

PROBLEM-BASED LEARNING IN NATURAL AND SOCIAL SCIENCES (IPAS) AND STUDENTS' CONCEPTUAL UNDERSTANDING

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Abstract

This study was conducted at MIS Al Jihad in Palangka Raya City to examine the effect of the Problem-Based Learning (PBL) model on students' conceptual understanding in the IPAS (Integrated Science and Social Studies) subject. The study employed a pre-experimental method using a one-group pretest-posttest design. The population consisted of all fifth-grade students at MIS Al Jihad, totaling 18 students. The sample included all members of the population and was selected using a saturated sampling technique. Data were analyzed through prerequisite tests and hypothesis testing using a paired-samples t-test. The results showed that the implementation of the PBL model was categorized as very good, with an average score of 91.7. Students' conceptual understanding improved from a mean pretest score of 61.11 to a mean posttest score of 77.78, indicating an increase of 16.67 points. Furthermore, the paired-samples t-test yielded a significance value (Sig. 2-tailed) of 0.000, which was lower than 0.05 ($0.000 < 0.05$). Therefore, the findings demonstrated that the *Problem-Based Learning* (PBL) model had a significant effect on students' conceptual understanding in the IPAS subject at MIS Al Jihad, Palangka Raya.

Keywords

Elementary Education, IPAS, MI Al Jihad, Problem-Based Learning.



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INTRODUCTION

Education plays an important role in helping individuals develop their potential. In addition, education enhances individuals' skills and competencies (Rawiyanti & Budiarti, 2024). Learning in the previous curriculum, particularly in the Merdeka Curriculum, should create an active, creative, and enjoyable learning environment (Rokhaniawati & Nugroho, 2025). Basic education is a fundamental right of Indonesian citizens (Rahmad, 2024). At the elementary level, education provides the foundation of knowledge for further learning. Strengthening knowledge is also supported by government efforts to make learning more meaningful. Learning should develop students' competencies, including the ability to collaborate and work with others.

Furthermore, students should possess critical and creative thinking skills and be able to communicate actively. To become successful learners, students must be competent and skillful in learning, possess literacy skills, and develop life and career skills. To achieve these goals, learning should not merely focus on delivering content but should also stimulate students' thinking through activities that encourage active engagement with their surrounding environment. The Merdeka Curriculum serves as a pedagogical framework that facilitates the development of students' competencies through conceptual integration and reflection in everyday life (Pratiwi et al., 2026). One of the purposes of curriculum reform is to address existing challenges. According to Rahmad et al. (2025), ongoing changes in society have also become a reason for curriculum reform. One of the changes introduced in the curriculum is the integration of subjects, such as the merger of Social Sciences and Natural Sciences into a single subject known as Integrated Science and Social Studies (IPAS).

The IPAS subject at the elementary education level can enhance students' understanding of scientific and social concepts. The success of IPAS learning depends on how effectively students construct an accurate understanding of concepts (Hanami et al., 2025). A pleasant and safe learning environment can significantly increase students' interest in learning (Shafwa & Hikmat, 2023). Furthermore, a learning environment that emphasizes interaction with the surrounding environment can improve the quality of learning. The utilization of the environment and the contextualization of learning materials to students' real-life situations are important processes that make learning more meaningful. Students' analytical skills can develop when learning materials are connected to events and phenomena that occur in their daily lives and the surrounding environment. One of the subjects that facilitates the connection between learning content and real-life situations is

Integrated Science and Social Studies (IPAS). In the learning process, students are not only required to memorize information but also to understand fundamental concepts related to natural phenomena and their surrounding environment.

Furthermore, the significant change resulting from integrating two subjects into a single subject, namely IPAS, has important implications for students. This integration combines social science and natural science disciplines into a unified learning framework. Through this integration, students are expected to develop a comprehensive understanding of the world around them. Therefore, students' understanding of concepts in the IPAS subject is of considerable importance. Such understanding should not be limited to cognitive aspects alone but should also be applied and reflected in everyday life. This is because a sound understanding of concepts contributes to the development of strong cognitive abilities.

Observations conducted in Grade V at MIS Al Jihad in the IPAS subject indicated that students had not yet achieved optimal learning outcomes and continued to experience difficulties in understanding the material. This was reflected in the finding that students' conceptual understanding of the topic "*Sounds Around Me*" yielded an average score of 65.57. This score indicates that several students had not yet met the Minimum Mastery Criterion (KKM) established by the school. Students' difficulties in answering the questions are consistent with the findings of Khabibah & Wahyudi (2023), who reported that students tend to experience challenges in responding to the questions provided.

