Lembaran Ilmu Kependidikan
Vol. 54 No. 1 (2025): 134-143

e-ISSN 0216-0847
https://journal.unnes.ac.id/journals/LIK

Classroom Action Research in IPAS Learning: Enhancing Students' Cognitive Abilities through a Differentiated Approach in Elementary Schools

Lidiawati Lidiawati [1], Eddy Haryanto[2], Ahmad Habibi[3]

[1,2,3] Master of Elementary Education, Jambi University, Indonesia

Corresponding author, email: lidiawati3790@gmail.com

Article info:
Submitted: February 19, 2025. Revised: March 10, 2025. Accepted: March 27, 2025

Abstract

Background - In the era of the Merdeka Curriculum, fostering cognitive development through inclusive and student-centered instruction is a key priority, especially in integrated science and social studies (IPAS) for elementary students.
Purpose - This study aims to improve students' cognitive abilities in the IPAS subject through the implementation of differentiated learning strategies in a fourth-grade elementary classroom.
Method/approach - This research employed Classroom Action Research (CAR) following the Kemmis & McTaggart model, which consists of two iterative cycles involving planning, implementation, observation, and reflection. Data collection techniques included cognitive assessments, classroom observations, teacher interviews, and documentation. The data were analyzed using both qualitative and quantitative descriptive methods.
Findings - The results indicated a significant improvement in students' cognitive performance: 29% of students achieved the competency standard in the pre-cycle, which increased to 50% in Cycle I, and further to 86% in Cycle II. In addition to improved academic outcomes, students showed higher motivation, active participation, and greater confidence in connecting IPAS concepts to real-life contexts.
Conclusions - The implementation of differentiated learning proved effective in enhancing cognitive understanding and fostering a more interactive and inclusive classroom atmosphere. This approach supports the goals of the Merdeka Curriculum by addressing diverse learning needs.
Novelty/Originality/Value - This study provides empirical evidence on the practical application of differentiated instruction in IPAS learning at the elementary level, demonstrating its value in promoting equity, engagement, and academic success in line with current curriculum reforms.

Keywords: Differentiated Learning; Cognitive Ability; Merdeka Curriculum

Recommended citation:
Lidiawati, L., Haryanto, E., & Habibi, A. (2025). Classroom Action Research in IPAS Learning: Enhancing Students' Cognitive Abilities Through a Differentiated Approach in Elementary Schools. (2024). *Lembaran Ilmu Kependidikan*, *54*(1), 134-143. https://doi.org/10.15294/lik.v54i1.22158

INTRODUCTION

Education is one of the fundamental aspects of a nation's development. High-quality education produces superior and highly competitive human resources (Sihite, 2018; Rusdiah, 2024). As time progresses, challenges in the field of education become increasingly complex, requiring innovation in learning methods. One approach that has been increasingly implemented in elementary schools is differentiated instruction, which focuses on meeting students' individual learning needs (Purnawanto, 2023). With the introduction of the *Merdeka Curriculum*, this approach has become even more relevant for improving student learning outcomes in the classroom.

Differentiated instruction emphasizes recognizing individual differences in learning readiness, interests, and student learning profiles (Yulaichah et al., 2024). In a single classroom, students come from diverse backgrounds, have different learning styles, and process information at varying speeds. If learning remains uniform without considering these differences, some students may struggle to understand the material. This can lead to low motivation, reduced engagement in learning, and suboptimal academic achievement. Therefore, implementing differentiated instruction can be a solution to enhance the effectiveness of teaching and learning.

One subject that requires an appropriate teaching strategy is Natural and Social Sciences (*Ilmu Pengetahuan Alam dan Sosial* or IPAS). This subject integrates Natural Sciences (*Ilmu Pengetahuan Alam* or IPA) and Social Sciences (*Ilmu Pengetahuan Sosial* or IPS) to help students develop a holistic understanding of the world around them (Sudirman, 2024). However, in practice, many students struggle to grasp IPAS concepts, particularly when learning relies solely on lectures. These difficulties can be addressed through differentiated instruction, which allows students to learn according to their individual needs and characteristics (Waruwu & Bilo, 2024).

