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# The impact of RADEC learning model on the problem-solving ability of high school students

**Bakri Mallo [1 *], Mustamin Idris[1], Nurhayadi[1], Pathuddin[1], Dasa Ismaimuza[1]**

[1] Tadulako of University, Central Sulawesi, Indonesia
[*] Correspondence: bakri88oke@gmail.com

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## Abstract

The low learning outcomes and problem-solving abilities of students in Palu City are the driving force for finding a student-centered learning model that can improve the problem-solving abilities of high school students in Palu City. This research method is a quasi-experimental design with an intact group comparison design consisting of two groups, namely the experimental class with the RADEC Model learning treatment with a differentiated learning strategy and the control class with direct learning models. The study population was 3656 students, while the sample was 186 students in the experimental class and 186 students in the control class. The researcher selected the sample by purposive random sampling technique. The instruments used were problem-solving ability tests and learning style questionnaires. Data were analyzed using t-test statistics and two-way ANOVA. The results showed that the RADEC learning model with a differentiated learning strategy had a greater impact when compared to the direct instruction model on the mathematical problem-solving abilities of high school students in Palu City, with a significance value of p = 0.000. The average score of problem-solving ability of students who follow the RADEC learning model is 79.63. While the average score of problem solving of students who follow the direct instruction model is 50.72 that the difference in the impact of the learning model is 28.91. The RADEC learning model does not have a different impact on the mathematical problem-solving ability of high school students in Palu city based on learning styles, so that teachers can implement it in classes that have heterogeneous students in terms of learning styles.

**Keywords**: RADEC Learning Model, Problem Solving, Differentiated Learning Strategy

## Introduction

The quality of learning has not been following expectations. The evaluation results show that students' mathematical abilities are still relatively low. This is caused by learning that is still dominated by teachers, such as the use of direct learning models. The measure of students' low mathematical abilities can be seen in the PISA results, which show that Indonesian students' mathematical abilities are fluctuating. The lowest average score was obtained in PISA 2003, which was 360. The highest average score was achieved in PISA 2006, 391 points (Nabilah et al., 2024). In PISA 2018, Indonesian students obtained an average score of 379 (Wuryanto & Abduh, 2022) student learning outcomes in mathematics subjects in schools are still low (Ardilla et al., 2023; Trisna Yanti et al., 2020). The mean mathematics learning outcomes of Islamic junior high school students in Palu City are 54.71 out of an ideal score of 100. The mean mathematical reasoning ability of public high school students in Palu City is 39.64, and 85.5% have low reasoning ability (Inayah, 2016).

The difficulties experienced by students in solving mathematical problems include the lack of understanding of students when reading texts, resulting in errors in solving mathematical problems (Restiani et al., 2023). Students who have high and moderate mathematical disposition abilities cannot understand questions or problems and do not recheck the answers, while students who have low mathematical disposition abilities cannot fulfill all indicators of Polya's problem-solving ability model (Dinia et al., 2019).

The use of learning models, methods, and strategies by teachers are some of the factors that influence student learning outcomes (Sartika et al., 2018) or mathematical problem-solving abilities (Mayasari et al., 2021). Learning models that do not provide many learning activities for students will have less impact on learning outcomes, but on the contrary, learning models that provide students with ample opportunities to carry out learning activities will have a major impact on learning outcomes. One of the learning models that provides students with ample learning opportunities is the Read, Answer, Discussion, Explain, and Create learning model which is then abbreviated as the RADEC learning model.

Wahyu Sopandi introduced the RADEC learning model at an international conference in Kuala Lumpur, Malaysia in 2017. The RADEC learning model can improve the quality of the process and learning outcomes of students (Chairunnisa & Sukardi, 2022). The RADEC learning model can develop students' knowledge, attitudes, and skills in the 21st century (W Sopandi, 2019). The RADEC learning model was developed according to the characteristics of students in Indonesia (W Sopandi & Handayani, 2019). So the RADEC learning model can be an option in efforts to improve learning outcomes such as students' problem-solving skills, communication skills, or critical and creative thinking skills.

