

APPLYING A DIFFERENTIATED INSTRUCTION APPROACH TO NATURAL AND SOCIAL SCIENCES (IPAS) EDUCATION IN ELEMENTARY SCHOOL

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Abstract

This study aimed to describe the application of a differentiated approach in Natural and Social Sciences (IPAS) learning in elementary schools. This study uses a qualitative descriptive approach with a multisite study design. The data of this research consist of descriptive information related to the planning, implementation, and evaluation of differentiated instruction in the IPAS subject. The data were obtained from teachers and students who were directly involved in the IPAS learning activities. Data collection techniques in the form of observation, depth interviews, and documentation analysis. The data were analyzed using the interactive analysis model by Miles & Huberman, which includes data reduction, data display, and conclusion drawing. The subjects of the study were teachers and students from three elementary schools in Gowa Regency, South Sulawesi, namely SD Negeri Rappokaleleng, SD Inpres Tamanyeleng, and SD Negeri Tanabangka. The results show that teachers have applied a differentiated approach to three main aspects of learning: content, process, and product. In the planning stage, teachers conducted diagnostic assessments to identify students' learning styles and interests as the basis for developing flexible teaching modules. In implementation, teachers present materials in various forms and provide a choice of activities and products according to students' learning preferences. The assessment is carried out in a formative and summative manner with a varied approach and adjusted to the individual needs of the student. A differentiated approach has been proven to increase students' active participation, motivation, and independence in learning. However, its implementation still faces a number of obstacles, such as limited time, facilities, and students' readiness for independent learning. Therefore, this study recommends the importance of systemic support and teacher capacity building so that the implementation of differentiated approaches can take place in a sustainable and equitable manner in primary schools.

Keywords

Content Differentiation, Differentiated Approach, Primary School, Science Learning.



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INTRODUCTION

The Merdeka Curriculum emphasizes the importance of flexible, adaptive, and student-centered learning through the implementation of differentiated instruction (Azmy & Fanny, 2023; Fauzia & Ramadan, 2023; Wahyudi et al., 2023). This approach is designed to respond to the diversity of students' characteristics, interests, learning styles, and readiness levels, so that the learning process becomes more inclusive and meaningful (Elviya, 2023; Ningrum & Andriani, 2023; Purwowidodo & Zaini, 2023). In the context of primary education, differentiated instruction holds a strategic position because the diversity of students' abilities at this developmental stage is relatively high and greatly influences the quality of their learning experiences (du Plooy et al., 2024; Fitriyah & Bisri, 2023; Goyibova et al., 2025; Gymnastiar, 2024; Purnawanto, 2023). One of the subjects that particularly requires such an adaptive approach is Natural and Social Science Education (IPAS), which demands the integration of scientific and social concepts in contextual situations that are closely related to students' daily lives (Mulyasa, 2023; Rosiyani et al., 2024; Wahyuni, 2022).

Based on preliminary observations in several elementary schools in Gowa District, namely SD Negeri Rappokaleleng, SD Negeri Tanabangka, SD Inpres Tamanyeleng, SD Inpres Pallappassang, and SD Inpres Pannujuang, it is evident that the implementation of differentiated instruction has begun to be initiated by some teachers. However, its implementation is still at the exploratory stage and has not yet become an integral part of daily teaching practice. Some teachers have attempted to modify teaching methods and learning materials according to differences in students' abilities, but they continue to face challenges in fully understanding the concepts and practical strategies involved, resulting in less-than-optimal effectiveness.

Although the government has provided policy support for differentiated instruction, challenges in the field remain quite complex. One of the main obstacles is the limited understanding among teachers regarding the fundamental principles and effective implementation techniques of differentiated instruction. In addition, inadequate infrastructure, large class sizes, and high diversity in student profiles pose further challenges. Teachers find it difficult to conduct in-depth diagnostic assessments for each student, even though such assessments should serve as the primary basis for implementing this strategy accurately. These constraints have led to differentiated instruction not yet reaching the expected level of effectiveness, indicating the need for further investigation to determine the type of support required to maximize its implementation in elementary schools.

