Az Zahra, S. I., Vioreza, N., Suhel, A. R.
Implementation of *RADEC* and *Problem Based* Learning Model in *Indonesiaku Kaya Budaya*
DOI 10.37640/ICE.03.918
In *Proceedings of the 3rd International Conference on Education* (ICE 2024), pages 15-21
E-ISSN 2964-7479
Copyright © 2024 by STKIP Kusuma Negara Press. All rights reserved

Implementation of *RADEC* and *Problem Based* Learning Model in Indonesiaku Kaya Budaya

Soraya Ismah Az Zahra[1*], Niken Vioreza[2], A. Rahim Suhel[2]
[1]Primary Teacher Education, SMP Islam Nurul Fikri Peduli, Depok.
[2]Primary Teacher Education, STKIP Kusuma Negara, Jakarta, Indonesia.
sorayazahra87@admin.smp.belajar.id

Abstract

Ilmu Pengetahuan Alam dan Sosial (IPAS) is a combination of science and social studies subjects that focuses on the context of nature and human interaction, playing a crucial role in shaping students' literacy and numeracy competencies. The recent curriculum Curriculum Merdeka provides teachers with the flexibility to develop curriculum that meet local needs and student characteristics. Therefore, in this study, the *Problem Based Learning* (PBL) model was selected because it encourages students to actively engage in solving contextual problems, while *Read Answer Discuss Explain Create* (RADEC) model was chosen for its emphasis on developing critical thinking skills. This study aims to analyze the differences in IPAS learning outcomes among fourth grade of SDN CIbubur 11 Pagi using PBL and RADEC models. This quantitive study was conducted at an elementary school in Jakarta Timur. The Dara was obtained using validated objective instruments and analyzed using parametric statistics. The data analysis results concluded that there is a difference in the final learning outcomes between PBL and RADEC groups. Therefore, this study suggests that PBL is more recommended for IPAS learning.

Key Word: Learning result, Problem Based Learning, RADEC learning model.

1 INTRODUCTION

In terms of supporting the Sustainable Development Goals program (SDGs) which was built by the United Nation, education has an important role, especially for providing quality and inclusive education (UNESCO, 2015). One of the goals of SDGs is to make sure that every pupil got relevant knowledge and skills for sustainable development. Before that, learning things still focused at just knowledge without giving enough attention in character and skill (Vioreza et al, 2022), but as time goes by, education in Indonesia passed many difference in reaching the goals, one of them is applying *Kurikulum Merdeka* which give flexibility to teacher in developing match curriculum with local needs and pupils character (Kemendikbud, 2021; Vioreza et.al, 2023)

Kurikulum Merdeka is one of the latest innovations in the Indonesian education system that focuses on developing the character and competence of students (Kemendikbud, 2021). This curriculum gives schools the freedom to develop a curriculum that is relevant to the needs of students, as well as emphasizing the mastery of literacy and numeracy skills (Rosyidah, 2021). One of the important updates in the *Kurikulum Merdeka* is the merger of *IPA* and *IPS* into *IPAS*, which is expected to help students understand scientific and social concepts holistically (Sopandi, 2018).

In its implementation, an effective learning model is one of the important factors that can improve student learning outcomes. PBL (*Problem Based Learning*) and RADEC (*Read Answer Discuss Explain Create*) are two learning models that are considered capable of supporting the achievement of the goals of the *Kurikulum Merdeka* (Sopandi, 2018). PBL is a pedagogical approach that focuses on contextual problem solving, in which students play an active role in finding solutions through the process of critical thinking is also a

learning model developed based on the theory of constructivist learning. (Srikan, 2021., Kassymova et al., 2020; Korkmaz, & Kalayci, 2021). Meanwhile, RADEC emphasizes the development of literacy, discussion, and creativity skills of students (Sopandi, 2018).

Various studies have shown that the use of innovative learning models such as PBL and RADEC can improve students' conceptual understanding and critical thinking skills (Rosyidah, 2021). However, each of these learning models has advantages and disadvantages. PBL emphasizes more on problem analysis skills and several learning studies conducted by previous researchers, as revealed by Dakabesi et al. (2019), shows that the steps in the PBL learning model begin by exposing learners to contextual problems, involving them in the learning process, guiding individuals and groups, developing investigation results, presenting investigation findings, and analyzing and evaluating solutions to the problems faced.