In addition to the use of learning models, curriculum changes are also an effort by the government to improve the quality of education (Barlian et al., 2022; Tampubolon et al., 2022). The implementation of the Merdeka Curriculum, starting in 2022, aims to catch up with Indonesian students in terms of literacy and numeracy skills, and students will have the skills to live in the 21st century. The learning applied to the Merdeka Curriculum is differentiated learning.

Differentiated learning is a process of teaching and learning activities that pay attention to students based on their abilities, what students like/are interested in learning, and meet the characteristics of students in carrying out the learning process (Purnawanto, 2023). Because it is undeniable that in a class, there are individuals who have diverse abilities. Some have high, medium, and low academic abilities. Some have an auditory, visual, or kinesthetic learning style, and some have an interest to learn in nature, or some students like to learn in the classroom (Wiwin, 2021).

Given the importance of mathematical problem-solving skills in mathematics learning in schools, appropriate models, methods, or strategies are needed that can be used to develop students' abilities in classroom learning (Firmansyah et al., 2020). Teachers must have diverse knowledge and references about models, methods, and strategies that can be chosen to develop students' problem-solving abilities (Madusila & Rosidi, 2024).

Teachers must be able to provide stimulus or facilitate student learning based on their abilities and learning styles. Because each individual has different characteristics and different initial abilities in participating in learning. Ki Hajar Dewantara's philosophy states that "children live and grow according to their own nature, educators can only care for and guide the growth of that nature" (Lean A.R. & Darmawan, 2023). This is also what drives the implementation of differentiated learning in the Merdeka Curriculum, which has been implemented since 2022 (Sartini & Mulyono, 2022).

To be able to implement differentiated learning, a learning model is needed as a structured platform or framework in realizing the learning objectives to be achieved. The learning model that can be applied is the RADEC Model. According to (Pohan & Abidin, 2020) the RADEC learning model can be used as a learning solution for education in Indonesia.

The RADEC learning model through its syntax (Read-Answer-Discussion-Explain-Create) can be combined with differentiated learning strategies. In the Read phase, students can be facilitated with teaching materials that follow auditory, visual, and kinesthetic learning styles. While in the Discussion phase, students can be given the responsibility to discuss learning materials according to their abilities, not forcing students to work on/discuss learning materials that exceed their abilities (Widodo et al., 2024).

The RADEC learning model with differentiated learning strategies can develop aspects of 21st century skills, namely critical thinking, creativity, and problem-solving skills can be developed through reading (Read) and discussion (Discussion) activities. Communication skills are developed through discussion activities (Discussion) and presentations (Explain). Collaboration skills can be developed through discussion activities (Discussion) and creation (Create) (Pratama et al., 2019).

Based on the description in the background, the formulation of the problem in this study is whether there is a significant impact of the RADEC learning model with differentiated learning strategies on the mathematical problem-solving abilities of high school students in Palu City.

## Methods

The research conducted is an experimental research type with an intact group comparison design. This study involved two sample groups, namely the experimental group and the control group. The experimental group used the RADEC learning model with a differentiated learning strategy, while the control group was taught using the direct instruction model. At the end of the learning, students in both groups were given a final mathematical problem-solving ability test.

The RADEC learning model variable with a differentiated learning strategy is a learning model with syntax that starts from reading (Read), answering (Answer), discussing (Discussion), presenting/presenting discussion results (Explain), and ending with creating (Create). The direct instruction model variable is a learning model with syntax that starts from the presentation of information by the teacher, exercises, and ends with evaluation.

The mathematical problem-solving ability variable is the ability of students to solve mathematical problems using Polya's steps (Leonisa & Soebagyo, 2022).The learning style variable is students' preferred and habitual way of learning. Learning styles in this study are grouped into 3, namely auditory learning styles, visual learning styles, and kinesthetic learning styles. Determination of students' learning styles using a questionnaire instrument (Sugianto, 2021).

