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IMPLEMENTATION OF DIFFERENTIATED LEARNING USING A PROJECT-BASED LEARNING MODEL TO IMPROVE STUDENTS' MATHEMATICAL PROBLEM-SOLVING ABILITY

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Abstract
This study aimed to determine the difference between students who learn with differentiated Learning by applying the project-based learning model and students who learn by applying the class X expository model on the material of the three-variable equation system. This research uses a quantitative approach with a quasi-experimental type. The data collection techniques used are questionnaires, tests, and observations. The main instrument consisted of questionnaires and test sheets, and supporting instruments consisted of teaching modules and student worksheets. The data analyzed were qualitative data describing learning activities and quantitative data describing pretest and posttest problem-solving ability data in experimental and control classes. The research hypothesis uses the Man Whitney U test; it is found that the mathematical problem-solving ability of students who learn with differentiated Learning using a project-based learning model is higher than that of students who learn with expository with a significance level of 0.05, and the acquisition of a significance value of 0.00.

Keywords: Differentiated Learning, PjBL, Problem Solving

Abstrak
Penelitian ini bertujuan untuk mengetahui perbedaan siswa yang belajar dengan pembelajaran terdiferensiasi menerapkan model *project based learning* dengan siswa yang belajar dengan menerapkan model ekspositori kelas X pada materi Sistem Persamaan Tiga Variabel. Penelitian ini merupakan penelitian kuantitatif dengan jenis kuasi eksperimen. Teknik pengumpulan data yang digunakan yaitu angket, tes, dan observasi. Instrumentnya yaitu instrument utama yang terdiri atas lembar angket dan lembar tes serta intrumen pendukung terdiri atas modul ajar dan lembar kerja peserta didik. Data yang dianalisis berupa data kualitatif yang menjelaskan tentang kegiatan pembelajaran serta data kuantitatif yang menjelaskan data kemampuan pemecahan masalah pretest dan postest pada kelas eksperimen dan kelas kontrol. Hipotesis penelitian ini menggunakan uji *Man Whitney U,* didapatkan bahwa kemampuan pemecahan masalah matematis siswa yang belajar dengan pembelajaran terdiferensiasi menggunakan model *project based learning* lebih tinggi dibandingkan siswa yang belajar dengan model pembelajaran ekspositori dengan taraf signifikan 5% dan perolehan nilai signifikansi sebesar 0,00.

Kata Kunci: Pembelajaran Terdiferensiasi, PjBL, Pemecahan Masalah

INTRODUCTION

Education is critical in determining the country's future (Saragih, 2021). Education must be of good quality so that superior human resources are formed and can make changes and progress in a nation. In addition, education is also required to be more innovative and dynamic in helping to develop the abilities and potential of students and their characteristics towards a better and more positive direction (Hamidi, 2018; Fitra, 2022). Based on the Law on National Education System No. 20 of 2002, education units, cultural potential, and students develop the curriculum at all levels and types of education (Wahyuningsari et al., 2022). That is also in line with the philosophy of Ki Hajar Dewantara, who argues that each person or individual has their uniqueness. Children's education should look at the nature of the child and relate it to the nature of the times. Teachers must pay attention to diversity and not impose specific learning methods on students based on theories they consider helpful. Students also have the right to Learning that suits their preferred way of Learning, and an educator must understand and facilitate the diversity of student learning (Fajri & Trisuryanti, 2021; Avivi et al., 2023).

Differentiated Learning is a facilitative approach that can accommodate diversity, particularly in the context of the current independent curriculum. This method tailors instruction to meet student's individual learning needs, allowing teachers to support learners effectively according to their specific requirements. As each student possesses unique characteristics, differentiated Learning aims to address these distinctions (Pitaloka & Arsanti, 2022). Tomlinson (2001), in his book titled "How to Differentiate Instruction in Mixed Ability Classroom," emphasizes that differentiated Learning can be adjusted to meet students' needs throughout the learning process. These needs encompass three key aspects: learning readiness, interests, and the student's learning profile. Differentiated Learning benefits teachers and students, ensuring that each student is treated according to their needs. That enables teachers to conduct, implement, and assess the learning process accurately and appropriately, eliminating the need for artificial interventions (Himmah & Nugraheni, 2023).

