they appear more open and enthusiastic about sharing ideas (Ayuninrum & Saputra, 2024). This shows that the PBL method is successful in creating a learning environment that supports and builds student self-confidence.

Overall, the implementation of PBL assisted by audio-visual media has a positive impact on student activity. The gradual process through three cycles shows consistent development in the aspects of asking questions, discussing, and expressing opinions. With

proper guidance from the teacher, this model has succeeded in helping students overcome shyness and lack of confidence, so that they are more active in participating in learning. These results also emphasize the importance of using relevant media to support PBL-based learning. Audio-visual media can make the material more interesting and easier for students to understand. The combination of the PBL approach and interesting media not only increases student activity but also helps them understand the material more deeply and meaningfully.

Discussion

The application of the Problem Based Learning (PBL) model in learning has been proven to have a significant impact on increasing student activity, especially in learning the human respiratory system. In the first cycle, the results showed that student activity was still low. Most students felt less confident in asking questions and expressing opinions (Sari & Rosidah, 2023). This is due to the lack of students' understanding of the PBL-based learning mechanism, which demands their active participation. By using the PBL model, the potential resulting from this design is that students can think critically, be trained to be disciplined, communicate with groups, be tolerant, responsible and can increase motivation and advance student participation (Halimah et al., 2023). This condition is also consistent with research (Amalia et al., 2024), which states that students need time to adapt to new learning methods.

The main obstacle in the first cycle is students' dependence on teachers or friends in completing assignments. Some students tend to wait for directions, so group discussions are less effective. According to research (Parikesit & Damiyanti, 2020) students' lack of initial understanding of the problem-based learning flow can hinder their activeness.

Teachers play an important role in providing motivation and guidance so that students can participate more actively. Improvements began to be seen in the second cycle, where student activeness increased significantly. The percentage of students asking questions increased from 48% to 72%, while participation in discussions reached 80%. This shows that students are beginning to understand the working patterns of the PBL model. The use of audio-visual media in learning helps students understand the material more easily, so they feel confident to ask questions and discuss. The audio-visual media can increase student engagement in learning.

The audio-visual media used in the second cycle proved effective in attracting students' attention. Visualization of material about the human respiratory system made it easier for students to understand complex concepts. Thus, students were not only more active in asking questions but were also able to make more meaningful contributions in group discussions. This success strengthens research by Suhartini (2024), which emphasizes the importance of interactive learning media in increasing student activity. In the third cycle, the results of the study showed a very significant increase in student activity. As many as 88% of students actively asked questions, 92% participated in discussions, and 80% expressed their opinions. This increase shows that students have fully understood the PBL-based learning flow and are able to contribute independently. They also seem more confident in expressing their opinions, although previously many were still shy or hesitant.

Group discussions in the third cycle were more dynamic and productive. Students began to help each other in completing assignments and providing input to their friends. The teacher who was previously active in guiding the discussion, now only plays a role as a facilitator or observer. This shows that students have developed the collaborative skills needed in the PBL model, as explained in the study. In the learning process, student understanding is the ability of students to define something and master it by understanding its meaning (Ikstanti & Yulianti, 2023).

Students' self-confidence also increased as the research progressed. If in the first cycle many students were reluctant to express their opinions, in the third cycle most students were brave enough to speak and express their ideas. This result is in line with research conducted by Halimah et al. (2023) mentioned that the PBL model provides space for students to improve their courage and communication skills.

Overall, the results of the study showed that the PBL model assisted by audio-visual media not only increased student activity, but also improved the overall quality of learning. With a structured and relevant approach, students are able to understand the material more deeply, as well as develop critical and analytical thinking skills (Sulistiana, 2022).

This success also emphasizes the importance of the teacher's role in providing clear direction during the learning process. Teachers who act as facilitators can create a conducive learning atmosphere, so that students are more motivated to learn. In the context of this study, consistent teacher guidance helps students overcome fear and build self-confidence. In problem-based learning, the learning process is given top priority, and the teacher's job is to help students develop self-direction skills (Andini et al., 2023).

Thus, it can be concluded that the application of the PBL model assisted by audio-visual media is an effective

strategy to increase student activity. This approach can be widely implemented in various subjects, especially in materials that require in-depth understanding and critical thinking skills.