RADEC is focused on literacy development and collaboration between pupils (Sopandi, 2018). RADEC learning model capable of motivating pupils to apply their knowledge actively and creatively. Besides that, this model push pupils to be involved in various learning activities, such as reading, responding, clarifying, analyzing, finding solutions to problems, and producing a work (Maulana et al., 2022). Therefore, it is important to examine the difference in the effectiveness of these two models in improving *IPAS*.

This research focused in comparative analysis of learning results of pupils in grade IV Elementary School using PBL and RADEC learning model in IPAS subject especially in "Indonesiaku Kaya Budaya" (Kemendikbud, 2021). Through a quantitative approach, this study aims to find out which learning model is more effective in improving students' learning outcomes and critical thinking skills (Rosyidah, 2021).

2 RESEARCH METHODS

This research is an experimental study with a posttest only control design. Experimental research involves the manipulation of independent variables to observe their effects on dependent variables, with strict control over other variables to ensure the validity of the results (Atmazaki et.al., 2023). The subjects of this study were fourth-grade students at SDN Cibubur 11 Pagi. The sample consisted of two experimental classes, each with 32 students. Experiment Class I was taught using the RADEC learning model, while Experiment Class II was taught using the PBL learning model.

This study was conducted by providing treatment in the form of teaching using different learning models in the two experimental classes. After the teaching was completed, the research instruments were administered to the students to measure their learning outcomes. The instruments used were objective instruments that had undergone several previous testing processes, including validity tests to ensure the instruments measured what they were supposed to measure, reliability tests to ensure the consistency of the results obtained from the instruments, difficulty level tests to ensure the questions had an appropriate level of difficulty, and discriminability tests to ensure the instruments could distinguish between students with high and low abilities.

Data were obtained by administering a final test to the students after the treatment. The test results were then used for data analysis. The data obtained were analyzed using descriptive and inferential statistics. Descriptive statistics presented the mean and standard deviation values, while inferential statistics included prerequisite tests for analysis and parametric tests. The prerequisite tests for analysis consisted of a normality test using the Lilliefors test to ensure the data were normally distributed and a homogeneity test using the Fisher test to ensure the data variance was homogeneous. After the data were confirmed to be normally distributed and the variance was homogeneous, parametric analysis was conducted using a t-test to compare the mean learning outcomes between the two experimental groups.

3 RESULT AND DISCUSSION

From the research and analysis of learning outcomes that have been carried out, the results will be explained in this section.

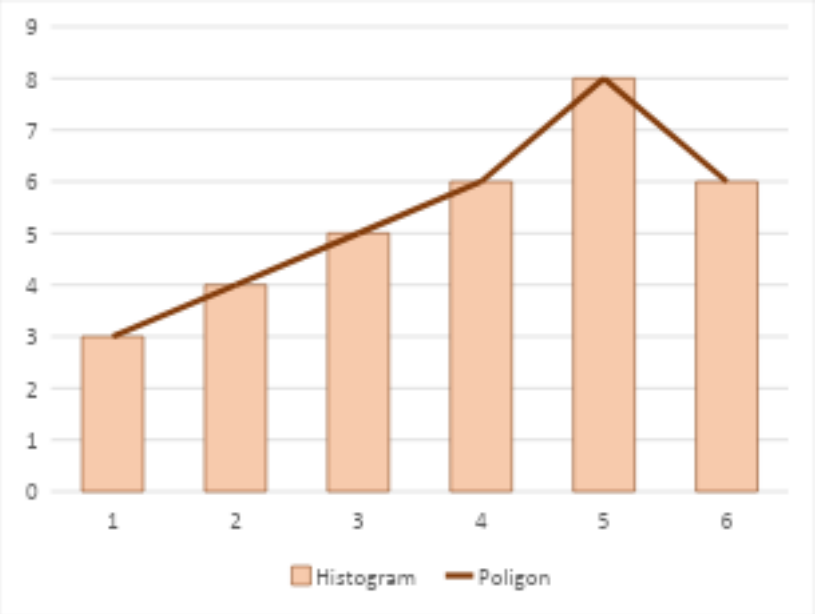
3.1 Data Class Experiment I (RADEC Learning Model)

Based on the achievement of students in the experimental class I am using the RADEC learning model, a score range between 100 is obtained as the maximum value and 35 as the minimum value. From these data, the average = 74.41 and the standard deviation = 16.72.