Mathematics is a collection of numbers, symbols, and abstract calculation operations that require understanding and concentration during execution. Many students perceive mathematics as a subject that could be more exciting, challenging, and exciting. Therefore, mathematics lessons should be taught engagingly, connected to the real world, and utilizing various models, approaches, and creativity in the mathematical process to create an enjoyable learning atmosphere (Nurfitriyanti, 2016; Setyowati et al., 2020). Students should be encouraged to think creatively and innovatively in the learning process and take responsibility for what they learn (Pratiwi et al., 2023). They are also required to possess the ability to solve problems they encounter, whether these problems occur in school or within the community (Achsin, 2016).

The problem-solving definition provided by Polya (1973) is an effort to overcome an existing problem to achieve a specific goal. The ability to solve problems is also present in mathematics education, focusing on students' mathematical problem-solving skills. According to NCTM (2000), problem-solving is a crucial aspect of mathematics learning and should be incorporated into the curriculum. Thus, it is clear that problem-solving is also a part of the goals of mathematics education and serves as a tool to help students understand mathematical concepts. The ability to solve mathematical problems includes the capacity to comprehend the problem, create a mathematical model, solve the model, and interpret and provide solutions that are found (Khoirunisa & Hartati, 2017).

Based on interviews with teachers at SMA Negeri 1 Bintan Timur, it was found that the students' problem-solving abilities are primarily low. This is because students need to plan their solutions more effectively, indicating the need for habituation to enable students to think critically when planning problem-solving activities. According to research conducted by Melindarwati and Munandar (2022), students have yet to execute it in the planning stage. That is attributed to students' difficulty in creating mathematical models to be applied in solving problems.

Based on the teaching experience of the mentioned teacher, one of the topics that students find challenging to understand is the material on systems of linear equations with three variables. Only 40% of the students can apply the concepts of systems of linear equations with three variables to solve contextual problems. That is attributed to students' difficulties in comprehending word problems, and they need help with analyzing contextual problems that need to be translated into mathematical models in the context of systems of linear equations with three variables. Furthermore, students need clarification in problem-solving for the given word problems. Mathematics lessons, such as systems of linear equations with three variables, are closely related to solving real-life problems. However, many students need help with mathematical models, determining assumptions, and making conclusions when solving problems (Asdamayanti et al., 2023).

Teachers can enhance students' mathematical problem-solving abilities by creating an environment that aligns with individual learning styles, such as auditory, visual, and kinesthetic. That aims to ensure that learning objectives can be effectively achieved. Each student has a unique learning style, resulting in diverse learning approaches. Therefore, teachers must understand students' learning styles when delivering instructional materials. Considering these learning style differences, students are likelier to improve their concentration and better understand the learning materials (Shaputra & Supardi, 2019; Rambe & Yarni, 2019).

Another effort that teachers can undertake to realize innovative Learning and improve students' mathematical problem-solving abilities is by designing an appropriate instructional model. According to Gultom et al. (2022), a suitable instructional model can create an enjoyable learning atmosphere and make it easier for students to absorb the lessons. One instructional model that can assist students in enhancing their mathematical problem-solving skills is the Project-Based Learning (PjBL) model. The Project-Based Learning model employs real-life or contextual problems to help students become more independent, boost their confidence, and construct their knowledge. This model also offers a conceptual framework to aid students in conducting activities, thereby influencing the application of Project-Based Learning on students' mathematical problem-solving abilities (Nuffitriyanti, 2016; Afilin, 2023).

