

Improving Students' Learning Outcomes in Science and Social Studies Using a Deep Learning Approach with Problem Based Learning (PBL) Model in Grade IV at SD Negeri 17 Gunung Pangilun, Padang

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ABSTRACT

Science and Social Studies (IPAS) learning in elementary schools still faces challenges because classroom instruction remains teacher-centered and provides limited opportunities for students to develop critical thinking and problem-solving skills. Consequently, many students experience low learning outcomes and limited engagement during classroom activities.

This study aimed to improve fourth-grade students' learning outcomes in IPAS through the implementation of a Deep Learning approach integrated with the Problem-Based Learning (PBL) model. This classroom action research employed qualitative and quantitative approaches and was conducted in two cycles consisting of planning, action, observation, and reflection. The participants were 18 fourth-grade students at SD Negeri 17 Gunung Pangilun, Padang. Data were collected through observation, interviews, documentation, and learning achievement tests. The findings indicated continuous improvement in learning quality. Teaching module assessment increased from 83.33% to 95.83%, while students' average learning outcomes improved from 58.47 in Cycle I Meeting I to 73.61 in Cycle I Meeting II and reached 86.88 in Cycle II. These findings indicate that integrating the Deep Learning approach with the Problem-Based Learning model effectively improves students' learning outcomes in IPAS.

Informasi Artikel

Kata Kunci:

Deep Learning;
Problem Based Learning;
Hasil belajar;
IPAS;
Penelitian Tindakan Kelas;

ABSTRAK

Penelitian ini dilatarbelakangi oleh rendahnya hasil belajar peserta didik pada pembelajaran Ilmu Pengetahuan Alam dan Sosial (IPAS) di kelas IV SD Negeri 17 Gunung Pangilun Kota Padang. Kondisi tersebut disebabkan oleh pembelajaran yang masih berpusat pada guru, rendahnya keterlibatan peserta didik, serta belum optimalnya penerapan model pembelajaran yang mendorong kemampuan berpikir kritis. Penelitian ini bertujuan untuk meningkatkan hasil belajar IPAS melalui penerapan pendekatan Deep Learning dengan model Problem Based Learning (PBL). Penelitian menggunakan metode Penelitian Tindakan Kelas (PTK) dengan pendekatan kualitatif dan kuantitatif yang dilaksanakan dalam dua siklus. Setiap siklus meliputi tahap perencanaan, pelaksanaan tindakan, observasi, dan refleksi. Subjek penelitian berjumlah 18 peserta didik kelas IV. Data dikumpulkan melalui observasi, wawancara, dokumentasi, dan tes hasil belajar. Hasil penelitian menunjukkan adanya peningkatan kualitas pembelajaran, terlihat dari peningkatan penilaian modul ajar dari 83,33% menjadi 95,83%. Rata-rata hasil belajar peserta didik meningkat dari 58,47 pada siklus I pertemuan I menjadi 73,61 pada pertemuan II dan mencapai 86,88 pada siklus II. Dengan demikian, pendekatan Deep Learning dengan model Problem Based Learning efektif meningkatkan hasil belajar IPAS peserta didik.

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1. Introduction

The curriculum is a set of plans and arrangements regarding the objectives, content, and learning process that serve as guidelines in the implementation of education. The curriculum is prepared to support the achievement of national education goals, which is to form Indonesian people who have faith, piety, noble character, knowledge, creativity, independence, and responsibility as citizens as mandated in Law Number 20 of 2003. Therefore, the curriculum has an important role in developing the potential of students optimally as the next generation of the nation and supporting the development of national education (Wahyuni et al., 2025)

Along with the times and the needs of students, the government implements the Independent Curriculum as an effort to create more flexible, meaningful, and student-centered learning. The Independent Curriculum provides flexibility for teachers to adjust learning strategies, models, and media according to the characteristics of students. Through this curriculum, students have the opportunity to learn more actively through real experiences, exploration, and contextual learning so that the learning process becomes more relevant to daily life (Farida & Astaty, 2024)