Table 1. Frequency Distribution Table Class Experiment I (RADEC)

Interval	Middle Point	Frequency	Limit
35-45	40	3	34,5-45,5
46-56	51	4	45,5-56,5
57-67	62	5	56,5-67,5
68-78	73	6	67,5-78,5
79-89	84	8	78,5-89,5
90-100	95	6	89,5-100,5

Based on table 1 (one), it is known that the learning outcomes of social studies students are grouped in 6 (six) intervals with a length of 11. As per the previous frequency distribution table, here is a histogram chart and its frequency polygons.



Gambar 1. Histogram and Polygon Chart of Learning Results Class Experiment I (RADEC)

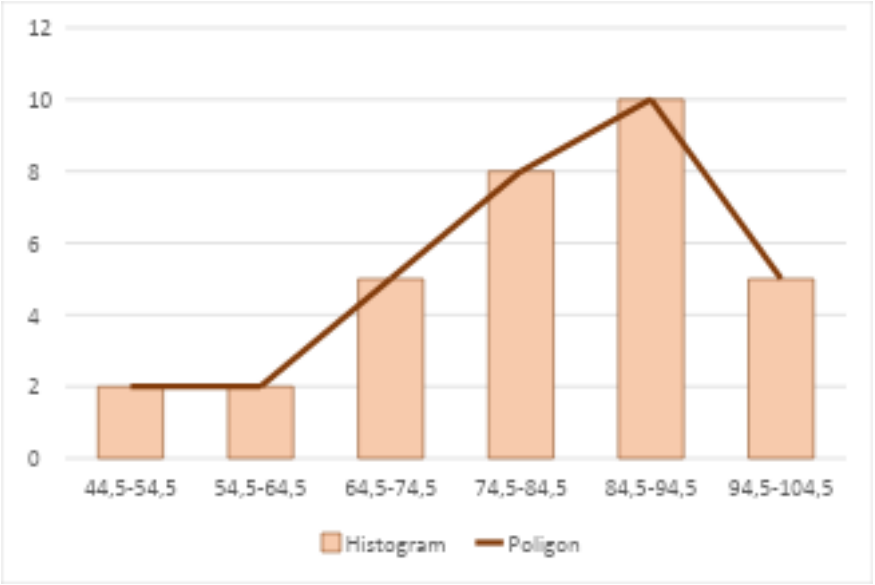
3.2 Data Class Experiment II (PBL Learning Model)

Based on the achievements of students in the experimental class II which uses the PBL learning model, a score range between 100 is obtained as the maximum value and 45 as the minimum value. From these data, the average = 79.38 and the standard deviation = 14.07.

Table 2. Frequency Distribution Table Class Experiment II (PBL)

Interval	Middle Point	Frequency	Limit
45-54	49,5	2	44,5-54,5
55-64	59,5	2	54,5-64,5
65-74	69,5	5	64,5-74,5
75-84	79,5	8	74,5-84,5
85-94	89,5	10	84,5-94,5
95-104	99,5	5	94,5-104,5

Based on table 2 (two), it is known that the learning outcomes of students' social studies are grouped into 6 (six intervals) with a length of 10. As per the previous frequency distribution table, here is a histogram chart and its frequency polygons.



Gambar 2. Histogram and Polygon Chart of Learning Results Class Experiment II (PBL)

3.3 Analysis Learning Result Difference of *IPAS*

Normality test result of learning result data of *IPAS* used to infer whether or not distributed data is normal. So, a Lilliefors test was carried out with a significance level equal to 0.05. Based on the results of the calculation of the Lilliefors test in experimental class I (RADEC) is 0.056 and for the calculation for experimental class II (PBL) is 0.710. The table with a significance of 0.05 is 0.1566. Because the L_{cal} value is less than the L_{table}, the data of the two experimental classes are distributed normally.

The homogeneity test of variance in this study was carried out by the fisher test with the provision of homogeneity if the calculation is less than the F_{table}. In the calculation, F_{cal} was obtained with a value of 0.71 and F_{table} at the significance level of 0.05 with a value of 1.84, so it was concluded that the samples of both classes had a homogeneous variance.

The researcher's hypothesis that there is a difference between learning with the RADEC and PBL models in this study is proven by conducting a t-test. The t_{count} results were 2,063 and the t_{table} was 1,999. Because the t_{cal} value is greater than the table, the conclusion of the analysis of this hypothesis test is that there is a difference in learning outcomes between learning with the RADEC and PBL models.