Preliminary observations conducted at SDN 28/IV Kota Jambi indicate that many students face difficulties in understanding IPAS concepts. Teachers still predominantly use lecture and question-answer methods, which provide limited opportunities for students to explore materials based on their learning styles. As a result, students' cognitive abilities in comprehending and applying IPAS concepts remain low. Based on daily test results, only about 35% of students achieved scores above the *Minimum Competency Criteria* (*Kriteria Ketuntasan Minimal* or KKM), while the rest were below the established standard.

Cognitive ability is a crucial aspect of learning, particularly in subjects that require analysis and problem-solving, such as IPAS. According to Bloom's Taxonomy, cognitive abilities range from remembering (C1), understanding (C2), applying (C3), analyzing (C4), evaluating (C5), to creating (C6). Teaching methods that do not accommodate variations in how students understand and apply concepts can result in weak memory retention, difficulty in comprehension, and a lack of critical thinking skills (Azizah et al., 2024). Therefore, a more flexible and adaptive approach to learning is necessary.

The implementation of differentiated instruction in *Classroom Action Research* (*Penelitian Tindakan Kelas* or PTK) is an appropriate choice to enhance the quality of IPAS learning. PTK is a research method aimed at directly improving the teaching process through cycles of planning, implementation, observation, and reflection (Machali, 2022; Agustinova et al., 2025; Purohman, 2018). By implementing differentiated instruction, teachers can adjust learning content, processes, and products based on students' readiness, interests, and learning profiles. This approach is expected to increase student participation, motivation, and learning outcomes in IPAS.

Previous studies have demonstrated the effectiveness of differentiated instruction in improving student learning outcomes. Research conducted by Suwariningsih (2023) found that differentiated instruction significantly enhanced students' understanding of Natural Sciences.

e-ISSN 0216-0847
https://journal.unnes.ac.id/journals/LIK

These findings align with those of Sholikhin et al. (2023), who reported that combining *Problem-Based Learning* (PBL) with differentiated instruction improved students' critical thinking skills. However, there is still limited research specifically examining the implementation of this strategy in IPAS at the elementary school level.

In the context of the *Merdeka Curriculum*, teachers are given the flexibility to apply teaching methods that best suit students' needs. Differentiated instruction aligns with the *Merdeka Belajar* philosophy, which allows students to learn according to their potential and interests. By adjusting learning content, processes, and products, teachers can create an inclusive and adaptive learning environment (Diarera & Budiarti, 2024; Westwood, 2018; Peng, 2019). This not only improves student learning outcomes but also helps them develop better critical thinking and problem-solving skills.

Additionally, this study aims to explore how differentiated instruction can be effectively implemented in an elementary school setting. In practice, implementing this strategy requires support from various stakeholders, including teachers, school principals, and students. Teachers need to understand how to design flexible lesson plans, while students must be trained to become more independent in their learning process. With active involvement from all school components, this approach is expected to be optimally executed and yield better results.

Furthermore, this study seeks to uncover the impact of differentiated instruction on student engagement in learning. Teacher-centered learning often results in passive students with limited active participation in class. With differentiated instruction, students are expected to be more motivated to learn, as this method provides them with an approach tailored to their individual learning styles. This aligns with the goal of education, which not only focuses on cognitive development but also fosters independent and creative student character. The urgency of this research lies in the importance of innovation in learning strategies that can answer the challenges of the Independent Curriculum and improve the quality of science learning in elementary schools. Although differentiated learning has been widely studied, its application in the context of integrated science learning with the Classroom Action Research (CAR) approach is still rarely carried out in depth, especially in public elementary schools in urban areas such as Jambi City.