One of the updates in the Independent Curriculum is the integration of Natural Sciences (IPA) and Social Sciences (IPS) subjects into Natural and Social Sciences (IPAS). Social studies learning aims to provide an integrated understanding of natural and social phenomena that occur in the environment around students. Through science learning, students are expected to be able to develop scientific and social literacy, logical thinking skills, and the ability to understand cause-and-effect relationships in daily life (Yanti et al., 2026)

However, the implementation of social studies learning in elementary schools still faces various challenges. Internal factors in the form of low learning motivation, interest in learning, and students' ability to concentrate are often obstacles in achieving learning goals. In addition, external factors such as a less supportive learning environment and the use of less varied learning strategies also affect the low involvement of students in the learning process (Putu et al., 2025)

Based on the results of observations and interviews conducted on October 22-24, 2025 in grade IV of SDN 17 Gunung Pangilun, Padang City, several problems were found in learning IPAS. From

the teacher's aspect, learning is still dominated by teachers' explanations, lacks the use of perception, has not implemented varied learning strategies, and has not provided opportunities for students to conclude learning materials. From the aspect of students, it was found that there was low participation in question and answer activities, lack of motivation to learn, quickly feeling bored, and low ability to think critically and understand concepts in depth. This condition shows that learning is still teacher-centered so that students are less actively involved in the learning process.

These problems have an impact on the low learning outcomes of students. Mid-Semester Test (UTS) score data for the IPAS subject for the first semester of the 2025/2026 Academic Year shows that out of 18 students in grade IV, only 7 students (38%) have achieved the Learning Goal Achievement Criteria (KKTP) of 80, while 11 students (61%) have not achieved completeness. The average class score only reached 75.72, which shows that the students' IPAS learning outcomes are still below the target set by the school.

One of the alternative solutions that can be applied to overcome these problems is the use of a Deep Learning approach combined with the Problem Based Learning (PBL) model. The Deep Learning approach emphasizes in-depth understanding of concepts, the interconnectedness between concepts, and the ability to apply knowledge in real life so that students not only memorize the material, but also understand its meaning in its entirety (Desryandri & Hadi, 2026) Meanwhile, the PBL model presents contextual problems as a learning trigger that encourages students to think critically, collaborate, discuss, and find solutions independently (Uki & Ekayanti Arta, 2021). The integration of these two approaches is believed to be able to create more meaningful and student-centered (UBM et al., 2025).

The effectiveness of the Deep Learning approach and the PBL model has been supported by various previous studies. (Hamimah et al., 2026) shows that the application of Deep Learning is able to increase the completeness of the learning outcomes of IPAS elementary school students from cycle I to cycle II. Research by (Putri et al., 2026) also found that Deep Learning learning has a significant influence on improving social studies learning outcomes compared to control classes. In addition, research by (Arwin & Ramzil, 2024) proves that the Problem Based Learning model is effective in increasing students' activeness and

learning outcomes in IPAS learning. Based on the problems and results of the previous research, this study was conducted to examine the application of the Deep Learning approach through the Problem Based Learning (PBL) model in improving the learning outcomes of social studies of grade IV students of SDN 17 Gunung Pangilun, Padang City.

2. Method

2.1 Research Design

This study employed a Classroom Action Research (CAR) design using qualitative and quantitative approaches. The qualitative approach was used to describe and analyze the learning process, while the quantitative approach was used to measure students' learning outcomes. The study was conducted in two cycles, with each cycle consisting of four stages: planning, action, observation, and reflection. The research focused on implementing the Deep Learning approach integrated with the Problem Based Learning (PBL) model to improve fourth-grade students' learning outcomes in IPAS.