The current implementation of the Project-Based Learning model often overlooks students' characteristics and unique, diverse needs. Without considering students' interests and learning styles, the assigned project tasks are nearly always the same for all students, leading to a lack of problem-solving abilities among students (Herwina, 2021; Wahyuni et al., 2023). According to Walidain et al. (2023), teachers must be able to differentiate instruction in Learning if they want to enhance students' problem-solving abilities. Therefore, this research proposes project-based Learning with diverse strategies, specifically through differentiated Learning. Differentiated Learning can be applied and used by teachers to meet the diverse learning needs of students based on their learning styles.

Based on the background previously outlined, research is needed to investigate the implementation of differentiated Learning using the Project-Based Learning (PjBL) model. Therefore, the researcher will conduct a study titled "Implementation of Differentiated Learning Using the Project-Based Learning Model to Enhance Students' Mathematical Problem-Solving Abilities." The researcher will specifically focus on differentiated Learning based on students' learning styles.

METHOD

This research was conducted at SMA Negeri 1 Bintan Timur. The method used was quantitative. According to Sugiyono (2019), this method is employed to investigate a population or sample by collecting data using research tools and analyzing data with a quantitative or statistical approach. Its main objective is to test hypotheses formulated beforehand. The population in this study consisted of 10 classes, from X.A to X.J. Then, the sampling technique used was Cluster sampling. Cluster sampling is a technique of determining samples in groups, where the sampling is based on specific groups or areas (Sugiyono, 2019). Class X.D was designated as the control group, and class X.C was designated as the experimental group, each with 40 students.

The research design used in this study was a nonequivalent-only control group design, involving two groups receiving different treatments and undergoing the same pretest and posttest. The first group was the experimental group receiving differentiated Learning using the Project-Based Learning model, while the second group was the control group receiving expository Learning. The data collection techniques included a learning style questionnaire, testing, and observation techniques. The main research instruments used were the learning style questionnaire, a test of mathematical problem-solving abilities, and teaching instruments such as teaching modules and student worksheets.

This study aimed to determine the difference in improving mathematical problem-solving abilities between students learning through differentiated Learning using the Project-Based Learning model and students learning through expository Learning. Therefore, preliminary tests are conducted before hypothesis testing using the data analysis technique. The prerequisite tests used are the normality test and the homogeneity test. The hypothesis testing is based on the N-gain values of the pretest and posttest in the experimental and control groups. If the N-gain data is normally distributed, the Independent T-test is used. However, the Mann-Whitney U test is employed if the N-gain data is not normally distributed.

RESULT AND DISCUSSION

The researcher conducted the learning activities in two classes selected as research samples, namely the experimental and control classes. The instruction followed the teaching module designed by the researcher, which had received approval from teachers and professors for use in the classroom learning process. The researcher implemented differentiated Learning using the Project-Based Learning model in the experimental class and the expository learning model in the control class.

The number of students in classes X.C. and X.D. is 40, but only 38 students participated in the pretest in both classes. That is due to 2 students needing to be present. However, during the posttest, all students took the test in class X.C, and only one student was absent in class X.D. That resulted in incomplete data. Only complete data will be analyzed since the pretest and posttest data are paired. Microsoft Excel calculated the average, N-gain values, and standard deviations of students' mathematical problem-solving abilities in the experimental and control classes. The results of these calculations can be presented in Table 1 below.

Table 1. Mathematical Problem-Solving Ability Data

Information	Eksperimental Class			Control Class		
	pretest	posttest	N-Gain (%)	pretest	posttest	N-Gain (%)
The Highest Score	25	97,2	96,9	44,4	100	100
The Lowest Score	0	33.3	33,3	0	16,7	16,7
Average	7,21	69,3	67,2	10,3	52,6	48,6
Standard Deviation	9,27	18,47	19,1	10,8	22,1	21,7

Based on the calculation results of the N-gain test, it is shown that the average N-gain value for the experimental class, which learned through differentiated Learning using the Project-Based Learning model, is 67.2%, categorized as medium. The lowest N-gain value is 33.3%, and the highest is 96.9%. Meanwhile, the average N-gain for the control class, learned through the expository learning model, is 48.6%, categorized as low, with the lowest N-gain being 16.7% and the highest 100%. Additionally, the standard deviation for the experimental and control classes shows a relatively close yet significant difference, where the N-gain standard deviation for the experimental class is 19.1%. For the control class, it is 22.1%. That indicates that the distribution of N-gain values in the control class is more evenly spread compared to the experimental class.