This research offers a new contribution by integrating the principles of differentiated learning in the context of integrated science learning, and evaluating its impact on student engagement and cognitive abilities through a classroom action approach. The findings of this study are expected to provide an adaptive and practical learning model for teachers, as well as enrich the scientific treasury related to differentiation strategies in Indonesian elementary education. Thus, this study is expected to contribute to the field of education, particularly in developing more effective and student-centered learning methods. The results of this study can serve as a reference for teachers and schools in optimizing differentiated instruction, especially in IPAS subjects. Additionally, this research is hoped to provide new insights for other researchers interested in exploring similar topics in a broader context.

METHODS

This study employs the *Classroom Action Research* (*Penelitian Tindakan Kelas* or PTK) method based on the Kemmis & McTaggart model, which consists of four stages in each cycle: planning, implementation, observation, and reflection. PTK was chosen because it allows for direct improvements in the learning process based on the evaluation results of each cycle. The research subjects are 30 fourth-grade students at SDN 28/IV Kota Jambi, comprising 15 boys and 15 girls. The selection of this location was based on preliminary observations that indicated low cognitive abilities in the IPAS subject and a lack of implementation of differentiated instruction. The classroom teacher was also involved as a collaborator in the teaching process.

This study was conducted in two cycles, each consisting of four stages. In the planning stage, researchers developed differentiated learning materials, prepared research instruments such as observation sheets, cognitive tests, interviews, and documentation, and coordinated with the classroom teacher. The implementation stage involved the teacher applying differentiated instruction by adjusting content, processes, and learning products based on students' readiness and learning styles, while students engaged in learning according to the predetermined differentiation groups. During the observation stage, students' participation in learning was monitored, formative assessments were conducted to measure cognitive improvement, and strengths and weaknesses of the applied strategy were recorded. Lastly, the reflection stage involved evaluating the results of the first cycle to determine improvements for the next cycle and discussing with the teacher to develop a more effective teaching strategy.

Data collection was carried out through several techniques, including observation, cognitive tests, interviews, and documentation. Observations were conducted to monitor student activities and engagement during learning. Cognitive tests were administered before and after each cycle to measure students' understanding of IPAS concepts. Interviews were conducted with teachers and students to explore their experiences and assess the effectiveness of differentiated instruction. Additionally, documentation, including photos, student work results, and teacher reflections, was used to strengthen data analysis.

The data analysis technique combined qualitative and quantitative descriptive methods. Data reduction was carried out by filtering data from observations, tests, and interviews for further analysis. The presentation of data involved displaying cognitive test results in tables or graphs and presenting observational findings in narrative descriptions. Finally, conclusions were drawn by comparing student learning outcomes before and after the intervention, determining the effectiveness of differentiated instruction, and providing recommendations for optimizing teaching strategies.

RESULTS AND DISCUSSION

The implementation of differentiated instruction in this study was grounded in the belief that students learn best when instructional strategies are aligned with their individual readiness levels, interests, and learning profiles. By applying this approach within the framework of Classroom Action Research (CAR), the study sought not only to improve students' academic outcomes but also to create a more inclusive and engaging classroom environment. This integration of CAR with differentiated instruction offered a structured yet flexible way to iteratively refine teaching practices based on continuous feedback and reflection.

Each cycle of the CAR process allowed the researchers and collaborating teacher to identify specific learning gaps, implement appropriate instructional interventions, and observe their direct effects on students' cognitive development. Differentiated learning strategies were adjusted at each stage to ensure that students with varying learning styles—visual, auditory, and kinesthetic—could meaningfully access and process the IPAS content. Furthermore, the study also aimed to foster greater student autonomy and engagement, in line with the principles of the Merdeka Curriculum.

The results of this study are presented below, starting with pre-cycle findings to establish a baseline of students' cognitive abilities. Subsequent sections detail the outcomes of Cycle I and Cycle II, highlighting the progression of student understanding and the observed impact of differentiated instruction on learning outcomes and classroom dynamics.

Pre-Cycle Results

Before implementing differentiated instruction, an initial test, teacher interviews, and classroom observations were conducted to assess students' cognitive abilities in the IPAS subject. The test covered basic conceptual understanding, simple analytical skills, and the ability to relate concepts to everyday life. The results revealed that most students struggled to grasp fundamental IPAS concepts, especially abstract

e-ISSN 0216-0847
https://journal.unnes.ac.id/journals/LIK

ones that required reasoning and basic analysis.