A positive learning environment can effectively support successful learning activities. Factors such as teacher support and a conducive learning atmosphere are important determinants of learning success (Sulistyowati et al., 2024). Students' difficulties in answering questions indicate that they have not yet fully understood the learning material. Furthermore, their inability to explain the lesson in their own words suggests that they have not yet mastered the concepts learned and still experience difficulties in identifying examples and non-examples of a concept. Therefore, efforts to improve the learning process in the IPAS subject for Grade V students at MIS Al Jihad require an instructional approach that helps students understand the material through more meaningful learning experiences that are closely connected to their daily lives. This can be achieved by selecting an appropriate learning model that aligns with the instructional objectives and learning needs.

Twenty-first-century learning and the implementation of the Merdeka Curriculum present both opportunities and challenges in advancing technology (Ifham Choli et al., 2024). This

development has encouraged efforts to enhance digital literacy in education (Theopilus et al., 2024). The rapid progress of digital technology has made its integration into education increasingly essential (Zhang et al., 2022). One learning model that can promote students' engagement and creativity is Problem-Based Learning (PBL). According to Cinthia et al., (2025), PBL can stimulate the development of students' thinking processes, encourage active participation, improve communication skills, and enhance critical thinking abilities. These competencies are essential for success in both professional and social contexts. Similarly, Masliah (2023) stated that the PBL model can improve students' literacy skills, including numeracy literacy.

Several previous studies have examined the effect of the PBL model supported by video media or the YouTube platform and are considered relevant to the present study. The first study, conducted by Amalia et al. (2022), highlighted improvements in students' communication skills following the implementation of PBL integrated with YouTube media. In addition, Ardiansyah et al. (2024) reported that video-based learning had a positive impact on eighth-grade students' problem-solving abilities. Furthermore, Faiza et al. (2023), through a quasi-experimental study, found that the PBL model assisted by YouTube videos improved the conceptual understanding of eleventh-grade students. These findings indicate that the use of YouTube media can positively influence the learning process. However, these studies were conducted at the junior and senior secondary education levels rather than at the elementary education level.

Carpathia Ellyana carried out another relevant study conducted in an elementary school, and I Carpathia Ellyana & I Made Teguh (2023). However, the study focused on Natural Sciences (IPA) rather than Integrated Science and Social Studies (IPAS), which is the focus of the present research. Another related study by (Pinem & I Nyoman Jampel, 2023), conducted with fifth-grade elementary school students concluded that problem-based instructional videos were highly feasible for educational implementation. Nevertheless, both studies employed Research and Development (R&D) methodologies, which differ from the research design used in the present study. Studies employing a quantitative approach to examine the effect of the PBL model assisted by video media, particularly YouTube videos, remain relatively limited. Therefore, this study is expected to contribute to the existing body of knowledge and serve as a valuable reference for future research in this field.

The novelty of this study lies in integrating the Problem-Based Learning (PBL) model with YouTube media. Research of this nature conducted at the Madrasah Ibtidaiyah (MI) level remains

relatively limited. Although numerous studies have explored similar topics, as discussed previously, most have employed Research and Development (R&D) methodologies. In contrast, this study seeks to examine the effect of implementing the PBL model assisted by YouTube media, making it distinct from previous relevant studies.

The use of YouTube media in teaching the topic *Sounds Around Me* contextualizes the learning materials by connecting them to phenomena that students commonly encounter in their daily lives. The implementation of the PBL model incorporating YouTube into IPAS learning activities has not been widely explored within the Merdeka Curriculum, particularly at the elementary school and Madrasah Ibtidaiyah levels. This consideration motivated the present study, as the application of YouTube media in teaching the topic of sound remains relatively uncommon, especially following curriculum changes that introduced integrated subjects such as IPAS.

Effective learning is one of the key strategies employed by teachers to maximize students' potential. Contextual and problem-based learning approaches can also encourage greater student engagement and participation. Therefore, this study is expected to contribute to improving the quality of learning among students at MIS Al Jihad Palangka Raya. Research on the implementation of PBL in elementary schools or Madrasah Ibtidaiyah within Palangka Raya is still relatively limited. Consequently, this study has the potential to produce a scientific publication that may serve as a valuable reference for implementing the PBL model within the Merdeka Curriculum in Madrasah Ibtidaiyah, particularly in Palangka Raya.