3.4 Discussion of Research Result

Based on the research and analysis of learning outcomes that have been conducted, several important points can be further discussed. The research results show a significant difference in learning outcomes between the experimental class using the RADEC learning model and the experimental class using the PBL learning model. The class taught using the PBL model had a higher average score (79.38) compared to the class taught using the RADEC model (74.41). This indicates that the PBL learning model is more effective in improving students' learning outcomes compared to the RADEC learning model.

This finding is consistent with previous studies (Vinda et al., 2023; Rahmadani, 2019; Muhammad Isa) that demonstrate the PBL learning model significantly enhances students' learning outcomes. PBL allows students to be more active in the learning process as it involves problem-solving and group discussions that stimulate critical thinking and creativity.

During the learning process, the researcher observed that students showed a high level of activity and enthusiasm in both RADEC and PBL learning models. However, this activity and enthusiasm were more prominent in the class using the PBL model. Students were more engaged in discussions and group collaborations, creating a more interactive and dynamic learning environment.

This observation is supported by the histogram and polygon diagrams showing the frequency distribution of students' learning outcomes. In the PBL experimental class, the distribution of learning outcomes was more even, with many students achieving high scores, while in the RADEC class, there was more variation in students' learning outcomes.

The research results also indicate that the effectiveness of a learning model can be influenced by its suitability with the material being taught. The material "Indonesiaku Kaya Budaya" taught in this study might be more appropriately taught using the PBL model, which allows students to explore and understand cultural diversity through problem-solving and research activities.

The researcher also compared these findings with the study by Putri et al. (2022), which showed that the IBL (Inquiry Based Learning) model was also effective in improving students' learning outcomes. In the context of Putri et al.'s study, students were more suited to using the IBL model due to the investigative nature of the material being taught.

From the discussion above, it can be concluded that the PBL learning model is more effective in improving students' learning outcomes compared to the RADEC model in the context of the material "Indonesiaku Kaya Budaya." Students' activity and enthusiasm in learning were also higher in the class using the PBL model. However, the effectiveness of a learning model may vary depending on its suitability with the material being taught.

Therefore, choosing the appropriate learning model is crucial to achieving optimal learning outcomes (Vioreza, et.al, 2020). The researcher recommends using the PBL model for materials that require problem-solving and collaboration, while other models such as RADEC or IBL can be used for materials with different characteristics.

Future research can further explore how other learning models such as IBL can be applied in different contexts and how the combination of various learning models can enhance overall student learning outcomes. Additionally, more in-depth research on factors affecting the effectiveness of learning models can provide a more comprehensive understanding of effective teaching strategies.

4 CONCLUSION

Based on the findings of this research, several suggestions can be made: first, the use of appropriate learning models. Given that the PBL learning model has proven to be more

effective in improving learning outcomes, it is recommended that teachers use this learning model more frequently, especially for materials that require problem-solving and collaboration. Second, further research is needed to compare other learning models to find the most effective methods in various contexts and subjects. This research should also consider other factors that influence learning outcomes, such as student engagement, motivation, and learning styles. Thus, the results of this research are expected to serve as a reference for educators and researchers in developing more effective learning strategies to improve the quality of education.

5 REFERENCES

Afifah, A. H., & Muslim, A. (2024). Upaya Meningkatkan Prestasi Belajar dan Rasa Percaya Diri Siswa melalui Model PBL Berbantu Media Edu-Picture Pada Materi Indonesiaku Kaya Budaya Kelas Iv Sd Negeri 2 Pandak. *Jurnal Review Pendidikan dan Pengajaran (JRPP)*, *7*(2), 4896-4901.

Arends, Richard. (2012). *Learning to Teach*, New York, McGraw-Hill.

Atmazaki, Vioreza, N., Nabila, J., & Brillian, M. T. (2023). *Buku Ajar Metode Penelitian*. Pustaka Alur.

Basit, R. A., & Maryani, E. (2021, April). Critical Thinking Skills Toward Ecological Problems of Climate Change in Basic Schools through The Application of Radec Learning Models. In *International Conference on Elementary Education* (Vol. 3, No. 1, pp. 508-512).

Dakabesi, D & Luoise, Y, S, I. The effect of Problem Based Learning Model on Critical Thinking Skills in the Cpntext of Chemical Reaction Rate. *Journal of Education and Learning (EduLearn). 13*(3), 395-401, 2019.