Furthermore, the gains in the experimental and control classes tend to be high. Based on the N-gain values above, it is evident that the average N-gain for the experimental class is higher than the average N-gain for the control class. Statistical tests need to be conducted to determine the significance of this difference. Specific prerequisites must be met to perform the statistical test, such as conducting tests for normality and homogeneity.

The Normality Test is required for testing through the SPSS software using the Shapiro-Wilk test. The results of the normality test are shown in Table 2.

Table 2. The results of the Normality Test

Tests of Normality *Shapiro-Wilk*		
Information	**Eksperimental Class (Sig)**	**Control Class (Sig)**
N-Gain	0,051	0,027

Based on the table, with a significance level (α) of 0.05, the normality test results indicate that the normalized N-Gain in the experimental and control classes can be observed. The results show that Sig. for the experimental class > α is 0.051 > 0.05, indicating that the data in the experimental class is usually distributed. However, the data for the control class indicates that it is not generally distributed as Sig. for the control class < α, which is 0.027 < 0.05.

Based on the normality results using the N-gain data from the experimental class and the N-gain data from the control class, it is found that the data for one class, namely the control class, is not normally distributed. Therefore, there is no need to conduct a homogeneity test, and a relevant non-parametric statistical test will be performed using the Mann-Whitney U test.

Based on the normality test results as a prerequisite, hypothesis testing is conducted using the Mann-Whitney U test for N-gain data, with the statistical hypothesis formulated as follows.

$H_0: \eta_{eks} = \eta_{kon}$

$H_a: \eta_{eks} > \eta_{kon}$

Information:

η_{eks}: The median N-gain of mathematical problem-solving abilities for the experimental class

η_{kon}: The median N-gain of mathematical problem-solving abilities for the control class

$H_0: \eta_{eks} = \eta_{\ kon}$: The median N-gain of students' mathematical problem-solving abilities who learned through differentiated Learning using the Project-Based Learning model is equal to that of students who learned through expository Learning

$H_a: \eta_{eks} > \eta_{kon}$: The median N-Gain of students' mathematical problem-solving abilities who learned through differentiated Learning using the Project-Based Learning model is higher than that of students who learned through expository Learning.

The testing criteria used have a significance level of 0.05, so H_0 Conversely, if Asymp.Sig > α, then H_0 is accepted, or H_a is rejected. The test conducted is one-tailed (right-tailed test), so the Asymp.Sig (2-tailed) value needs to be divided by 2 (Uyanto, 2009). The test results can be seen in the following table.

Table 3. The results of the *Mann-Whitney U* Test

Information	N-Gain Score
Mann-Whitney U	379.000
Z	-3.564
Asymp. Sig. (2-tailed)	.000

Based on the "Test Statistic" output, it is known that the Asymp.Sig. (2-tailed) value is 0.000 < α. Since the study conducts a one-tailed (right-tailed) test, the Asymp. The sig value needs to be divided by two, i.e.,$\frac{0{,}000}{2} = 0{,}000$. The Asymp.sig value for this one-tailed test is smaller than 0.05, so it is concluded that H_0 is rejected and H_a is accepted. Therefore, it can be stated that the mathematical problem-solving abilities of students who learned through differentiated Learning using the Project-Based Learning model are higher than the mathematical problem-solving abilities of students who learned through expository Learning.