2.2 Data Sources

The research was conducted at SDN 17 Gunung Pangilun, Padang City, during the second semester of the 2025/2026 academic year. The subjects of the study were 18 fourth-grade students, consisting of 9 male and 9 female students. Data sources included students, classroom teachers, observation results, interview results, learning outcome tests, and supporting documents related to the implementation of learning activities. The researcher acted as the practitioner, while the classroom teacher and a colleague served as observers.

2.3 Data Collection Technique

Data were collected using test and non-test techniques. Test techniques were employed to measure students' learning outcomes after the implementation of the Deep Learning approach with the PBL model. Non-test techniques included classroom observations, interviews, and documentation. The research instruments consisted of lesson module assessment sheets, observation sheets for teacher and student activities, interview guidelines, and learning outcome tests.

2.4 Inclusion and Exclusion Criteria

The study was conducted through two action cycles. Each cycle consisted of four stages: planning, action, observation, and reflection. During the planning stage, the researcher prepared teaching

modules, learning materials, learning media, and research instruments. The action stage involved implementing the Deep Learning approach integrated with the Problem Based Learning model in IPAS learning. Observation was carried out by observers to record teacher and student activities during the learning process. Reflection was conducted after each cycle to evaluate the effectiveness of the action and determine improvements for the subsequent cycle.

2.5 Data Analysis Technique

Qualitative data were analyzed through data reduction, data display, and conclusion drawing. Quantitative data were analyzed by calculating the percentage of students' learning mastery using the formula proposed by Habsari (2022). The Minimum Mastery Criterion (KKTP) applied in this study was 80. The success of the action was determined by the improvement of students' learning outcomes and the increase in the percentage of learning mastery from one cycle to the next.

3. Results and Discussion

3.1 Cycle I Meeting I

- a. Social Science Learning Planning Using a Deep Learning Approach with a Problem Based Learning (PBL) Model

The IPAS learning planning in the first cycle of the first meeting was carried out collaboratively between researchers and fourth grade teachers of SDN 17 Gunung Pangilun, Padang City. The learning plan is outlined in the form of a teaching module that is prepared based on the Deep Learning approach and the Problem Based Learning (PBL) model in the material CHAPTER 7 Cultural Diversity and Local Wisdom, subchapter Local Wisdom in the Community Around Me. The learning objectives designed include the ability of students to identify forms of local wisdom, explain the benefits of local wisdom in people's lives, and show an attitude of respect for cultural diversity and local wisdom in the surrounding environment.

To support the implementation of learning, the researcher prepared teaching

modules, teaching materials, learning media in the form of videos, LKPD, evaluation instruments, and observation sheets. Based on the results of the observer's assessment of the teaching module used, a score of 20 out of a maximum score of 24 was obtained with a percentage of 83.33% and was in the Very Good (SB) qualification. These results show that the learning plan prepared is in accordance with the characteristics of the Deep Learning approach and the Problem Based Learning model.

b. Implementation of Social Science Learning Using a Deep Learning Approach with a Problem Based Learning (PBL) Model

At the problem orientation stage, the teacher shows a video about local wisdom in Indonesia to bring out the students' initial understanding. Furthermore, students were divided into several groups to discuss and complete the LKPD that had been provided. Each group then presented the results of its discussion and received responses from teachers and friends. The learning activity ended with the evaluation and conclusion of the material together.

The results of observation of teachers' activities showed a score of 22 out of a maximum score of 28 with a percentage of 78.57% and was at the good qualification (B). The results of observation of student activities also obtained a score of 22 out of a maximum score of 28 with a percentage of 78.57% and were at the good qualification (B). These findings show that the implementation of learning has been carried out in accordance with the steps of Deep Learning and Problem Based Learning, although there are still several aspects that need to be improved, especially at the evaluation stage and providing opportunities for students to respond to the results of other groups' presentations.

c. Student Learning Outcomes in Social Science Learning Using a Deep Learning Approach with the Problem Based Learning (PBL) Model

The learning outcomes of students in the first cycle of the first meeting included aspects of attitudes, knowledge, and skills. In terms of attitudes, most of the students have shown positive behavior that reflects the dimensions of the graduate's profile, such as faith and fear of God Almighty, critical reasoning, and working together. However, there are still some students who are less serious when praying and less active in group discussion activities so that they need follow-up in the form of guidance and motivation from teachers.