Out of 28 students, only 8 (29%) achieved scores above the Minimum Competency Criteria (*Kriteria Ketuntasan Minimal* or KKM), while 20 students (71%) remained below the standard. Teacher interviews indicated that students with high scores generally had strong learning motivation and additional parental support at home. In contrast, those with lower scores tended to be less active in class, rarely asked questions, and faced difficulties when dealing with problems requiring deeper conceptual understanding.

Initial observations also showed that the teacher primarily used lecture-based methods, leading to low student engagement. Many students passively listened without actively participating in discussions or classroom activities. Additionally, the instructional approach was more focused on memorization rather than direct application, making it difficult for students to understand how IPAS concepts relate to real-world phenomena. Some students lacked confidence in answering questions, particularly when asked to connect concepts with real-life examples.

Moreover, most students struggled to draw conclusions from the material and tended to rely on rote memorization rather than true conceptual understanding. The teacher noted that students who had difficulty grasping the material often felt bored during lessons because the teaching methods were not varied and did not align with their learning styles. Table 1 presents the initial test results of students' cognitive abilities before the implementation of differentiated instruction.

Table 1. Pre-Cycle Cognitive Ability Test Results

Cognitive Ability Category	Number of Students	Percentage
Able to understand basic IPAS concepts	6	21%
Able to relate IPAS concepts to daily life	2	8%
Still struggling to understand IPAS concepts	20	71%
Total	28	100%

Based on these conditions, this study was conducted to address students' learning gaps by implementing differentiated instruction tailored to their readiness, interests, and learning styles.

Cycle I Results

In the first cycle, the teacher implemented differentiated instruction by varying the content, process, and learning products. Learning content was presented in multiple formats tailored to students' learning styles, including visual aids, simple experiments, and group discussions. The learning process was made more interactive, giving students greater opportunities to discuss the material in groups and use learning media that suited their needs.

The teacher also introduced an initial student mapping system based on their readiness. Students who had already grasped the basic concepts were given more complex challenges, while those who still struggled received more intensive guidance with simplified approaches.

Observations from Cycle I showed an increase in student engagement. Previously passive students began asking more questions and participating in discussions. Visual learners found it easier to understand the material when provided with images and graphics, while kinesthetic learners were more active when given experiment-based tasks.

Interviews with the teacher at the end of Cycle I also indicated that students who previously struggled started to show improvement in understanding IPAS concepts. However, some students still had difficulty connecting the learned concepts to real-life applications.

The test results from Cycle I demonstrated a significant improvement in students' comprehension of IPAS concepts. Out of 28 students, 14 (50%) scored above the Minimum Competency Criteria (KKM), while the remaining 14 (50%) were still below the standard.

Table 2. Cognitive Ability Test Results – Cycle I

Cognitive Ability Category	Number of Students	Percentage
Able to understand basic IPAS concepts	9	32%
Able to relate IPAS concepts to daily life	5	18%
Still struggling to understand IPAS concepts	14	50%
Total	28	100%

From the reflection of cycle I, it was found that some students still had difficulty in connecting abstract concepts with real examples. Therefore, in cycle II, improvements were made to learning strategies by using more project-based approaches and contextual discussions.

Cycle II Results

In the second cycle, adjustments were made to the teaching strategies to further enhance students' understanding. The teacher implemented a project-based learning approach, where students were asked to observe their surroundings and connect their observations with the IPAS concepts being studied. Additionally, group discussions were strengthened by incorporating open-ended questions that encouraged students to think more critically.

Observations from Cycle II indicated that students were more enthusiastic and actively engaged in the learning process. Previously passive students gained confidence in asking questions and expressing their opinions. The teacher also noted that students became more independent in understanding concepts and were able to assist their peers in group discussions.

Interviews with the teacher after Cycle II revealed that most students showed improvement in their understanding of IPAS concepts. The teacher stated that differentiated instruction helped accommodate various learning styles, making it easier for students to grasp the material. This method was considered effective and suitable for continued implementation in future lessons.