The study by Amalia & Ratnaningrum (2025) found that the application of the Problem-Based Learning model combined with differentiated instruction improved learning outcomes and critical-thinking skills among elementary school students. Furthermore, research by Boroallo et al. (2025) demonstrated that differentiated learning modules based on learning styles effectively enhanced students' collaborative skills in IPAS projects. Amini et al. (2023) also showed that the implementation of differentiated instruction in high school civics classes increased students' intrinsic motivation and active participation. Similar results were reported by Pebriyanti (2023), who emphasized that differentiated instruction in elementary schools meets students' learning needs by aligning materials with their readiness levels and preferences. In addition, Nazilah (2024) highlighted the importance of diagnostic assessment as a foundation for successful differentiation, as it improves the accuracy of instructional interventions and positively influences learning outcomes.

Although previous studies have demonstrated the effectiveness of differentiated instruction in improving student participation, motivation, and learning outcomes, the implementation of this strategy in Gowa Regency remains limited and has not yet been fully optimized. These limitations are evident from the lack of structured teacher training, insufficient in-depth understanding of differentiation concepts, and the absence of monitoring mechanisms to assess consistency and quality of classroom implementation. In addition, support from the school environment, including policies, availability of learning resources, and the role of school leaders, varies greatly, resulting in inconsistent application of this strategy across educational settings. This situation indicates a need for further investigation into how differentiated instruction is actually implemented in practice, how effective it is for students with diverse ability levels, and what real challenges teachers face in integrating it into daily teaching. Therefore, this study is important to fill the knowledge gap regarding the real implementation of differentiated instruction in the context of Gowa Regency.

The novelty of this research lies in its focus on providing a comprehensive empirical overview of the actual implementation of differentiated instruction in Gowa Regency. This study not only examines the extent to which teachers apply differentiation strategies but also measures their effectiveness on the learning outcomes of students with diverse needs and abilities. Furthermore, the study maps the real challenges faced by teachers, producing findings that are more contextual and relevant for improving local education policies. Thus, this research offers new contributions that not only enrich the literature on differentiated instruction but also provide

evidence-based recommendations that local governments and schools can use to enhance the quality of this strategy's implementation in the future.

Conceptually, Tomlinson (2022) grouping differentiated learning into three main dimensions, namely Content differentiation, process differentiation, and product differentiation. Content differentiation is related to the variety of material according to student readiness; process differentiation relates to the way students learn. Meanwhile, product differentiation emphasizes the form of learning outcomes that show student understanding. These three aspects are the basic framework used to assess the application of differentiated strategies in social studies learning. By adapting this model, teachers can create an inclusive, equitable learning environment and foster the potential of each student.

Based on this description, this study aims to describe the application of a differentiated approach in social studies learning in elementary schools in Gowa Regency, South Sulawesi. In particular, this study focuses on three main aspects: (1) the application of a differentiated approach in the IPAS learning process, (2) the level of student involvement in differentiated learning, and (3) the obstacles faced by teachers in implementing a differentiated approach. The findings of this study are expected to make an empirical contribution to the development of adaptive learning practices in elementary schools, as well as enrich theoretical studies on the implementation of differentiation in the context of the Independent Curriculum.

METHOD

This study uses a qualitative approach with a multi-site study type. This approach was chosen to gain a deep and contextual understanding of the application of differentiated learning approaches in Natural and Social Sciences (IPAS) subjects in elementary schools. Through a qualitative approach, the researcher seeks to describe holistically how teachers design, implement, and evaluate differentiated strategies and how students respond to the learning. Multisite case studies allow researchers to compare practices that occur across multiple schools, resulting in richer and more varied findings (Farisia et al., 2025; McAlearney et al., 2023; Nurhidayati & Sayono, 2025).