Conclusion

This study shows that the application of the Problem Based Learning (PBL) model assisted by audio-visual media significantly increases student activity in learning the human respiratory system. Through three cycles, student activity in the aspects of asking questions, discussing, and expressing opinions has increased gradually. In the first cycle, student activity was still low due to adaptation to the new method, but began to increase in the second cycle with teacher guidance and the use of audio-visual media. At its peak in the third cycle, student activity reached a high category with students who were more independent and confident. This success shows that the PBL model combined with audio-visual media is effective in creating interactive, interesting, and meaningful learning. In addition to increasing activity, this approach also helps students understand the material more deeply and develop critical thinking and collaboration skills. Therefore, this model can be a recommended alternative in learning, especially for conceptual and complex materials.

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References

Adiilah, I. I., & Haryanti, Y. D. (2023). Pengaruh Model Problem Based Learning Terhadap Kemampuan Berpikir Kreatif Siswa Pada Pembelajaran IPA. *Papanda Journal Of Mathematics And Science Research*, *2*(1), 49–56. https://doi.org/10.56916/pjmsr.v2i1.306

Amalia, R., Arjudin, A., & Astria, F. P. (2024). Pengaruh Model Pembelajaran Problem Based Learning Terhadap Kemampuan Berpikir Kritis Pada Pembelajaran IPA Siswa Kelas IV SDN 07 Woja Kabupaten Dompu. *Jurnal Ilmiah Profesi Pendidikan*, *9*(1), 18–27. https://doi.org/10.29303/jipp.v9i1.1992

Andini P., Suardika, I. K., Muhamad Abas, & Uge, S. (2023). Penerapan Model Pembelajaran Problem Based Learning (Pbl) Untuk Meningkatkan Hasil Belajar Siswa Di Kelas IV SD. *Jurnal Ilmiah Pembelajaran Sekolah Dasar*, *5*(1), 50–59. https://doi.org/10.36709/jipsd.v5i1.8

Arianatasari, A. (2019). Penerapan Desain Model Pjbl Pada Pengembangan Buku Teks Berbasis Guided Inquiry. *Jurnal Pendidikan Akuntansi*, *6*(1), 36–40. Retrieved from https://jurnalmahasiswa.unesa.ac.id/index.php/35/article/view/24947/22854

Arikunto, S., Suharjono, & Supardi. (2018). *Penelitian Tindakan Kelas: Edisi Revisi*. Jakarta: Bumi Aksara.

Asmedy. (2021). Pengaruh Model Pembelajaran Kooperatif Tipe STAD Terhadap Hasil Belajar Siswa Sekolah Dasar. *Ainara Journal (Jurnal Penelitian Dan PKM Bidang Ilmu Pendidikan)*, *2*(2), 108–113. https://doi.org/10.54371/ainj.v2i2.41

Astuti, Y. P., & Jamilah, J. (2024). Penerapan Model Cooperative Learning dengan Teknik Two Stay Two Stray dalam Pembelajaran Ipas di Sekolah Dasar. *Jurnal Pendidikan Guru Sekolah Dasar*, *1*(3), 8-8. https://doi.org/10.47134/pgsd.v1i3.246

Atminingsih, D., Wijayanti, A., & Ardiyanto, A. (2019). Keefektifan Model Pembelajaran PBL Media Audio Visual Terhadap Hasil Belajar IPA Kelas III SDN Baturagung. *Mimbar PGSD Undiksha, 7*(2). https://doi.org/10.23887/jjpgsd.v7i2.17560

Ayuninrum, Y. S., & Saputra, H. J. (2024). Penerapan Model Pembelajaran Project Based Learning (PJBL) Terhadap Keterampilan Pemecahan Masalah Pada Pembelajaran IPAS. *INNOVATIVE: Journal Of Social Science Research*, *4*(2), 6960–6969. https://doi.org/10.31004/innovative.v4i2.10062

Dewi, W. S., Siregar, R., Putra, A., & Hidayati, H. (2023). Effect Of Problem-Based Learning Model On Students' Physics Problem Solving Ability: A Meta-Analysis. *Jurnal Penelitian Pendidikan IPA*, *9*(4), 2103–2109. https://doi.org/10.29303/jppipa.v9i4.3291