METHOD

This study was conducted during the second semester of the 2025/2026 academic year. The research employed a pre-experimental method using a one-group pretest–posttest design. In this design, students were administered a pretest before receiving the treatment. The pretest was intended to determine the students' initial condition, allowing the effect of the treatment to be measured more accurately by comparing results before and after the intervention. The study was conducted at MIS Al Jihad Palangka Raya. The population consisted of all fifth-grade students at MIS Al Jihad, which comprised only one class. The total number of students in Grade V was 18, and all of them were selected as the research sample. The sampling technique used was saturated sampling, in which all members of the population were included as research participants. The fifth-grade class was designated as the experimental group and received the treatment in the form of the

Problem-Based Learning (PBL) model.

The study involved all 18 fifth-grade students of MIS Al Jihad Palangka Raya as research participants. Before it was used as a data collection instrument, the research instrument underwent a testing process to ensure its quality. The instrument trial was conducted at MIS Nahdlatul Ulama Palangka Raya. Instrument quality was assessed through validity and reliability testing. Validity testing was carried out using correlation analysis to determine the extent to which the instrument accurately measured the intended constructs.

In contrast, reliability testing was conducted to ensure the consistency of the measurement results. In addition, a normality test was performed as a prerequisite for data analysis. This test aimed to determine whether the collected data were normally distributed and therefore suitable for further statistical analysis. Data were collected through classroom observations and multiple-choice tests. Both techniques were employed to obtain information regarding students' learning outcomes and levels of conceptual understanding following the implementation of the *Problem-Based Learning* (PBL) model in the learning process.

Data collection in this study was carried out using two instruments. The first instrument was a teacher observation sheet completed by the researcher and an assisting observer. The second instrument consisted of 16 multiple-choice test items. The observation sheet was developed based on the syntax of the Problem-Based Learning (PBL) model used in this study. The orientation stage, as the first step of the PBL process, was conducted by comparing sounds in an empty room with sounds in a room containing various objects and asking students why the sounds differed. YouTube was utilized as a learning medium to provide a more concrete representation of the problem. In the second stage, students were organized into small groups to facilitate collaborative learning. The third stage involved guiding students in conducting investigations through simple activities that could be found in their surrounding environment. One of the activities required students to blow into bottles containing different volumes of water and observe the resulting sounds. After completing the investigation, students proceeded to the fourth stage, which involved preparing and presenting their findings in the form of a report. Finally, students engaged in the fifth stage, namely analyzing and evaluating the outcomes of the activities, intending to develop their evaluative thinking skills.

The primary focus of this study was to test the proposed research hypotheses. Two hypotheses were examined: the null hypothesis and the alternative hypothesis. The null hypothesis

(H₀) stated that implementing the *Problem-Based Learning* (PBL) model did not significantly affect fifth-grade students' understanding of the IPAS subject at MIS Al Jihad. In contrast, the alternative hypothesis (H_a) stated that the implementation of the *Problem-Based Learning* (PBL) model had a significant effect on students' understanding in the IPAS subject at the same grade level.

FINDINGS AND DISCUSSION

Findings

Previous scholars have widely researched the Problem-Based Learning (PBL) model. However, studies that integrate YouTube media with the topic "*Sounds Around Me*" remain limited, and to the best of our knowledge, are very rare. Moreover, we have not identified any studies examining the implementation of PBL on the topic of sound within the context of the Merdeka Curriculum. This makes the present study particularly interesting, as it provides students with conceptual understanding related to sound phenomena that they encounter in their daily lives. Such an approach is expected to make students' conceptual knowledge of sound more contextualized and concrete.

The validity test in this study was conducted through an instrument trial at a different madrasah. The trial was carried out at MIS Nahdlatul Ulama because Grade V at MIS Al Jihad consisted of only one class. Consequently, the Grade V students at MIS Al Jihad could not be used for instrument testing, as they constituted the research population. In other words, the instrument trial could not be conducted in the same class that served as the research sample. The validity testing was intended to ensure that the instrument used in this study was both accurate and appropriate for measuring the intended constructs.