Based on the results of the Mann-Whitney test in Table 3, it is evident that the difference is significant. The mathematical problem-solving abilities of students in the material of Systems of Linear Equations with Three Variables who learned through differentiated Learning using the Project-Based Learning model were higher than those of students who received expository Learning, with a significant level of 0.05 and a significance value of 0.00. That is reasonable, as mentioned by Yanti & Novaliyosi (2023) that training students' mathematical problem-solving abilities requires the application of a learning model that supports an active learning environment, involves direct student activities and creativity, and encourages the exchange of ideas through investigative activities. Project-based Learning, with its characteristics, is one of the learning models that can assist students in acquiring solid knowledge and skills through project-based activities, thus enhancing student activity and creativity. Based on the research conducted by Hardiningsih et al. (2023) shows the effectiveness of the Project-Based Learning model in improving the mathematical and statistical problem-solving abilities of students. A 33.3% improvement in problem-solving abilities from cycle I to cycle II is a positive indication of the implementation of this model.

Additionally, after implementing project-based Learning, student and teacher activities increased from cycles I to II. Furthermore, the findings of the research conducted by Prastowo and Waluya (2019) indicate that the average problem-solving abilities in the PjBL model are better than those in expository Learning. This evidence convincingly supports that this learning approach is an effective alternative to enhance students' problem-solving abilities.

One crucial aspect of the independent curriculum is differentiated Learning, which involves using varied teaching methods. Each student has a different learning style, so teachers need to utilize various teaching methods that suit the needs of each student. Adjusting Learning to students' learning styles is one form of differentiation strategy teachers employ (Wahyuni et al., 2023). Research conducted by Permana and Amry (2013) further supports this, finding that it can positively impact students' mathematical problem-solving abilities.

Additionally, based on the research by Siburian et al. (2019), the results show an improvement in the mathematical problem-solving abilities of students who undergo differentiated instruction compared to those in conventional Learning. In the independent curriculum, one of the models used is problem—and project-based Learning, which eventually generates the Pancasila learner profile. Therefore, one model that can be integrated with differentiated Learning is Project-Based Learning tailored to learning styles (Elyani et al., 2019; Gusteti & Neviyarni, 2022).

Hardiningsih et al. (2023) state that implementing the Project-Based Learning (PjBL) model in mathematics education requires careful planning. Teachers must consider psychological aspects such as students' learning styles and readiness to learn. Additionally, teachers must identify students' prior understanding so weaknesses from past experiences can be addressed with engaging and enjoyable learning approaches. Implementing differentiated Learning using the Project-Based Learning model can enhance students' problem-solving abilities more effectively because students will create products according to their learning styles.

CONCLUSION

Based on the results and discussions of the research on "Implementation of Differentiated Learning Using the Project-Based Learning Model to Improve Students' Mathematical Problem-Solving Abilities on the Material of Systems of Linear Equations with Three Variables in Class X SMA," it can be concluded that the mathematical problem-solving abilities of students who learned through differentiated Learning using the Project-Based Learning model were higher compared to students who received expository Learning on the material of systems of linear equations with three variables in Class X SMA. That indicates that differentiated Learning using the Project-Based Learning model significantly impacts students' mathematical problem-solving abilities compared to implementing expository Learning.

Based on the implementation and results of the research, it is recommended that teachers adopt instructional models that consider the activeness and characteristics of students as an implementation of the independent curriculum, such as implementing differentiated Learning using the Project-Based Learning model. Additionally, this research is expected to serve as a reference for future studies, particularly in efforts to enhance the various mathematical learning abilities of students. Subsequent research is hoped to develop further and explore additional aspects of students' mathematical learning abilities.