In the aspect of knowledge, an average score of 52.94 was obtained, with the highest score of 85 and the lowest score of 17. Of the 18 students, only 4 students (22.22%) have achieved learning completeness, while 14 students (77.78%) have not reached the set KKTP of 80. These results show that students' understanding of the material still needs to be improved.

Meanwhile, in the aspect of skills, an average score of 64 was obtained, with the highest score of 96 and the lowest score of 24. A total of 6 students (33.33%) have achieved completeness, while 12 students (66.67%) have not completed it. These results show that students' ability to process information, discuss, and present the results of group work is starting to develop, but still needs improvement in the next cycle.

Based on the results of observations and assessments in the first cycle of the first meeting, it can be concluded that the application of the Deep Learning approach with the Problem Based Learning model has shown a positive impact on the involvement of students in IPAS learning. However, the learning results obtained have not reached the set success indicators, so improvements are needed in the next cycle.

3.2 Result of the Implementation of Cycle I Meeting II

a. Learning Implementation

The implementation of IPAS learning using the Deep Learning approach with the Problem Based Learning (PBL) model in the first cycle of the second meeting was held on April 22, 2026 with a time allocation of 2×35 minutes. The

material studied is CHAPTER 7 Cultural Diversity and Local Wisdom, Subchapter Traditions and Culture of the People Around Me.

At the planning stage, researchers and classroom teachers compile teaching modules, LKPD, learning media in the form of videos and pictures, evaluation instruments, and observation sheets. The learning objectives to be achieved include the ability of students to explain the traditions and culture of the surrounding community, identify cultural diversity in Indonesia, and show respect for cultural diversity.

The implementation of learning is carried out through three main activities, namely the introduction, core, and closing. In the preliminary activity, the teacher opens the learning with greetings, prayers, attendance checks, and spark questions related to the material. In the core activities, PBL model steps are applied which consist of student orientation to problems, organizing students, guiding investigations, developing and presenting the results of work, and analyzing and evaluating the problem-solving process. The learning was closed with evaluation activities, material conclusions, follow-up, and closing prayers.

b. Observation Result

The results of the observation showed that the quality of planning and implementation of learning had improved compared to the previous meeting. The assessment of the teaching module obtained a score of 22 out of a maximum score of 24 with a percentage of 91.66% and was at the Very Good (A) qualification. The results of the observation of teacher activities obtained a score of 23 out of a maximum score of 28 with a percentage of 82.14% and were in the Very Good (SB) qualification. The improvement can be seen in the teacher's ability to organize students, guide group discussions, and facilitate the presentation of students' work. However, teachers are still not optimal in guiding students to evaluate the results of group presentations and provide reinforcement for inappropriate answers. Student activities also showed an

increase with a score of 23 out of a maximum score of 28 or 82.14% with a Good (B) qualification. Most of the students have actively participated in group discussions, worked on LKPD, and presented the results of the group's work. However, there are still some students who have not dared to respond to the results of other group's presentations and have not been able to evaluate the solutions produced optimally.

The results of the attitude assessment show that there are positive developments in the aspects of faith and fear of God Almighty, cooperation, and critical reasoning. Most of the students have shown an attitude of cooperation and active involvement in the learning process, although there are still some students who are less focused during discussions and when praying. In the aspect of knowledge, an average score of 65.22 was obtained, with the highest score of 88 and the lowest score of 22. A total of 7 students have achieved completeness, while 11 students have not achieved KKTP. In terms of skills, an average score of 82 was obtained, with the highest score of 96 and the lowest score of 48. A total of 13 students have achieved completeness, while 5 students have not achieved KKTP.

c. Reflection Cycle I

Based on the results of the implementation of the first cycle consisting of meeting I and meeting II, there was an increase in the aspects of learning planning, teacher activities, student activities, and student learning outcomes. The teaching modules used have met most of the indicators set, although there is still a need for improvements in the systematics of learning activities, the use of more varied media, and the simplification of instructions in the LKPD to make it easier for students to understand.