The results of the instrument trial were analyzed by comparing the obtained r_{xy} values with the critical r -table values at a 5% significance level. If r_{xy} was greater than the r -table value, the item was considered valid. Conversely, if r_{xy} was lower than the r -table value, the item was regarded as invalid. Furthermore, items with correlation coefficients below 0.40 were considered insufficiently valid and therefore required revision or replacement.

Validity analysis was performed using SPSS version 26. The criterion established in this study was that items with correlation coefficients greater than 0.45 were considered valid. A total of 25 test items were piloted using a significance level of 5% (0.05). The correlation coefficient of each item was compared with the corresponding r -table value. If the correlation coefficient exceeded the

r -table value, the item was declared valid. However, if the correlation coefficient was lower than the r -table value, the item was classified as invalid.

The results of the validity test indicated that 16 test items were valid, as their correlation coefficients exceeded the r -table value. The valid items were numbers 1, 2, 4, 6, 9, 10, 12, 13, 14, 15, 17, 19, 20, 23, 24, and 25. In contrast, 9 items were found to be invalid because their correlation coefficients were lower than the r -table value. The invalid items were numbers 3, 5, 7, 8, 11, 16, 18, 21, and 22.

As a result, the 16 valid items were retained and used as research instruments in this study, whereas the 9 invalid items were excluded from further use. This decision was made because the invalid items did not meet the established validity criteria. A detailed summary of the valid and invalid test items is presented in Table 1.

Table 1. Results of the Item Validity Test.

Items	Coefficient of correlation	Correlation	Decision
1	0,45	0.500	Valid
2	0,45	0.562	Valid
3	0,45	0.219	Invalid
4	0,45	0.605	Valid
5	0,45	0.220	Invalid
6	0,45	0.464	Valid
7	0,45	0.507	Invalid
8	0,45	0.218	Invalid
9	0,45	0.555	Valid
10	0,45	0.498	Valid
11	0,45	0.426	Invalid
12	0,45	0.646	Valid
13	0,45	0.659	Valid
14	0,45	0.478	Valid
15	0,45	0.479	Valid
16	0,45	0.016	Invalid
17	0,45	0.453	Valid
18	0,45	0.256	Invalid
19	0,45	0.585	Valid
20	0,45	0.605	Valid
21	0,45	0.167	Invalid
22	0,45	0.019	Invalid
23	0,45	0.615	Valid
24	0,45	0.637	Valid
25	0,45	0.486	Valid

Source: processed data.

Of the 25 test items administered, a significance level of 5% (0.05) was applied, resulting in an r -table value of 0.4438. Based on the criteria established by Arikunto (2016), a coefficient of 0.40 was used as the minimum threshold for acceptable validity. Accordingly, this value was adopted as the lower limit for determining whether an instrument was suitable for use in the study.

Following the validity testing and the identification of valid items, a reliability test was conducted. This procedure was intended to ensure that the validated instrument also demonstrated consistency in measurement. The reliability coefficient was expected to fall within the range of 0.400–1.000, with the obtained coefficient indicating the instrument's reliability. The assumption applied was that if the calculated r value exceeded the r -table value, the instrument could be considered reliable.

The results of the reliability analysis showed a Cronbach's Alpha coefficient of 0.860 for the 16 valid items. This value falls within the range of $0.800 < r_{11} \leq 1.000$, indicating a very high level of reliability. Therefore, it can be concluded that the instrument used in this study possesses excellent reliability and is appropriate for use as a data collection instrument. The detailed results of the reliability test are presented in Table 2 below.

Table 2. Instrument Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.860	16

The reliability analysis produced a Cronbach's Alpha coefficient of 0.860, based on the 16 test items selected as the research instrument. This coefficient falls within the range of $0.800 < r_{11} \leq 1.000$, indicating a very high level of reliability. Therefore, it can be concluded that the instrument used in this study possesses excellent internal consistency and a very high degree of reliability. As a result, the instrument can be considered reliable and highly suitable for use in this research. Furthermore, it is appropriate for measuring students' learning outcomes within the context of the study.

The next procedure conducted was the normality test. This test examined whether the data collected in this study followed a normal distribution. The normality test selected for this research was the Shapiro–Wilk test, as it is considered appropriate for studies involving a relatively small sample size. Accordingly, the Shapiro–Wilk test was deemed suitable for the sample used in this study. The results of the Shapiro–Wilk normality test are presented in Table 3 below.