The test results from Cycle II demonstrated a more significant improvement compared to Cycle I. Out of 28 students, 24 (86%) scored above the Minimum Competency Criteria (KKM), while only 4 students (14%) remained below the standard.

Table 3. Cognitive Ability Test Results – Cycle II

Cognitive Ability Category	**Number of Students**	**Percentage**
Able to understand basic IPAS concepts	13	46%
Able to relate IPAS concepts to daily life	11	40%
Still struggling to understand IPAS concepts	4	14%
Total	28	100%

Based on the results of the two cycles, it can be concluded that differentiated instruction has a positive impact on students' understanding and learning motivation, particularly in enhancing their ability to comprehend IPAS concepts and relate them to real-world phenomena.

The following bar chart illustrates the comparison of students' cognitive test results across the pre-cycle, Cycle I, and Cycle II. This diagram highlights the increase in the number of students who understand IPAS concepts after the implementation of differentiated instruction.

e-ISSN 0216-0847
https://journal.unnes.ac.id/journals/LIK

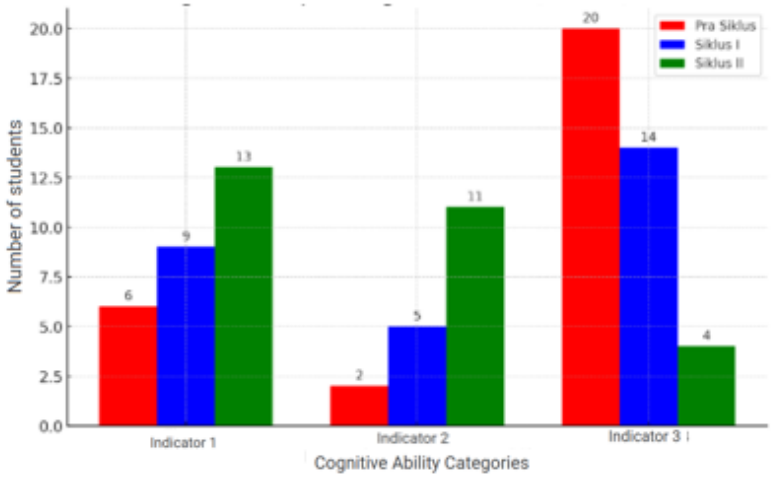

Figure 1. Comparison of students' cognitive test results in the pre-cycle, Cycle I, and Cycle II.

Differentiated learning is an approach d esigned to adjust instruction based on students' readiness, interests, and learning profiles (Koimah et al. , 2024; Tomlison et al., 2003; Tomlison, 2017). In this study, the approach was implemented to enhance students' cognitive abilities in the IPAS (Integrated Science and Social Studies) subject. The research findings indicate that applying this strategy gradually improved students' understanding, as evidenced by increased test scores from the pre-cycle to cycle II. Additionally, observations and teacher interviews revealed that differentiated learning effectively boosted students' motivation and engagement in the learning process.

In the pre-cycle stage, the majority of students still struggled to understand IPAS concepts, with 71% of them scoring below the Minimum Mastery Criteria (KKM). Interviews with teachers revealed that previous teaching methods were still conventional, where students mainly listened to lectures with minimal opportunities for independent exploration. As a result, students had difficulty understanding the connection between IPAS concepts and real-world phenomena around them. Additionally, students with different learning styles often did not receive instructional strategies suited to their needs, which hindered their understanding of the material.

In Cycle I, the implementation of differentiated learning began to bring positive changes in student engagement and comprehension. Previously passive students became more active in discussions and material exploration. Observations supported this, showing that students participated more when provided with media and approaches aligned with their learning styles. Teachers also noted that this method helped students organize their understanding more systematically, as they could choose the learning method that suited them best. However, some students still struggled to connect IPAS concepts with real-life applications, leading to reflections from Cycle I that focused on enhancing more applicable instructional strategies.