From the teacher's aspect, there are still several weaknesses, especially in perception activities, student guidance in evaluating the results of discussions, and providing reinforcement to students' answers. Therefore, in the second cycle, teachers need to improve the quality of

perception, provide wider opportunities for students to ask questions and opinions, and strengthen learning reflection and evaluation activities.

From the student aspect, some students still show low confidence in expressing opinions and responding to the results of other groups presentations. In addition, there are still students who are less active in group discussions. Therefore, in cycle II, it is necessary to make efforts to increase student involvement through more intensive guidance, motivation, and the implementation of more interactive learning activities.

From the student aspect, some students still show low confidence in expressing opinions and responding to the results of other groups presentations. In addition, there are still students who are less active in group discussions. Therefore, in cycle II, it is necessary to make efforts to increase student involvement through more intensive guidance, motivation, and the implementation of more interactive learning activities.

3.3 Cycle II

a. Action Planning

Action planning in Cycle II was carried out collaboratively between researchers and fourth grade teachers of SD Negeri 17 Gunung Pangilun, Padang City. The learning plan was prepared based on the results of reflection in Cycle I which showed that there were still several shortcomings in the implementation of learning. Therefore, improvements are focused on the implementation of perception, increasing the activeness of students in discussions and presentations, and providing more optimal guidance in problem-solving activities. The learning planning is poured into the teaching module using the Deep Learning approach and the Problem Based Learning (PBL) learning model in the material of Chapter 7 Cultural Diversity and Local Wisdom, Subchapter My Attitude to Cultural Diversity, with a time allocation of 2×35 minutes.

Learning materials are obtained

from teacher books, student books, and other relevant learning resources. The learning objectives formulated are: (1) students can identify cultural diversity in Indonesia through images accurately, and (2) students can show appreciation for cultural diversity through real examples in daily life well. To support the achievement of these learning goals, the researcher prepares teaching modules, teaching materials, student worksheets (LKPD), learning media in the form of videos and images, evaluation instruments, and observation sheets that are used to observe the implementation of learning, teacher activities, and student activities during the learning process.

b. Implementation of Actions and Observations

The implementation of actions in Cycle II was carried out on Thursday, April 30, 2026 in grade IV of SD Negeri 17 Gunung Pangilun Padang City with a time allocation of 2×35 minutes. In the implementation of learning, the classroom teacher acts as a practitioner while the researcher acts as an observer. The learning activities began with preliminary activities which included greetings, prayers, singing the national anthem, checking attendance, perception, conveying learning objectives, and giving triggering questions related to the material. In the core activities, learning is carried out in accordance with the steps of the Problem Based Learning (PBL) model, namely orienting students to problems through video broadcasting, organizing students into groups, guiding group investigations, developing and presenting the results of their work, and analyzing and evaluating the problem-solving process. Furthermore, the learning activity ended with an evaluation, follow-up delivery, and closing prayer.

Based on the results of observations on the teaching module, a score of 23 out of a maximum score of 24 was obtained with a percentage of 95.83% and the qualifications were very good. The results of observation of teacher activities obtained a score of 25 out of a maximum score of 28 with a

percentage of 89.28% and very good qualifications. Meanwhile, the activities of the students obtained a score of 27 out of a maximum score of 28 with a percentage of 96.42% and very good qualifications. These results show that the implementation of learning in Cycle II has increased compared to Cycle I.