Table 3. Normality Test Results

	Shapiro-Wilk		
	Statistic	df	Sig.
Concept Understanding (Pretest)	.935	18	.238
Concept Understanding (Posttest)	.966	18	.712

The normality test in this study was conducted using the Shapiro–Wilk method. The results presented in the *Tests of Normality* table indicate that the significance value (*Sig.*) for students' conceptual understanding before the treatment (*pretest*) was 0.238, while the significance value for the data after the treatment (*posttest*) was 0.712. Both values exceed the predetermined significance level of 0.05. Based on these results, it can be concluded that the conceptual understanding data from both the *pretest* and *posttest* satisfy the assumption of normality. This finding indicates that the research data were drawn from a normally distributed population and therefore meet the decision criterion for the normality test, namely a significance value greater than 0.05. Since the normality assumption was fulfilled, the data were subsequently analyzed using parametric statistical techniques. Accordingly, a *Paired Sample t-Test* was employed to determine whether there was a significant difference between the *pretest* and *posttest* results.

The selection of IPAS as the subject of this study was based on its role as one of the innovations introduced within the curriculum. This development aims to ensure that students not only understand concepts theoretically but are also able to relate those concepts to their surrounding environment, thereby making learning more meaningful. However, implementing IPAS as an integrated subject also presents certain challenges. In practice, science and social studies are often taught separately by teachers. Teachers may face this situation when they struggle to integrate concepts from science and social studies. Collaborative instructional approaches can address these challenges by facilitating meaningful connections between content from both disciplines. As widely recognized, learning approaches that connect instructional content with real-world environmental contexts can enhance students' understanding, particularly at the elementary education level.

Table 4. Summary of Pretest and Posttest Scores.

No	Initial	Pretest	Posttest
1.	AN	68,75	81,25
2.	ASC	62,5	75
3.	APT	37,5	68,75
4.	DEM	43,75	56,25
5.	DMA	37,5	68,75
6.	GAP	50	62,5
7.	HJA	75	87,5
8.	KARA	81,25	93,75
9.	MAMH	75	87,5
10.	MFCT	87,5	100
11.	MRR	68,75	81,25
12.	MUS	50	68,75
13.	NAM	62,5	75
14.	RJ	50	75
15.	SAN	81,25	87,5

16.	SI	75	93,75
17.	TLKR	75	87,5
18	TDM	18,75	50

The data presented in Table 4 clearly indicate an improvement in students' learning outcomes following the implementation of the Problem-Based Learning (PBL) model. This finding is consistent with the study by Wahyujati et al. (2026), which reported that the PBL model is effective in enhancing students' conceptual understanding and improving learning outcomes. Such improvements are particularly evident when supported by a conducive learning environment and adequate educational resources.

The analysis results indicate that implementing the *Problem-Based Learning* (PBL) model significantly affected fifth-grade students' conceptual understanding of IPAS at MIS Al Jihad. This conclusion is supported by the hypothesis testing results, which revealed a significance value of 0.000, lower than the established significance level of 0.05. Therefore, the decision criterion was met, indicating that the alternative hypothesis (H_a) was accepted and the null hypothesis (H_0) was rejected. These findings indicate a statistically significant difference in Grade V students' understanding of IPAS concepts following the implementation of the *Problem-Based Learning* (PBL) model at MIS Al Jihad. Table 5 presents the detailed results of the hypothesis testing.

Table 5. Paired Samples t-Test Results.

		Paired Samples Test					t	df	Sig. (2-tailed)
		Paired Differences							
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	Pretest - Posttest	-16.66667	7.72934	1.82182	-20.51038	-12.82296	-9.148	17	.000

Based on the statistical data presented above, the implementation of the learning model was successful, as evidenced by the improvement in posttest scores. This finding is consistent with the study by (Papilaya & Tuapattinaya, 2025), which reported a significant improvement in students' learning outcomes through the use of Problem-Based Learning. The improvement observed in the present study cannot be separated from the successful implementation of the PBL model, which had previously been evaluated as very good, with an average implementation score of 91.67%. The effective implementation of the model encouraged students to become more active, motivated, and directly engaged in the learning process. In addition to the use of the PBL model, the incorporation of YouTube as an audiovisual learning medium also contributed substantially to the learning

outcomes achieved in this study.