The population of this study was all grade X SMA students in Palu City registered in DAPODIK in 2023, consisting of public and private SMA students. There are 11 public SMA schools in Palu City and 18 private SMA schools. The number of grade X SMA students in Palu City is 3656, who are spread into 126 study groups. A research sample of 372 was taken from the population. The samples were taken from 3 schools, namely SMA Negeri 4 Palu, SMA Model Terpadu Madani Palu, and SMA Al-Azhar Palu. Researchers selected samples using purposive random sampling techniques because the students being taught had to follow the Merdeka curriculum material and had heterogeneous learning styles in each class.

The data in this study are quantitative, namely: 1) data on students' problem-solving abilities collected using test instruments, and 2) data on students' learning styles collected using learning style questionnaires. The data were analyzed using descriptive statistical analysis techniques and inferential statistics. The descriptive statistics used are mean, maximum value, minimum value, median, and standard deviation. Meanwhile, the inferential statistics used are t-statistics and two-way ANOVA, and a prerequisite test analysis, namely, a data normality test and a data homogeneity test (Sugiyono, 2019).

## Results and Discussion

The results of descriptive statistical analysis of problem-solving ability data for the experimental class and control class can be seen in Table 1.

**Table 1.** Descriptive Statistics of Problem-Solving Ability Data for the Experimental Class and Control Class

| Statistics | Experimental Class | Control Class |
|---|---|---|
| Number of data | 186 | 186 |

| | | |
|---|---|---|
| Minimum Score | 44 | 14 |
| Maximum Score | 100 | 96 |
| Mean | 79,63 | 50,72 |
| Standard Deviation | 11,623 | 20,183 |

Based on Table 1, the Maximum score of students in the experimental class was 100, while in the control class, it was 96. The minimum score of students in the experimental class was 44, while in the control class, it was 14. The mean score of students in the experimental class was 79.82, while the mean score of students in the control class was 50.72.

The next analysis is the normality test (Vicy et al., 2024) and its homogeneity (Sabri et al., 2022). The results of the calculation of the normality test of the problem-solving ability data of students taught using the RADEC learning model and the direct instruction model are presented in Table 2.

**Table 2.** Normality Test of Problem-solving Ability Data for Experimental and Control Classes

| **Learning Model** | **Number of data** | **Kolmogorov-Smirnov Test** | | |
|---|---|---|---|---|
| | | **Statistics** | **Df** | **Sig.** |
| RADEC (Eksperiment class) | 186 | 0,064 | 186 | 0,062 |
| Direct Instruction (Control class) | 186 | 0,061 | 186 | 0,091 |

Based on Table 2, it can be seen that in the sig. column, the significance of the RADEC learning model (experimental class) is 0.062 and the significance of the direct instruction model is 0.091. These values are greater than $\alpha = 0.05$ which means that the data is normally distributed.

Furthermore, the data homogeneity test was carried out to test the two groups of data, namely the experimental class and the control class, had the same variance. Testing using the Levene Test with the help of the SPSS 24 application obtained results such as Table 3.

**Table 3.** Homogeneity Test of Students' Problem-Solving

| **Variables** | **Based** | **Levene's Statistic** | **Df1** | **Df2** | **Sig.** |
|---|---|---|---|---|---|
| Problem-solving | Mean | 0,879 | 1 | 370 | 0,563 |

Based on Table 3, the obtained sig value = 0.563 > 0.05. The significance value is greater than $\alpha = 0,05$ so it is concluded that the two groups of data are homogeneous. The results of the prerequisite test, namely the normality and homogeneity tests, all provide conclusions to carry out the research hypothesis test, then further hypothesis testing is carried out. The statistic used is the t-test whose results are shown in Table 4.