Gusteti, M. U., & Neviyarni. (2022). Pembelajaran

Berdiferensiasi Pada Pembelajaran Matematika Di Kurikulum Merdeka. *Lebesgue: Jurnal Ilmiah Pendidikan Matematika, Matematika Dan Statistika*, *3*(3), 636–646. https:/doi.org/10.46306/lb.v3i3.180

Halimah, S., Usman, H., & Maryam, S. (2023). Peningkatkan Kemampuan Berpikir Kritis Dalam Pembelajaran IPA Melalui Penerapan Model Pembelajaran Problem-Based Learning (PBL) Di Sekolah Dasar. *JSIM: Jurnal Ilmu Sosial Dan Pendidikan*, *3*(6). https://doi.org/10.36418/syntax-imperatif.v3i6.207

Ikstanti, V. M., & Yulianti, Y. (2023). Pengaruh Model Pembelajaran Problem Based Learning (PBL) Terhadap Pemahaman Konsep IPA Siswa. *Papanda Journal Of Mathematics And Science Research*, *2*(1), 40–48. https://doi.org/10.56916/pjmsr.v2i1.303

Janmariando, P., Rio P. N.,, & Radode K. S. (2023). Pengaruh Model Problem Based Learning (Pbl) Terhadap Hasil Belajar Siswa Kelas V Sd Negeri 47 Prabumulih. *Didaktik : Jurnal Ilmiah PGSD STKIP Subang*, *9*(3), 168–177. https://doi.org/10.36989/didaktik.v9i3.1436

Khairani, R., & Aloysius, S. (2023). How Does PBL Brainwriting Method Supplemented With Concept Mapping Effective To Improve Critical Thinking And Problem-Solving Ability? *Jurnal Penelitian Pendidikan IPA*, *9*(3), 1030–1038. https://doi.org/10.29303/jppipa.v9i3.3212

Khairi, A., & Miaz, Y. (2023). Peningkatan Hasil Belajar Peserta Didik Pada Tematik Terpadu Dengan Menggunakan Model PBL Di Kelas IV SD. *E-Jurnal Inovasi Pembelajaran Sekolah Dasar*, *10*(2), 105. https://doi.org/10.24036/e-jipsd.v10i2.10421

Khoirulloh, H., Astra, I. M., & Rahayu, Y. (2024). The Implementation Of Problem Based Learning (PBL) Assisted By Video On Momentum And Impuls Material To Improve Students Critical Thinking Abilities. *Jurnal Penelitian Pendidikan IPA*, *10*(2), 704–713. https://doi.org/10.29303/jppipa.v10i2.6320

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. https://doi.org/10.17509/md.v13i2.9500

Marlina, R., Miaz, Y., & Farida, F. (2025). The Influence Of Project Based Learning LKPD In Improving 21 St Century Skills For Class V Elementary School Students. *Jurnal Penelitian Pendidikan IPA, 11*(1), 634–641. https://doi.org/10.29303/jppipa.v11i1.8972

Pahmi, S., Haryanto, E., & Wulandari, B. A. (2025). The Influence Of The NHT (Numbered Heads Together) Model On Students ' Learning Outcomes In The IPAS Subject. *Jurnal Penelitian Pendidikan IPA*, *11*(2), 531–536. https://doi.org/10.29303/jppipa.v11i2.9228

Paratiwi, T., & Ramadhan, Z. H. (2023). Model Pembelajaran Problem Based Learning Untuk Meningkatkan Aktivitas Dan Hasil Belajar Siswa Pada Pembelajaran IPAS Kelas V Sekolah Dasar. *Journal Of Education Action Research*, *7*(4), 603–610. https://doi.org/10.23887/jear.v7i4.69971

Parikesit, A. A., & Damiyanti, M. (2020). Kecemasan Terhadap Mata Ajar Ilmu Pengetahuan Alam (Ipa) Pada Siswa Sekolah Dasar Dan Menengah. *Manajemen Pendidikan*, *14*(2), 82–90. https://doi.org/10.23917/jmp.v14i2.4387