This research was carried out in three elementary schools in Gowa Regency, South Sulawesi, namely SD Negeri Rappokaleleng, SD Inpres Tamanyeleng, and SD Negeri Tanabangka. The three schools were selected purposively with the consideration that the schools have implemented the Independent Curriculum and have begun to implement differentiated learning, especially in science

subjects. The research subjects included teachers in grades V and VI, as well as a number of students at the same level. Teachers are chosen because they have direct experience in implementing differentiation strategies in learning, while students are involved in exploring their learning experiences and perceptions of these strategies.

The data in this study are qualitative, descriptive, and obtained through various sources. The data of this research consist of descriptive information related to the planning, implementation, and evaluation of differentiated instruction in the IPAS subject. The main data sources are teachers and students who are directly involved in IPAS learning activities. Primary data was collected through observations, in-depth interviews, and hands-on classroom interactions. In addition, secondary data was obtained from supporting documents such as teaching modules, diagnostic assessment results, student worksheets, and teacher reflection notes. These various data sources are used to provide a comprehensive picture of the application of differentiated approaches.

Data collection was carried out through three main complementary techniques, namely participatory observation, in-depth interviews, and document analysis. Observations were carried out to observe firsthand how teachers apply differentiation to aspects of content, processes, and learning products. Interviews are used to dig deeper into the strategies, experiences, and obstacles faced by teachers as well as students' responses to differentiated learning. Document analysis was carried out by examining various written evidence, such as teaching modules, formative assessment results, and student learning products that reflect the implementation of differentiation strategies. These three techniques are used triangulatively to ensure the integrity and validity of the data obtained.

The main instrument in this study is the researcher himself, who plays the role of planner, implementer, data collector, and analyzer. To maintain objectivity and consistency, the researcher uses auxiliary instruments in the form of observation guidelines, interview guides, and document analysis sheets that are prepared based on indicators of differentiated learning implementation according to aspects of content, process, and product, as explained by Tomlinson (2022).

Data analysis was carried out using an interactive analysis model (Miles et al., 2021), which includes the simultaneous collection, reduction, presentation, and drawing of data conclusions. All the data collected were selected and categorized based on the main themes, then presented in the form of descriptive narratives and direct quotes to strengthen the interpretation. The analysis process takes place continuously from the time the data is collected to the conclusion stage, so that

the results of the research truly reflect the actual conditions in the field.

The validity of the data is maintained through the triangulation technique of sources and methods by comparing the results of observations, interviews, and document analysis. The data obtained is also re-verified through a confirmation process with the informant (member checking) to ensure that the results of the researcher's interpretation are in accordance with the experience and perception of the informant. With these steps, the findings of this study are expected to have high validity and provide a credible picture of the implementation of differentiated learning approaches in the context of science learning in elementary schools.

FINDINGS AND DISCUSSION

Findings

This results section presents the main findings regarding the implementation of differentiated instruction in the Natural and Social Science (IPAS) subject at several elementary schools in Gowa Regency. The findings were obtained through classroom observations, interviews with teachers and students, as well as an analysis of instructional documents used during the teaching and learning process. The analysis focused on five key components: instructional planning through diagnostic assessment, differentiated content, differentiated process, differentiated product, and assessment within differentiated instruction. To provide a more systematic overview, all findings are presented in a table that summarizes the practices carried out by teachers, the level of student engagement, and the challenges encountered during the implementation of this strategy in the field.

Table 1. Implementation of Differentiated Instruction in Natural and Social Science (IPAS) Education at Elementary Schools in Gowa Regency, South Sulawesi

No	Stage	Implementation	Student Engagement	Challenges
1	Planning (Diagnostic Assessment)	Teachers conduct an initial diagnostic assessment to map students' abilities, interests, and learning styles; the results are used to develop teaching modules and varied levels of material difficulty.	Students understand the learning objectives more clearly and feel that the instruction aligns better with their needs.	Diagnostic assessment increases teachers' workload; limited time prevents in-depth mapping.
2	Differentiated Content	Teachers provide materials in the form of texts, videos, and images to match students' learning styles.	Visual and auditory learners understand the material more easily; focus and interest	Learning media and technological devices are limited in several schools.