In Cycle II, the learning strategy emphasized a project-based approach, where students were required to observe their surroundings and relate their observations to IPAS concepts. This strategy proved to be more effective in enhancing students' critical and analytical thinking skills. Project-based learning has been proven to improve thinking skills and student interactions (Sholeh et al., 2024; Anazifa & Djukri, 2017; Eliyasni et al., 2019). Observations showed that students became more confident in expressing their opinions and were able to apply IPAS concepts to explain the phenomena they observed. Teacher interviews also indicated that students found it easier to recall concepts they had learned because they could connect them with direct experiences.

Cognitive test results showed a significant improvement from the pre-cycle to Cycle II. In the pre-cycle, only 8 students (29%) met the KKM standard, whereas in Cycle I, this number increased to 14 students (50%), and in Cycle II, it reached 24 students (86%). This improvement indicates that differentiated learning effectively helps students grasp the material more deeply, especially because this approach provides flexibility in learning according to their needs.

This improvement can also be explained through constructivist learning theory, which suggests that effective learning occurs when students build their knowledge based on direct experiences. By using more interactive learning strategies, students became more motivated to understand and apply concepts. This is also consistent with Vygotsky's theory of the Zone of Proximal Development (ZPD), where students can achieve a higher level of understanding whengiven appropriate guidance based on their level of readiness.

Furthermore, this study aligns with findings from Miqwati, Susilowati, & Moonik (2023), who stated that differentiated learning enhances students' understanding of science subjects. Another study by Novita Sarie (2022) found that combining Problem-Based Learning (PBL) with differentiated instruction improves students' critical thinking skills, particularly in understanding complex concepts. Thus, this study reinforces evidence that differentiated learning is an effective strategy for improving student learning outcomes.

Beyond academic performance, this study also demonstrates that differentiated learning positively impacts students' motivation and engagement. In line with Tulak et al. (2024), who found that implementing differentiated learning methods makes students more actively engaged in learning, teacher interviews revealed that students were more enthusiastic and active in class compared to before this strategy was implemented (Ismail, 2019; Geogory & Chapman, 2012). This can be explained through Self-Determination Theory (SDT), which states that students' motivation increases when they are given the freedom to choose their preferred learning methods. Therefore, differentiated learning not only enhances academic understanding but also encourages students to become more independent learners.

However, despite the success of this study, some challenges remain in implementing differentiated learning. One of the main challenges is the teacher's readiness to design flexible instruction. Teachers need to have a deep understanding of instructional strategies that can be adapted to students' needs and must be able to conduct formative assessments regularly to track student progress (Kurniawan & Effendi, 2024; Moss & Brookhart, 2019). Additionally, time constraints in designing differentiated instruction pose a challenge that requires attention.

Another factor affecting the effectiveness of this strategy is parental involvement in supporting students' learning at home. Teacher interviews revealed that students who received parental support adapted more quickly to this learning strategy compared to those who lacked parental involvement. Therefore, collaboration between teachers, schools, and parents is essential to ensure the sustainability of this learning strategy. The findings of this study also provide recommendations for schools to develop more flexible and student-centered learning policies. Schools can conduct teacher training on implementing differentiated learning strategies, as well as provide resources and learning tools that support this approach. Additionally, further research can explore how this strategy can be applied to other subjects and how it can be optimized in different classroom settings.

CONCLUSION

Differentiated learning has proven to be effective in enhancing students' cognitive abilities, motivation, and engagement in the IPAS subject at the elementary school level. Research findings indicate a significant improvement in student comprehension, with the

e-ISSN 0216-0847
https://journal.unnes.ac.id/journals/LIK

percentage of students meeting the Minimum Mastery Criteria (KKM) increasing from 29% in the pre-cycle to 86% in Cycle II. This strategy allows students to learn based on their readiness, interests, and learning styles, making them more active and confident in the learning process. Although challenges remain in its implementation, such as teacher readiness and parental involvement, differentiated learning remains a relevant approach aligned with the philosophy of the Merdeka Curriculum. Therefore, this strategy is recommended for continuous development to foster a more inclusive and effective learning environment.