**Table 4.** Research Hypothesis Test Based on Problem-Solving Ability

| **Assumption** | **t** | **Df** | **Sig. (two-sided)** |
|---|---|---|---|
| Variances are equal | 16,246 | 370 | 0,000 |

Based on Table 4, it can be seen that the results of the t-statistic calculation obtained are 16.246. If $\alpha = 0,05$ and Df = 370, then ttable = 1.645 is obtained. When comparing the t value = 16.246 and the ttable value, it appears that t > ttable, so the H0 hypothesis is rejected, or H1 is accepted. When viewed, the sig value = 0.000 is smaller than 0.05, this also provides information that the H0 hypothesis is rejected. This means that there is a significant impact of the RADEC learning model with differentiated learning strategies on the mathematical problem-solving abilities of high school students in Palu City. The RADEC Learning Model can improve student learning outcomes (Nugraha & Prabawanto, 2021). The RADEC learning model, when combined with different learning strategies, significantly improves students' mathematical problem-solving abilities. Research shows that the RADEC model fosters a more engaging and effective learning environment, leading to better learning outcomes (Widodo et al., 2024).

The analysis of problem-solving abilities is then based on students' learning styles. Students are grouped into 3 learning style groups, namely auditory learning styles, kinesthetic learning styles, and visual learning styles. The results of the descriptive statistical analysis of students' problem-solving ability data based on learning styles can be seen in Table 5.

**Table 5.** Results of Descriptive Statistical Analysis of Problem-Solving Ability Data for Experimental Classes and Control Classes Based on Learning Styles

| Statistics | Experiment Class | | | Control Class | | |
|---|---|---|---|---|---|---|
| | Auditorial | Kinesthetic | Visual | Auditorial | Kinesthetic | Visual |
| Number of data | 62 | 62 | 62 | 62 | 62 | 62 |
| Minimum Score | 54 | 44 | 52 | 14 | 20 | 18 |
| Maximum Score | 100 | 100 | 100 | 96 | 94 | 92 |
| Mean | 79,97 | 78,52 | 78,52 | 50,77 | 49,81 | 51,58 |
| Standard deviation | 12,537 | 12,706 | 13,917 | 20,445 | 19,924 | 20,465 |

Based on Table 5, it appears that the mean score of students in the experimental class with an auditory learning style is 79.97. This mean is greater than the mean score of students in the control class with an auditory learning style which is only 50.77. The same thing also happened to students with a kinesthetic learning style. In the experimental class, it was 78.52 while in the control class, it was 49.81. For students with a visual learning style in the experimental class, it was 78.52 while in the control class, it was 51.58. This fact shows that the impact of the RADEC learning model with a differentiated learning strategy is higher than the impact of the direct instruction model on the mathematical problem-solving abilities of high school students in Palu City.

Furthermore, the research hypothesis test was carried out "there is a significant impact of the RADEC learning model with a differentiated learning strategy in terms of students' learning styles on the mathematical problem-solving abilities of high school students in Palu City".

The statistics used to test the hypothesis are the Two-Way ANOVA test. The calculation results using the help of the SPSS version 25 application are stated in Table 6.

**Table 6.** Results of ANOVA Test of Students' Problem-Solving Ability Reviewed from Learning Style

| Source | The sum of Squares Kuadrat | Df | Mean Square | F | Sig |
|---|---|---|---|---|---|
| Learning Model | 23712,097 | 1 | 23712.097 | 211,523 | 0,000 |
| Learning Style | 399,376 | 2 | 199,688 | 1,781 | 0,170 |
| Learning Style*Learning Model | 41,097 | 2 | 20,548 | 0,183 | 0,833 |

Based on Table 6, it can be seen that the significance in the row "Learning Style" is 0.170. This value is greater than 0.05 so the hypothesis H0 is accepted or H1 is rejected. This condition indicates that there is no significant impact of the learning model in terms of students' learning styles on the mathematical problem-solving abilities of high school students in Palu City. In another row, namely in the row "Learning Model", the significance obtained is 0.000, which means that there is a difference in the impact of the two learning models without looking at the student's learning styles.