Discussion

An enjoyable learning process can motivate students to engage more actively in learning. According to (Kollmuss & Agyeman, 2002), motivation encourages individuals to perform activities effectively. Students' positive attitudes toward learning may be influenced by the learning model employed, as it can stimulate their curiosity and interest in the subject matter. In addition, students are expected to develop stronger critical thinking skills. Therefore, after the completion of the learning process, a *posttest* was administered to measure the improvement in students' conceptual understanding of the topic "*Sounds Around Me.*" The *posttest* consisted of items similar to those used in the *pretest* and maintained an equivalent level of difficulty.

Based on the results, the mean *posttest* score increased to 77.78, with the lowest score being 50 and the highest score being 100. These findings indicate an improvement in students' conceptual understanding of the topic, as the average score increased from 61.11 on the *pretest* to 77.78 on the *posttest*. The difference of 16.67 points between the mean *pretest* and *posttest* scores suggests that there was an improvement in students' conceptual understanding of the IPAS subject in Grade V at MIS Al Jihad following the implementation of the PBL model.

The PBL model enhances students' critical thinking skills and improves their ability to work collaboratively in groups (Adenti & Puspita, 2025). Statistical analysis using the *Paired Sample t-Test* revealed a significance value (*Sig. 2-tailed*) of 0.000, which was lower than the significance level of 0.05, and a calculated *t*-value of -9.148. Since the significance value was less than 0.05 ($0.000 < 0.05$), these results indicate a statistically significant difference between the students' *pretest* and *posttest* scores. The mean difference of -16.67 indicates that the average *posttest* score was higher than the average *pretest* score.

Based on the proposed hypothesis, the researcher accepts the alternative hypothesis (H_a) when the significance value is less than 0.05 or when the absolute calculated *t*-value exceeds the critical *t*-value. In this study, the significance value was lower than 0.05 ($0.000 < 0.05$). Therefore, the results indicate that the *Problem-Based Learning* (PBL) model had a significant effect on fifth-grade students' conceptual understanding of IPAS at MIS Al Jihad.

The IPAS subject represents one of the curriculum innovations introduced through the Merdeka Curriculum. This subject focuses on the study of natural phenomena, the relationships among various components, and the cause-and-effect interactions that occur within the surrounding

environment. Through IPAS learning, students are expected to develop critical thinking skills, problem-solving abilities, and the capacity to construct knowledge independently. However, the learning process cannot achieve these objectives optimally when teachers rely solely on conventional instructional methods. Therefore, teachers need to implement more innovative and student-centered learning models. One model that can support the achievement of these objectives is *Problem-Based Learning* (PBL).

Numerous studies have demonstrated the effectiveness of the PBL model in improving the quality of learning. Research conducted by Safitri et al. (2024) found that implementing PBL enhanced students' critical thinking skills. In addition, Amiruddin et al. (2024) reported that the model contributed to improvements in students' analytical abilities and classroom engagement. Similar findings were reported by Oktariani et al. (2025), who concluded that the use of PBL increased both students' learning activities and numeracy skills.

The findings of the present study support these previous results. The learning implementation rate reflected the successful implementation of the PBL model and averaged 91.67%, which was categorized as *very good*. This high level of implementation indicates that teachers carried out each stage of the PBL model according to the planned instructional procedures. As a result, students participated more actively in the learning process, demonstrated higher learning motivation, and engaged directly in problem-solving activities throughout the instructional sessions.

To examine the effect of the PBL model on students' understanding, this study employed a *Paired Sample t-Test*, a statistical technique used to compare scores obtained before the treatment (*pretest*) and after the treatment (*posttest*). The analysis yielded a calculated *t*-value of -9.148 with 17 degrees of freedom (*df*) and a significance value (*Sig. 2-tailed*) of 0.000. Since the significance value was lower than the established significance level of 0.05, the results indicate a statistically significant difference between the *pretest* and *posttest* scores. Furthermore, the mean difference of -16.67 indicates that the students achieved a higher average score on the *posttest* than on the *pretest*. Therefore, the results indicate that implementing the *Problem-Based Learning* (PBL) model had a positive and significant effect on improving students' understanding of the IPAS subject.