The results of the attitude assessment show that students have shown good development in the dimensions of faith and fear of God Almighty, critical reasoning, and cooperation. In the aspect of knowledge, an average score of 83.88 was obtained with the highest score of 100 and the lowest score of 25, where as many as 14 students have achieved learning completeness and 4 students have not completed. In the skill aspect, an average score of 89.33 was obtained with the highest score of 96 and the lowest score of 72, where as many as 17 students have achieved learning completeness and only 1 student has not completed. These results show an increase in student learning outcomes after the implementation of the Deep Learning approach with the Problem Based Learning (PBL) model.

3.4 Discussion

- a. Science Learning Teaching Module Using a Deep Learning Approach with a Problem Based Learning (PBL) Model

Based on the results of the assessment of the teaching module, there was an improvement in the quality of learning planning in each cycle. In the first cycle of the first meeting, the percentage was obtained of 83.33% with very good qualifications, increased to 91.66% in the first cycle of the second meeting, and again increased to 95.83% in the second cycle with very good qualifications. These results show that learning planning prepared in the form of Deep Learning-based teaching modules is getting better after improvements are made in each cycle. The teaching modules used have contained components of general information, core competencies, learning activities, teaching materials, assessments, and attachments that support the creation of mindful, meaningful, and joyful learning.

In the first cycle, several shortcomings were still found, such as the suitability of the material with the learning objectives, the use of learning media that was not fully in accordance with the characteristics of the students, and the preparation of learning activities that were not optimal. After reflection and improvement in cycle II, these shortcomings can be minimized so that the quality of the teaching modules increases. Improvements in the aspects of learning activities, teaching materials, and learning media have a positive impact on the learning process of students because learning becomes more directed, systematic, and interesting so that learning goals can be achieved optimally.

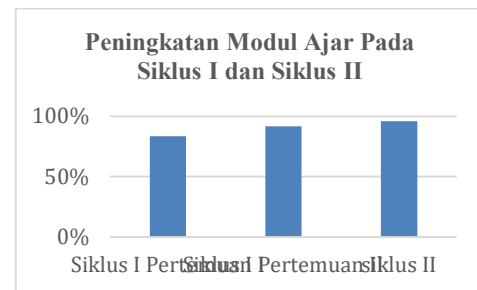


Figure 1. Improvement of Teaching Modules in Cycles I and II

- b. Implementation of Social Science Learning Using a Deep Learning Approach with a Problem Based Learning (PBL) Model

The implementation of social studies learning using the Deep Learning approach with the Problem Based Learning model showed an increase in each cycle. In the teacher aspect, the percentage of implementation increased from 71.42% in the first cycle of the first meeting to 75% in the first cycle of the second meeting, and increased again to 89.28% in the second cycle with very good qualifications. Meanwhile, in the aspect of students, there was an increase from 71.42% in the first cycle of the first meeting to 82.14% in the first cycle of the second meeting, and

reached 96.42% in the second cycle. This increase shows that teachers are increasingly able to implement Problem Based Learning measures optimally and students are more active in following the learning process.

In the first cycle, several obstacles were still found, such as teachers not having done maximum perception, not involving students in responding to the results of other groups' presentations, and not being optimal in guiding students to evaluate the answers of the presenting group. After reflection and improvement in cycle II, teachers are able to carry out all stages of Problem Based Learning better. As a result, students become more active in discussing, dare to express opinions, are able to work together in groups, and are more skilled in solving problems related to learning materials.