REFERENCES

Agustinova, D. E., Wulansari, N. L. T., & Fitriana, K. N. (2025). The Improving the Professional Competence of High School Teachers in Yogyakarta Through the Development of Classroom Action Research Management (PTK) Based on Android Mobile Applications. *Journal of Science and Education (JSE)*, *5*(2), 499-519. https://doi.org/10.58905/jse.v5i2.466

Anazifa, R. D., & Djukri, D. (2017). Project-based learning and problem-based learning: Are they effective to improve student's thinking skills?. *Jurnal Pendidikan IPA Indonesia*, *6*(2), 346-355. https://doi.org/10.15294/jpii.v6i2.11100

Azizah, A. N., Arrindha, N., Suwana, C. A., & Rofiki, I. (2024). Profil Pengelolaan Kelas Guru Matematika SMP dengan Sistem Blok pada Materi Teorema Pythagoras. *Suska Journal of Mathematics Education*, *10*(1), 25-38. http://dx.doi.org/10.24014/juring.v7i4.31925

Diarera, D., & Budiarti, W. N. (2024). Optimalisasi Kurikulum Merdeka Melalui Pembelajaran Diferensiasi: Menggali Konsep, Implementasi, dan Dampaknya. In *Social, Humanities, and Educational Studies (SHES): Conference Series* (Vol. 7, No. 3). https://doi.org/10.20961/shes.v7i3.92643

Eliyasni, R., Kenedi, A. K., & Sayer, I. M. (2019). Blended learning and project based learning: the method to improve students' higher order thinking skill (HOTS). *Jurnal Iqra': Kajian Ilmu Pendidikan*, *4*(2), 231-248. https://doi.org/10.25217/ji.v4i2.549

Gregory, G. H., & Chapman, C. (2012). *Differentiated Instructional strategies: One size doesn' t fit all*. Corwin press.' Moss, C. M., & Brookhart, S. M. (2019). *Advancing formative assessment in every classroom: A guide for instructional leaders*. ASCD.

Ismail, S. A. A., & Al Allaq, K. (2019). The nature of cooperative learning and differentiated instruction practices in English classes. *Sage Open*, *9*(2), 2158244019856450. https://doi.org/10.1177/21582440198564

Koimah, S. M., Zahra, N. A., Prasitini, E., Sasmita, S. K., & Sari, N. (2024). Implementasi pembelajaran berdiferensiasi untuk memenuhi kebutuhan belajar siswa yang beragam. *Jurnal Ilmu Sosial Dan Budaya Indonesia*, *2*(2), 58-66. https://doi.org/10.61476/49j96838

Kurniawan, M. E., & Effendi, M. (2024). Evaluasi Kesiapan Guru terhadap Implementasi Kurikulum Merdeka di Madrasah Aliyah Negeri 01 Kepahiang. *Dirasah: Jurnal Studi Ilmu Dan Manajemen Pendidikan Islam*, *7*(1), 241-248. https://doi.org/10.58401/dirasah.v7i1.1104

Machali, I. (2022). Bagaimana melakukan penelitian tindakan kelas bagi guru. *Ijar*, *1*(2), 2022-12. https://doi.org/10.14421/ijar.2022.12-21

Peng, H., Ma, S., & Spector, J. M. (2019). Personalized adaptive learning: an emerging pedagogical approach enabled by a smart learning environment. *Smart Learning Environments*, *6*(1), 1-14. https://doi.org/10.1186/s40561-019-0089-y

Purnawanto, A. T. (2023). Pembelajaran berdiferensiasi. *Jurnal Pedagogy*, *16*(1), 34-54. https://doi.org/10.63889/pedagogy.v16i1.152

Purohman, S. P. (2018). Classroom action research alternative research activity for teachers. *Research gate*, 2. https://www.researchgate.net/publication/326083037_Classroom_Action_Research_Alte

rnative Research Activity for Teachers

Rusdiah, N. (2024). Strategic Human Resource Management: Enhancing Competitive Advantage in Educational Institutions. *MANAZHIM*, *6*(1), 129-145. 10.36088/manazhim.v6i1.4343