The successful implementation of the PBL model also provides substantial opportunities for interaction and collaboration among students. It encourages discussion and collective problem-solving activities (Supriyanti et al., 2025) (Supriyanti et al., 2025). A supportive learning environment

can further enhance students' willingness and motivation to learn (Yilmaz Kurt et al., 2025). The PBL model creates valuable opportunities for establishing a learning ecosystem that fosters students' potential throughout the learning process. Through this approach, students are encouraged to develop problem-solving skills, engage in deeper analysis, and identify relevant and reliable information (Sulaiman et al., 2025).

In this study, the topic "Sounds Around Me" was connected to students' real-life experiences and everyday situations. The learning process was also supported by YouTube, a freely accessible digital platform. Through this medium, students were able to learn visually and contextually, enabling them to understand the concepts related to sound more effectively and meaningfully.

Learning activities that incorporate digital elements have also been shown to increase students' motivation to learn (Salazar et al., 2024). The PBL model serves as an instructional approach that helps students become effective problem-solvers while fostering initiative and responsibility (Surtikawati et al., 2022). The results of the "pretest" and "posttest" demonstrated a significant improvement in students' conceptual understanding. Learning experiences that connect academic content with authentic situations, supported by interactive digital media, enable students to understand, retain, and apply concepts more effectively in their daily lives. Furthermore, implementing meaningful learning practices can substantially improve the quality of education (Puspitasari et al., 2024). Educational reforms continue to promote positive transformation, particularly at the elementary education level (Gürhan, 2026).

The selection of appropriate instructional models and engaging learning media can significantly influence students' enthusiasm and motivation to learn. This effect becomes even stronger when supported by digital learning media that capture students' attention (Salmah et al., 2025). In today's educational context, digital literacy skills are increasingly important and should be integrated into the teaching and learning process. The use of digital technologies in education can broaden students' access to learning materials and resources. Existing learning resources become even more engaging when integrated with digital instructional materials. In this study, the use of YouTube served as one strategy for incorporating digital technology into the learning process.

The use of digital media also supported the successful implementation of the PBL model in this study. The teacher used YouTube to present learning materials on the topic "*Sounds Around Me*," allowing all students to listen to and observe examples of sound phenomena. This approach made the learning content more concrete and accessible. The use of video-based materials contributed to

a more engaging and enjoyable learning experience. Furthermore, YouTube as a learning medium attracted students' attention and increased their interest in the instructional content. Therefore, the use of YouTube proved to be an appropriate and effective choice for supporting the learning process in this study.

The rapid advancement of technology and the increasing flow of information have also influenced educational practices. Contemporary learners face various challenges associated with an increasingly complex and dynamic world. Essential competencies for the twenty-first century include collaboration, communication, creativity, critical thinking, information literacy, problem-solving skills, and socio-emotional abilities. These competencies should be cultivated from an early age, particularly through learning experiences at the elementary education level. The findings of this study further emphasize the importance of selecting appropriate instructional models to enhance students' learning potential and support the development of these essential competencies.

CONCLUSION

Based on the observation results, the implementation of IPAS learning using the *Problem-Based Learning* (PBL) model achieved 91.67%, which falls within the *very good* category. This high level of implementation indicates that each stage of the learning process was carried out in accordance with the planned instructional design. The effective implementation of the PBL model provided students with greater opportunities to actively participate in the learning process, which contributed to improvements in both learning outcomes and conceptual understanding. The effect of the PBL model on students' conceptual understanding can be observed through the comparison of the *pretest* and *posttest* results. Before the implementation of the PBL model, the average level of students' conceptual understanding was 61.11%. Following the intervention, the average score increased to 77.78%. These results indicate an improvement of 16.67 points between the mean *pretest* and *posttest* scores.

These findings were further supported by the results of the hypothesis testing using the *Paired Sample t-Test*. The analysis yielded a calculated *t*-value of -9.148 with 17 degrees of freedom (*df*) and a significance value (*Sig. 2-tailed*) of 0.000. Since the significance value fell below 0.05, the analysis demonstrated a statistically significant difference between the *pretest* and *posttest* scores. The mean difference of -16.67 indicates that the average *posttest* score was higher than the average *pretest* score. Based on the observation findings and statistical analysis, the implementation of the

Problem-Based Learning (PBL) model significantly improved fifth-grade students' conceptual understanding in the IPAS subject at MIS Al Jihad. In other words, the use of the PBL model proved effective in enhancing students' conceptual understanding throughout the learning process.

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