			improve.	
3	Differentiated Process	Teachers group students based on ability and offer choices of activities such as experiments, group discussions, reading tasks, or small projects.	Discussions become more dynamic; kinesthetic learners are highly active; cooperation among students improves.	Classroom management becomes more challenging; lower-ability students require more intensive support.
4	Differentiated Product	Teachers offer choices of task formats such as posters, reports, summaries, or models, allowing students to demonstrate understanding according to their interests.	Students become more creative and take pride in their chosen products; motivation increases due to task choice.	Completion time varies among students; individualized assessment becomes more complex for teachers.
5	Assessment in Differentiated Instruction	Teachers implement formative and summative assessments tailored to students' work; assessments are based on rubrics evaluating process, creativity, and conceptual understanding; teachers provide personalized feedback to support each student's progress.	Students better understand their strengths and weaknesses; they feel valued because they are assessed according to their abilities and learning processes; feedback increases motivation.	Assessment takes more time; rubrics must be adapted to product variations; teachers struggle to provide consistent individual feedback due to large class sizes.

Source: Processed Data (2025)

Table 1 indicates that the implementation of differentiated instruction in the IPAS subject at elementary schools in Gowa Regency has been carried out through a fairly comprehensive sequence of stages, starting from planning and differentiating content, process, and product, to assessment. In the planning stage, teachers conducted diagnostic assessments to map students' learning profiles as a basis for designing varied instructional materials. This demonstrates that teachers understand the fundamental principle of differentiation, namely, providing learning experiences that align with students' needs, readiness levels, and interests.

In the implementation stage, content differentiation is reflected in the provision of materials in various formats, while process differentiation appears through a range of activities and the grouping of students based on ability levels. Product differentiation is also evident through the options given to students to express their understanding in different ways. Overall, these practices positively influence student engagement. Students become more active, more enthusiastic, and more collaborative because differentiated instruction allows them to choose learning methods that best suit their individual characteristics.

However, the implementation of differentiated instruction also faces several significant challenges. At the planning stage, diagnostic assessments require considerable time and increase teachers' administrative workload. During implementation, limited facilities such as ICT tools and learning media hinder content variation, while classroom management becomes more demanding when teachers must handle groups of students with differing ability levels. In product differentiation, students' task completion times vary, and individualized assessment requires greater effort.

At the assessment stage, teachers encounter difficulties in aligning rubrics with the diversity of student products and in providing consistent personalized feedback. This shows that although teachers have a sound understanding of differentiation, supporting capacities such as facilities, time, training, and classroom management strategies are not yet fully adequate to meet the demands of differentiated instruction.

Discussion

Application of Differentiated Approaches in the Science Learning Process

The results of the study show that teachers in elementary schools have tried to implement differentiated learning through adjusting learning content, processes, and products according to the needs of students. This is in line with the concept put forward Tomlinson (2022) Differentiation is the process of adjusting learning based on student readiness, interests, and learning profiles so that all students get optimal learning opportunities.

The findings that teachers conduct diagnostic assessments at the beginning of learning show the application of the basic principle of differentiation, namely, understanding the diversity of students' abilities and needs before designing learning strategies. Content adjustment through a variety of materials and media also reflects the application of adaptive learning as recommended in the Independent Curriculum, which requires flexibility in determining learning approaches, methods, and resources according to the context of students (Iskak et al., 2023; Nazilah, 2024; F. R. Putri & Rosmalinda, 2025; Zulaikha & Laeli, 2023).

However, the results of the study also show that the application of differentiated learning has not been completely consistent. This constraint reinforces the findings Heriani et al. (2025), Yogi (2025), Dewi et al. (2025), and Anggraini et al. (2025), which states that the success of differentiation is highly dependent on teacher readiness, facility support, and availability of time for careful planning. Teachers who understand the principle of differentiation are able to create more varied

and student-centered learning activities (Asmi, 2025; Ma'wa et al., 2025; Sitorus, 2025), but they still need continuous training to develop teaching tools that truly meet the needs of students.