Putra, A., & Milenia, I. F. (2021). Systematic Literature Review : Media Komik Dalam Pembelajaran Matematika. *MATHEMA JOURNAL*, *3*(1), 30–43. Retrieved from https://shorturl.asia/elCK6

Rahayu. (2021). Pentingnya Pendidikan Karakter Pada Anak Sekolah Dasar Di Era Digital. *Jurnal Pendidikan, Bahasa Dan Budaya*, *1*(1), 83–88. https://doi.org/10.55606/jpbb.v1i1.836

Rahmasari, R. (2019). Application Of Problem Based Learning Model To Increase Science Learning Result Of 4th Grade Student. *Jurnal Pendidikan Guru Sekolah Dasar*, *36*(5). Retrieved from https://shorturl.asia/zE4d9

Samsudin, A., Raharjo, T. J., & Widiasih. (2023). Effectiveness Of Contextual Teaching Learning (CTL) And Problem Based Learning (PBL) Models In Class VI Science Subjects On Creativity And Learning Outcomes. *Jurnal Penelitian Pendidikan IPA*, *9*(11), 9324–9331. https://doi.org/10.29303/jppipa.v9i11.5290

Saragih, N. (2022). Penerapan Model Pembelajaran Problem Based Learning Untuk Meningkatkan Motivasi Belajar Siswa Dalam Sosiologi. *Algebra : Jurnal Pendidikan, Sosial Dan Sains*, *2*(2), 96–105. https://doi.org/10.58432/algebra.v2i2.390

Sari, M., & Rosidah, A. (2023). Implementasi Model Problem Based Learning (PBL) Terhadap Hasil Belajar IPS SD. *Jurnal Ilmiah Pendidik Indonesia*, *2*(1), 8–17. https://doi.org/10.56916/jipi.v2i1.307

Septian, A., Agustina, D., & Maghfirah, D. (2020). Model Pembelajaran Kooperatif Tipe Student Teams Achievement Division (STAD) Untuk Meningkatkan Pemahaman Konsep Matematika. *Mathema Journal*, *2*(2), 10–22. Retrieved from https://core.ac.uk/download/pdf/327261863.pdf

Sinaga, R. (2023). Pengaruh Pendekatan Matematika Realistik Terhadap Hasil Belajar Matematika Siswa. *Algebra : Jurnal Pendidikan, Sosial Dan Sains*,

3(1). https://doi.org/10.58432/algebra.v3i1.834

Suhartini, T. T. (2024). Problem-Based Learning with Gamification-based: Improving Critical Thinking Skills and Indonesian Learning Outcomes for Seventh Graders of SMPN 1 Jatiroto. *Journal of Applied Educational Study*, *1*(1), 25-36. Retrieved from https://journal.planthroper.com/jaes/article/view/16

Sulistiana, I. (2022). Peningkatan Hasil Belajar Siswa Melalui Model Pembelajaran Problem Based Learning (PBL) Pada Mata Pelajaran IPA Kelas IV SDN Blimbing Kabupaten Kediri. *Jurnal Tindakan Kelas*, *2*(2), 127–133. https://doi.org/10.53624/ptk.v2i2.50

Suparsawan, I. K. (2021). Implementasi Pendekatan Saintifik Pada Model Pembelajaran Kooperatif Tipe Stad Untuk Meningkatkan Keaktifan Dan Hasil Belajar Matematika. *Indonesian Journal Of Educational Development*, *1*, 607–620. https://doi.org/10.5281/zenodo.4560676

Wulandari, A., Parenrengi, S., & Tune, I. L. (2023). Penerapan Model Pembelajaran Problem Based Learning Untuk Meningkatkan Motivasi Belajar Siswa Smk. *Jurnal Pendidikan Dan Profesi Keguruan*, *2*(2), 225. https://doi.org/10.59562/progresif.v2i2.30424

Zulvira, R., Neviyarni, N., & Irdamurni, I. (2021). Karakteristik siswa kelas rendah Sekolah Dasar. *Jurnal Pendidikan Tambusai*, *5*(1), 1846-1851. Retrieved from https://shorturl.asia/0qAOo