Because there was no interaction between the learning model and the learning style of students, the RADEC learning model can be more flexibly applied by teachers in the classroom. Teachers can use various types of teaching materials at the reading stage, then students can implement the understanding from the results of reading the teaching materials at the discussion and create stages (Maulana et al., 2022). The RADEC learning model (Read, Answer, Discussion, Explain, Create) does not specialize in one learning style, but focuses more on a structured and holistic learning process (Sopandi et al., 2021). The RADEC learning model is designed to improve understanding and thinking skills through five steps, namely: reading (Reading), answering questions (Answer), discussion (Discussion), explaining (Explain), and creating (Create) (Rahayu et al., 2021).

The RADEC Learning Model is not explicitly aimed at a particular learning style (Pratama et al., 2019). This learning model can be applied with flexibility to meet the various learning styles of students. For example, in the reading step (Read), teachers can adjust to the learning style of students. In this study, researchers provided learning resources in the form of textbook reading materials, learning videos, and interactive media applications plip PDF. Visual learning style students are given textbooks that are dominated by images, graphs, and charts. Auditory learning style students learn by listening to learning videos. Kinesthetic learning style students learn by opening interactive media applications plip PDF.

## Conclusion

Based on the results of the research and discussion, it is concluded that the RADEC learning model with a differentiated learning strategy has a greater impact when compared to the direct instruction model on the mathematical problem-solving abilities of high school students in Palu City. The average score of the problem-solving abilities of students who follow the

RADEC learning model is 79.63. The average score of problem-solving of students who follow the direct instruction model is 50.72. The RADEC learning model does not have a different impact on the mathematical problem-solving abilities of high school students in Palu City based on learning styles.

## Conflicts of Interest

No conflict of interest regarding the publication of this manuscript.

## References

Ardilla, F. T., Bambang, R., & Annisa, D. (2023). Kontribusi Motivasi Terhadap Hasil Belajar Matematika Siswa Kelas VIII. Peluang, 11(1), 1–7. https://doi.org/10.24815/jp.v11i1.32282.

Barlian, U. C., Solekah, S., & Rahayu, P. (2022). Implementasi Kurikulum Merdeka dalam Meningkatkan Mutu Pendidikan. Journal of Educational and Languange Research, 1(12), 1–52. https://doi.org/10.53625/joel.v1i12.3015

Chairunnisa, C. C., & Sukardi, R. R. (2022). Model Read, Answer, Discuss, Explain, and Create untuk Meningkatkan Hasil Belajar IPS Siswa Pada Pembelajaran Daring. Jurnal Educatio FKIP UNMA. https://www.ejournal.unma.ac.id/index.php/educatio/article/view/1819

Dinia, S., Nurhafifah, Y. A., Mayasari, Patimah, S., & Hidayat, W. (2019). Analisis Kesulitan Kemampuan Pemecahan Masalah Matematis Ditinjau dari Kemampuan Disposisi Matematis Siswa. Journal of Honai Math, 2(1), 65–76. https://doi.org/10.30862/jhm.v2i1.59

Firmansyah, E., Mubarika, M. P., Taryudi, T., & Ratnasari, S. (2020). Penggunaan Model Pembelajaran Problem Based Learning Untuk Meningkatkan Kemampuan Pemecahan Masalah Dan Motivasi Belajar Siswa. EDU-MAT: Jurnal Pendidikan Matematika, 8(1), 62–73. https://doi.org/10.20527/edumat.v8i1.7687

Inayah, N. (2016). Pengaruh Kemampuan Penalaran Matematis dan Gaya Kognitif terhadap Kemampuan Komunikasi dan Koneksi pada Materi Statistika Siswa SMA. Journal Educational, Science and Technology (EST), 2(2), 74–80. https://doi.org/10.26858/est.v2i2.2105

Lean A.R., D., & Darmawan, P. (2023). KI HAJAR DEWANTARA Dea Lean Arsy Rosyah *, Puguh Darmawan. Jurnal Ekonomi, Bisnis Dan Pendidikan, 3(9). https://doi.org/10.17977/um066.v3.i9.2023.5