Ikawati, W. (2023). Meningkatkan Hasil Belajar Bahasa Inggris Siswa dengan Menggunakan Metode Problem Based Learning. *Jurnal Ilmu Pendidikan (JIP) STKIP Kusuma Negara*, *14*(2), 186-193.

Isa, Muhammad, Pengaruh Model Problem Based Learning (PBL) Terhadap Hasil Belajar Ekonomi Kelas X Man 1 Kabupaten Tebo, t.t.

Kassymova, G., Akhmetova, A., Baibekova, M., Kalniyazova, A., Mazhinov, B., & Mussina, S. (2020) E-Learning Environtments and Problem Based Learning. *Internasional Journal of Advanced Science and Technology, 29*(7), 346-356.

Kemendikbud. (2021). *Kurikulum Merdeka: Kebijakan dan Implementasi*, Jakarta, Kementerian Pendidikan dan Kebudayaan Republik Indonesia.

Kiska, N. D., Haryanto, E., & Indryani, I. (2024). Improving Students' Collaboration Skills Using the RADEC Learning Model in Elementary School Science Learning. *Jurnal Pijar Mipa*, *19*(2), 240-247.

Korkmaz, G., & Kalayci, N. (2020). Problem and Project-Based Learning as an Educational Philosophy: A Novel Conceptual model for higher education. *African Educational Researcher*, *49*(4), 241-253.

Maulana, Y., Sopandi, W., Sujana, A., Robandi, B., Agustin, N. S., Rosmiati, I., Pebriati, T. (2022). Validation of Student Worksheets Air Theme based on the RADEC Model and 4C Skill-oriented. *Jurnal Penelitian Pendidikan IPA, 8*(3), 1605-1611.

Mahayati, I., Nurimani, N., & Ripki, A. J. (2019). Perbedaan Hasil Belajar Matematika Siswa Menggunakan Model Problem-Based Learning dan Problem Solving. In *Prosiding Seminar Nasional Pendidikan STKIP Kusuma Negara*.

Murti, K., Kresnadi, H., & Halidjah, S. (2023). Pengembangan Modul Ajar Mata Pelajaran Ilmu Pengetahuan Alam dan Sosial (IPAS) Kelas IV Kurikulum Merdeka Materi Indonesiaku Kaya Budaya di SDN 24 Pontianak Timur. *Journal on Education*, *6*(1), 6801-6808.

Rahmadani, Metode Penerapan Model Pembelajaran Problem Based Learning (PBL), 2019.

Rosyidah, Cholifah Tur,. (2021). *Pengaruh Model Pembelajaran Inovatif Terhadap Hasil Belajar Siswa di Sekolah Dasar*, Jakarta, Jurnal Pendidikan Dasar Indonesia.

Setiawan, D., Yanto, A., & Nurhalimah, S. (2024). Gender Differences in Critical Thinking through RADEC, Problem-based Learning, and Direct Instruction Learning Models. *Jurnal Elementaria Edukasia*, *7*(3), 3072-3082.

Sopandi, Wahyu. (2018). *The Quality Improvement of Learning Processes and Achievements through the Read-Answer-Discuss-Explain-and Create Learning Model Implementation*, London, Journal of Education and Practice.

Srikan, P., Pimdee, P., Leekitchwatana, P., & Narabin, A. (2021). A Problem Based Learning (PBL) and Teaching Model Using a Cloud Based Constructivist Environment to Enhance Thai Undergraduate Creative Thinking and Digita Media Skills. *Internasional Journal of Innovations in Engineering Research and Technological Educarion, 25*(3), 351-369.

Vioreza, N., Marhamah, S. P., Nugroho, B. T. A., Solihat, E., Hasanah, N., Oktaviana, E., ... & Ginting, M. B. (2020). *Call For Book Tema 4 (Model & Metode Pembelajaran)*. Jakad Media Publishing.

Vioreza, N., Supriatna, N., & Hakam, K. A. (2022). Development of Digital Teaching Materials Based on Betawi Local Food to Increasi Ecoliteracy in Elementary School Students. *Al Ibtidda: Jurnal Pendidikan Guru MI, 9*(2), 402-416.

Vioreza, N., Hilyati, W., & Lasminingsih, M. (2023). Education for Sustainable Development: Bagaimana Urgensi dan Peluang Penerapannya pada Kurikulum Merdeka? *PUSAKA: Journal of Educational Review*, *1*(1), 34-48.

UNESCO. (2015). *Education for All 2015 National Review: Indonesia*, Paris, United Nations Educational, Scientific and Cultural Organization.