Sholeh, M. I., Tasya, D. A., Syafi'i, A., Rosyidi, H., Arifin, Z., & binti Ab Rahman, S. F. (2024). Penerapan Pembelajaran Berbasis Proyek (Pjbl) Dalam Meningkatkan Kemampuan Berpikir Kritis Siswa. *Jurnal Tinta: Jurnal Ilmu Keguruan Dan Pendidikan*, *6*(2), 158-176. https://doi.org/10.35897/jurnaltinta.v6i2.1484

Sihite, M. (2018). Peran kompetensi dalam mewujudkan sumber daya manusia yang berdaya saing tinggi di era revolusi industri 4.0: suatu tinjauan konseptual. *Jurnal Ilmiah Methonomi*, *4*(2), 145-159. https://www.neliti.com/id/publications/461731/peran-kompetensi-dalam-mewujudkan-sumber-daya-manusia-yang-berdaya-saing-tinggi#cite

Solikhin, M., Seno, A. A., & Utami, B. (2023). Pembelajaran berdiferensiasi dalam model problem based learning terintegrasi role play untuk melatihkan berpikir kritis peserta didik. In *Proceeding Biology Education Conference: Biology, Science, Enviromental, and Learning* (Vol. 20, No. 1, pp. 54-60). https://jurnal.uns.ac.id/prosbi/article/view/82558

Sudirman, I. N. (2024). PENDIDIKAN IPS DI SEKOLAH DASAR DALAM ERA KURIKULUM MERDEKA. In *PROSIDING SEMINAR PENDIDIKAN* (p. 42).

Suwartiningsih, S. (2021). Penerapan pembelajaran berdiferensiasi untuk meningkatkan hasil belajar siswa pada mata pelajaran IPA pokok bahasan tanah dan keberlangsungan kehidupan di Kelas IXb semester genap SMPN 4 Monta tahun pelajaran 2020/2021. *Jurnal Pendidikan Dan Pembelajaran Indonesia (JPPI)*, *1*(2), 80-94.
https://doi.org/10.53299/jppi.v1i2.39

Tomlinson, C. A. (2017). Differentiated instruction. In *Fundamentals of gifted education* (pp. 279-292). Routledge.

Tomlinson, C. A., Brighton, C., Hertberg, H., Callahan, C. M., Moon, T. R., Brimijoin, K., ... & Reynolds, T. (2003). Differentiating instruction in response to student readiness, interest, and learning profile in academically diverse classrooms: A review of literature. *Journal for the Education of the Gifted*, *27*(2-3), 119-145. https://doi.org/10.4324/9781315639987-26

Tulak, A. M., Gasong, D., & Baan, A. (2024). Efektivitas kompetensi guru Bahasa Indonesia dalam pembelajaran berdiferensiasi berbasis Kurikulum Merdeka di SMP Negeri 1 Sopai. *Indonesian Research Journal on Education*, *4*(3), 832-839. https://doi.org/10.31004/irje.v4i3.901

Waruwu, E. W., & Bilo, D. T. (2024). Pembelajaran Berdiferensiasi Dalam Kurikulum Merdeka Belajar: Strategi Untuk Meningkatkan Hasil Belajar Siswa Dalam Pendidikan Agama Kristen. *Sinar Kasih: Jurnal Pendidikan Agama Dan Filsafat*, *2*(2), 254-268. https://doi.org/10.55606/sinarkasih.v2i2.328

Westwood, P. (2018). *Inclusive and adaptive teaching: Meeting the challenge of diversity in the classroom*. Routledge.

Yulaichah, S., Mariana, N., & Puspita, A. M. I. (2024). Implementasi Pembelajaran Berdiferensiasi dalam Membangun Budaya Kelas di Sekolah Anuban Khon Kaen, Thailand. *JIIP-Jurnal Ilmiah Ilmu Pendidikan*, *7*(3), 2319-2330. DOI:10.54371/jiip.v7i3.3644