Leonisa, I., & Soebagyo, J. (2022). Strategi Siswa dan Langkah Polya dalam Penyelesaian Masalah Matematis Berbasis HOTS. Proximal: Jurnal Penelitian Matematika Dan Pendidikan Matematika, 5(2), 77–86. https://doi.org/10.30605/proximal.v5i2.1852

Madusila, Y. S., & Rosidi, M. I. (2024). Peningkatan Kualitas Pembelajaran Dan Profesionalis Guru. Jurnal Ilmu Pendidikan Nasional (JIPNAS), 2(1), 45–50. https://doi.org/10.59435/jipnas.v2i1.312

Maulana, Y., Sopandi, W., Sujana, A., & ... (2022). Development and Validation of Student Worksheets Air Theme based on the RADEC Model and 4C Skill-oriented. Jurnal Penelitian …. https://jppipa.unram.ac.id/index.php/jppipa/article/view/1772

Mayasari, D., Natsir, I., Pagiling, S. L., & Taufik, A. R. (2021). Developing Student Worksheet-Based Cooperative Learning Model for Improving Problem Solving Ability. Journal of Honai Math, 4(2), 161–172. https://doi.org/10.30862/jhm.v4i2.195

Nabilah, S., Muslim, & Rusyati, L. (2024). Analysis of High School Students' Literacy Using the Pisa Framework. Proceedings of International Conference on EducationTeacher Training and Education Faculty Universitas Serambi Mekkah, 2(1), 687–693. https://doi.org/10.32672/pice.v2i1.1346

Nugraha, T., & Prabawanto, S. (2021). Analisis Adaptasi Kecenderungan Gaya Belajar Siswa Terhadap Kemampuan Pemahaman Konsep Matematis Selama Pembelajaran Jarak Jauh. Paedagogia: Jurnal Penelitian Pendidikan, 24(2), 174–186. https://doi.org/10.20961/paedagogia.v24i1.54182

Pohan, A., & Abidin, Y. (2020). Model Pembelajaran RADEC dalam Pembelajaran Membaca Pemahaman Siswa. Seminar Internasional Riksa Bahasa XIV, 496, 250–258. http://proceedings2.upi.edu/index.php/riksabahasa/article/view/1354

Pratama, Y. ., Sopandi, W., & Hidayah, Y. (2019). RADEC Learning Model (Read-Answer-Discuss-Explain and Create): The Importance of Building Critical Thinking Skills In Indonesian Context. International Journal for Education and Vocational Studies, 1(2), 109–115. https://doi.org/https://doi.org/10.29103/ijevs.v1i2.1379

Purnawanto, A. T. (2023). Pembelajaran Berdiferensiasi. Jurnal Ilmiah Pedagogy, 16(1), 35–54. http://www.jurnal.staimuhblora.ac.id/index.php/pedagogy/article/view/152

Rahayu, A. H., Sopandi, W., Anggraeni, P., & ... (2021). Keterampilan Berpikir Kritis Mahasiswa PGSD Melalui Model Read-Answer-Discuss-Explain-and Create (RADEC) Berorientasi Masalah. Jurnal Educatio FKIP …. https://www.ejournal.unma.ac.id/index.php/educatio/article/view/1170

Restiani, N. D., Rahmawati, A. F., Amalia, N. Y., Suryandari, K. C., & Hidayah, R. (2023). Analysis of Mathematical Difficulties Facing Class IV Students in Dealing with Numeration Ability in the Age of Independent Curriculum. Social, Humanities, and Educational Studies (SHES): Conference Series, 6(1), 120–129. https://doi.org/10.20961/shes.v6i1.71066

Sabri, M., Muhammad, S., & Sulaiman. (2022). The Contribution of Principal Supervision and Motivation of Teacher Work Towards Teacher Attitudes to Work and Implementation of Teaching at State Junior High School in Bati-Bati District, Tanah Laut Regency. International Journal of Social Science and Human Research, 05(06), 2661–2666. https://doi.org/10.47191/ijsshr/v5-i6-100