REFERENCES

[1] Achsin, M. (2016). Kemampuan pemecahan masalah pada PBL pendekatan kontekstual dalam tinjauan inventori kesadaran metakognitif. *PRISMA, Prosiding Seminar Nasional Matematika*, *150*, 696–

704. https://journal.unnes.ac.id/sju/index.php/prisma/article/view/21684.
[2] Afilin, K. M. (2023). Penerapan pembelajaran terdiferensiasi menggunakan model project based learning untuk meningkatkan hasil belajar matematika Sekolah Dasar Negeri jetis 3 sukoharjo. *6*, 36–46.
[3] Asdamayanti, N., Nasution, E. Y. P., & Sari, M. (2023). Analisis kemampuan pemecahan masalah matematis siswa madrasah aliyah pada materi SPLTV. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *7*(2), 1141–1152. https://doi.org/10.31004/cendekia.v7i2.2084.
[4] Ayu Sri Wahyuni, I Wayan Redhana, & I Nyoman Tika. (2023). Pengaruh model pembelajaran berbasis proyek dengan strategi berdiferensiasi terhadap keterampilan berpikir kreatif. *Jurnal Pendidikan Mipa*, *13*(1), 274–283. https://doi.org/10.37630/jpm.v13i1.824.
[5] Fajri, S., & Trisuryanti, T. (2021). Gagasan sistem among ki hajar dewantara dalam membangun pendidikan di indonesia sejak 1922 sampai dengan 2021. *Tarikhuna: Journal of History and History Education*, *4*(1), 18–27. https://doi.org/10.15548/thje.v3i1.2833.
[6] Fitra, D. K. (2022). Pembelajaran berdiferensiasi dalam perspektif progresivisme pada mata pelajaran IPA. *Jurnal Filsafat Indonesia*, *5*(3), 250–258. https://doi.org/10.23887/jfi.v5i3.41249.
[7] Gultom, S. P., Pakpahan, T. B., Lubis, J. F., & Sihotang, S. D. (2022). Pengaruh model pembelajaran problem posing terhadap kemampuan pemecahan masalah matematika peserta didik pada materi lingkaran di kelas VIII SMP Negeri 1 Besitang. *SEPREN: Journal of Mathematics Education and Applied*, *10*, 126–134.
[8] Gusteti, M. U., & Neviyarni, N. (2022). Pembelajaran berdiferensiasi pada pembelajaran matematika di kurikulum merdeka. *Jurnal Lebesgue : Jurnal Ilmiah Pendidikan Matematika, Matematika Dan Statistika*, *3*(3), 636–646. https://doi.org/10.46306/lb.v3i3.180.
[9] Hamidi, N. (2018). Pengembangan media pembelajaran interaktif pendidikan agama islam berbasis adobe flash professional cs6 untuk mendukung implementasi kurikulum 2013. *Jurnal Pendidikan Agama Islam*, *14*(1), 109–130. https://doi.org/10.14421/jpai.2017.141-07.
[10] Hardiningsih, E. F., Masjudin, M., Abidin, Z., Salim, M., & Aziza, I. F. (2023). Penerapan model pembelajaran project based learning untuk meningkatkan kemampuan pemecahan masalah statistika matematika siswa SMKN 2 Mataram. *Reflection Journal*, *3*(1), 21–29. https://doi.org/10.36312/rj.v3i1.1264.
[11] Herwina, W. (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.
[12] Himmah, F. I., & Nugraheni, N. (2023). Analisis gaya belajar siswa untuk pembelajaran berdiferensiasi. *Jurnal Riset Pendidikan Dasar (JRPD)*, *4*(1), 31. https://doi.org/10.30595/jrpd.v4i1.16045
[13] Khoirunisa, L., & Hartati, L. (2017). Kemampuan pemecahan masalah matematika ditinjau dari kreativitas dan kecerdasan emosional. *Jurnal Analisa*, *3*(2), 106–114. https://doi.org/10.15575/ja.v3i2.2011.
[14] Melindarwati, T., & Munandar, D. R. (2022). Analisis kemampuan pemecahan masalah matematis siswa smp dalam menyelesaikan materi bilangan bulat. *Jurnal THEOREMS (The Original Research of Mathematics)*, *7*(1), 13. https://doi.org/10.31949/th.v7i1.3720.
[15] NCTM. (2000). *Principles and Standards for School Mathematics* (Issue 1).
[16] Nurfitriyanti, M. (2016). Model pembelajaran project based learning terhadap kemampuan pemecahan masalah matematika. *Formatif*, *2*(6), 149–160.
[17] Permana, R. I., & Amry, Z. (2013). Kemampuan Pemecahan masalah matematis berbantuan e-learning di SMP Negeri 1 Binjai. *Paradigma Jurnal Pendidikan Matematika*, *12*(1), 81–89.
[18] Pitaloka, H., & Arsanti, M. (2022). Pembelajaran diferensiasi dalam kurikulum merdeka. *Seminar Nasional Pendidikan Sultan …*, *November*, 2020–2023. http://jurnal.unissula.ac.id/index.php/sendiksa/article/view/27283.
[19] Polya. (1973). *How To Solve It.* (p. 284). Princeton University Press.