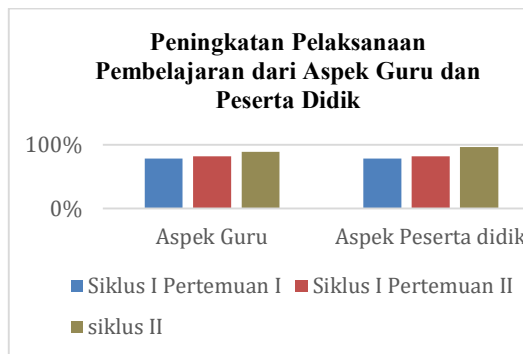


Figure 2. Improvement in Learning Implementation

- c. Social Science Learning Learning Outcomes Using a Deep Learning Approach with a Problem Based Learning (PBL) Model

Improving the quality of learning planning and implementation has an impact on improving student learning outcomes. In the attitude aspect, students showed positive development from cycle I to cycle II. Attitudes that reflect the Pancasila Student Profile, such as faith and fear of God Almighty, mutual cooperation, and critical reasoning are increasingly visible during the learning process. Students are also more active in cooperating, discussing, and showing a sense of responsibility for the

tasks given. This shows that the application of the Deep Learning approach with the Problem Based Learning model can help shape students' character in a positive way.

The improvement in learning outcomes is also seen in the aspects of knowledge and skills. In the aspect of knowledge, the average score of students increased from 52.94 in the first cycle of the first meeting to 65.22 in the first cycle of the second meeting and reached 83.88 in the second cycle. Meanwhile, in terms of skills, the average score increased from 64 in the first cycle of the first meeting to 82 in the first cycle of the second meeting and reached 89.33 in the second cycle. Overall, the average learning outcomes of students increased from 58.47 in the first cycle of the first meeting to 73.61 in the first cycle of the second meeting, and reached 86.88 in the second cycle. These results show that the application of the Deep Learning approach with the Problem Based Learning (PBL) model is effective in improving student learning outcomes in science learning in grade IV of SD Negeri 17 Gunung Pangilun, Padang City.

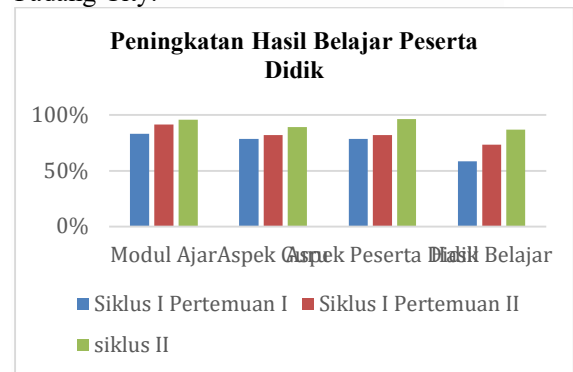


Figure 3. Improvement in Students' Learning Outcomes

4. Conclusion

Based on the results of the classroom action research that has been carried out in IPAS learning using the Deep Learning approach with the Problem Based Learning (PBL) model in grade IV of SD Negeri 17 Gunung Pangilun Padang City, it can be concluded that the planning and implementation of learning has been carried out very well and has improved in each cycle. The learning plan prepared in the

form of teaching modules contains learning objectives, activity steps, media, learning resources, assessments, and student activities that are oriented towards meaningful and contextual learning. This can be seen from the increase in the results of the assessment of the teaching module, namely from 83.33% in the first cycle of the first meeting to 91.66% in the first cycle of the second meeting, and increased again to 95.83% in the second cycle with very good qualifications. The implementation of learning through Problem Based Learning (PBL) steps is also effective, so that students become more active, dare to express opinions, are able to work together, and better understand the material in depth and meaning. The application of the Deep Learning approach with the Problem Based Learning (PBL) model has been proven to improve student learning outcomes in social studies learning. The improvement can be seen in the aspects of students' attitudes, knowledge, and skills during the learning process. The average learning outcomes of students increased from 58.47 in the first cycle of the first meeting with qualifications that needed guidance, to 73.61 in the first cycle of the second meeting with good qualifications, and increased again to 86.88 in the second cycle with very good qualifications. In addition, the completeness of students' learning has also increased to reach the set success criteria. Thus, the Deep Learning approach with the Problem Based Learning (PBL) model is effectively used to improve the quality of the learning process and learning outcomes of students in social studies learning in grade IV of SD Negeri 17 Gunung Pangilun Padang City

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