Sartika, S., Dahlan, D., & Waspada, I. (2018). Kompetensi Guru dan Motivasi Belajar Siswa Terhadap Hasil Belajar Melalui Kebiasaan Belajar Siswa. Jurnal MANAJERIAL, 17(1), 39–51. https://doi.org/10.17509/manajerial.v17i1.9760

Sartini, & Mulyono, R. (2022). Analisis Implementasi Kurikulum Merdeka Belajar untuk Mempersiapkan Pembelajaran Abad 21. Didaktik : Jurnal Ilmiah PGSD FKIP Universitas Mandiri, 8(2), 1348–1363. https://doi.org/10.36989/didaktik.v8i2.392

Sopandi, W. (2019). Sosialisasi dan Workshop Implementasi Model Pembelajaran RADEC Bagi Guru-Guru Pendidikan dasar dan Menengah. Pedagogia: Jurnal Pendidikan. https://pedagogia.umsida.ac.id/index.php/pedagogia/article/view/1425

Sopandi, W, & Handayani, H. (2019). The Impact of Workshop on Implementation of Read-Answer-Discuss-Explain-And-Create (RADEC) Learning Model on Pedagogic Competency of Elementary School. Proceedings of the 1st International Conference on Innovation in Education (ICoIE 2018). https://www.atlantis-press.com/proceedings/icoie-18/55912858

Sopandi, Wahyu, Sujana, A., Sukardi, R., Sutinah, C., Yanuar, Y., & Imran, M. E. (2021). Model Pembelajaran RADEC (Teori dan Implementasi di Sekolah). Bandung: UPI Press.

Sugianto, A. (2021). Kuesioner Gaya Belajar Siswa. https://repo-dosen.ulm.ac.id/bitstream/handle/123456789/26041/Angket Gaya Belajar 2021.pdf?sequence=1&isAllowed=y

Sugiyono. (2019). Statistika untuk Penelitian. Bandung: Alfabeta.

Tampubolon, R., Gulo, Y., & Nababan, R. (2022). Pengaruh Reformasi Kurikulum Pendidikan Indonesia Terhadap Kualitas Pembelajaran. Jurnal Darma Agung, 30(2), 389–395. https://doi.org/10.46930/ojsuda.v30i2.1748

Trisna Yanti, N. M. D., Jayanta, I. N. L., & Suarjana, I. M. (2020). Pengaruh Model Pembelajaran Course Review Horay Berbantuan Media Visual Terhadap Hasil Belajar Matematika. Jurnal Penelitian Dan Pengembangan Pendidikan, 4(3), 463. https://doi.org/10.23887/jppp.v4i3.27462

Vicy, Mustaji, Mariono, A., & Arianto, F. (2024). Analysis of the Effectiveness of Project - Based Seamless Learning Model on Concept Understanding. Journal of Education, Society and Behavioural Science, 37(6), 307–320. https://doi.org/10.9734/jesbs/2024/v37i61347

Widodo, Suciati, & Hidayat, R. (2024). Implementasi Model Pembelajaran RADEC (Read Answer Discuss Explain Create) Serta Dampaknya pada Kemampuan Berpikir Tingkat Tinggi dan Kemampuan Komunikasi. Jurnal Studi Guru Dan Pembelajaran, 7(1), 270–285. https://doi.org/10.30605/jsgp.7.1.2024.9999

Wiwin, H. (2021). Optimalisasi Kebutuhan Murid dan Hasil Belajar dengan Pembelajaran Berdiferensiasi. Perspektif Ilmu Pendidikan, 35(2), 175–182. https://doi.org/10.21009/pip.352.10

Wuryanto, H., & Abduh, M. (2022). Mengkaji Kembali Hasil PISA sebagai Pendekatan Inovasi Pembelajaran untuk Peningkatan Kompetensi Literasi dan Numerasi. Direktorat Guru Pendidikan Dasar. https://gurudikdas.kemdikbud.go.id/news/mengkaji-kembali-hasil-pisa-sebagai-pendekatan-inovasi-pembelajaran--untuk-peningkatan-kompetensi-li