[20] Prastowo, A. Y., & Waluya, S. B. (2019). Kemampuan pemecahan masalah ditinjau dari percaya diri pada model project based learningdengan asesmen kinerja. *Jurnal Pendidikan: Riset & Konseptual*, *3*(3), 209–2017. http://doi.org/10.28926/riset_konseptual.v3i3.133.

[21] Pratiwi, E. A., Agung, S., & Saridewi, N. (2023). Pengaruh pendekatan reciprocal teaching pembelajaran jarak jauh terhadap aktivitas dan hasil belajar siswa. *Edu Sains: Jurnal Pendidikan Sains Dan Matematika*, *11*(1), 54.

[22] Saragih, N. D. (2021). Menyiapkan Pendidikan dalam pembelejaran di era society 5.0. *Jurnal Pendidikan Dan Pembelajaran Bahasa Indonesia*, *2*(3), 1–9.

[23] Shaputra, R., & Supardi. (2019). Pengaruh gaya belajar dan rasa ingin tahu terhadap kemampuan pemecahan masalah matematika siswa. *Jurnal Pendidikan MIPA*, *2*(3), 252–259.

[24] Siburian, R., Simanjuntak, S. D., Si, S., Pd, M., Simorangkir, F. M. A., Si, S., Pd, M., & Kunci, K. (2019). Penerapan pembelajaran diferensiasi dalam meningkatkan kemampuan pemecahan masalah matematika siswa pada pembelajaran daring. *6*(2), 1–3.

[25] Sugiyono. (2019). *Metode Penelitian Pendidikan*. ALFABETA.

[26] Tomlinson, C. (2001). *Differentiate Instruction IN Mixed-Ability Classrooms Differentiate Instruction* (2nd ed.). Differentiate Instruction HOW TO IN Classrooms Mixed-Ability 2ND EDITION Carol Ann Tomlinson Association for Supervision and Curriculum Development.

[27] Uyanto, S. (2009). *Pedoman Analisis Data dengan SPSS*. Graha Ilmu.

[28] Wahyuningsari, D., Mujiwati, Y., Hilmiyah, L., Kusumawardani, F., & Sari, I. P. (2022). Pembelajaran berdiferensiasi dalam rangka mewujudkan merdeka belajar. *Jurnal Jendela Pendidikan*, *2*(04), 529–535. https://doi.org/10.57008/jjp.v2i04.301.

[29] Walidain, S. N., Haris, A., & Fitriyanto, S. (2023). *Analisis kemampuan pemecahan masalah fisika dalam pembelajaran diferensiasi*. *3*(1), 50–57.

[30] Yanti, R. A., & Novaliyosi, N. (2023). Systematic literature review: model pembelajaran project based learning (pjbl) terhadap skill yang dikembangkan dalam tingkatan satuan pendidikan. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *7*(3), 2191–2207. https://doi.org/10.31004/cendekia.v7i3.2463