In general, the application of differentiation in social studies learning in Gowa Regency shows a positive direction towards more inclusive and contextual learning. Teachers began to display creativity in packaging project-based learning, experimental activities, and group work that provided space for each student to develop according to their potential. This shows that the learning paradigm is starting to shift from a uniform approach to one that values diversity.

Student Engagement in Differentiated Learning

The results of the study show that the implementation of differentiated learning has a positive impact on student engagement. Students are more active, enthusiastic, and motivated to participate in learning activities. This condition supports the view Pebriyanti (2023) and Sihombing et al. (2025) that learning that adapts to students' interests and learning styles will increase students' emotional and cognitive involvement in the classroom.

Giving choices to learning activities and products has also been proven to increase students' sense of responsibility and confidence. These findings are in line with research conducted by Amini et al. (2023) and Prasetyo & Suciptaningsih (2022), which states that process and product differentiation help students feel valued and contribute to their intrinsic motivation. In addition, project-based activities and experiments applied in IPAS learning support the principle of *Active Learning*, which is believed to be able to develop critical thinking and problem-solving skills (Amalia & Ratnaningrum, 2025; Boroallo et al., 2025; Mulyasa, 2023; A. P. Putri et al., 2023).

Although student engagement is increasing, some students with low learning ability still show limited participation. This is because students need guidance from teachers or peers to achieve their optimal abilities. Teachers need to adjust the support (scaffolding) so that students with different abilities can still participate actively. Therefore, differentiated learning strategies demand not only a variety of activities but also the adaptive role of teachers in facilitating individual learning needs.

Obstacles Faced by Teachers in Implementing a Differentiated Approach

The main obstacles faced by teachers in implementing differentiated learning include limited time, resources, and professional readiness. These results are consistent with the findings Gibbs (2023), Al-Shaboul et al. (2021), and Ayuningtyas et al. (2023), which states that the implementation of differentiation is often constrained by large numbers of students, limited facilities, and high

administrative demands. Teachers need ample time to develop different activities and assessments according to students' learning profiles, while the teaching load and administrative responsibilities often make it difficult to implement them ideally.

Limited facilities, such as access to learning technology and digital learning media, are also a challenge in implementing a variety of content and methods. Some teachers overcome this by using simple teaching materials based on the surrounding environment, which actually strengthens the relevance of contextual learning as recommended in the Independent Curriculum. However, the use of local resources has not been able to completely replace the need for more modern and interactive learning media. In terms of teacher competence, most teachers admit that they do not have a deep understanding of the strategies and techniques for implementing differentiation. This shows the need for continuous training and a learning community to share good practices. Efforts to improve teacher professionalism are the main key so that differentiated learning can be applied consistently and sustainably. Thus, although still facing several obstacles, the findings of this study show the commitment of teachers to continue to develop learning practices that are inclusive, adaptive, and on the side of students. This is in line with the spirit of national education transformation, which focuses on improving the quality of learning and developing individual potential according to their characteristics.

CONCLUSION

This study shows that the application of differentiated learning has begun to be implemented by teachers through adjustments to learning content, processes, and products. Teachers' efforts in adapting learning activities to students' abilities, interests, and learning styles show a positive direction towards more adaptive and student-centered learning. The application of diagnostic assessments as a basis for planning, as well as increased student involvement in the learning process, is an indication that the principle of differentiation is beginning to be internalized in learning practices in elementary schools. This strategy is able to create a more inclusive, collaborative learning atmosphere and motivate students to actively participate according to their respective potential. However, the implementation of differentiated learning still faces a number of obstacles, such as limited time, resources, and teachers' understanding of effective differentiation practices. These challenges demonstrate the need for systemic support through ongoing training, the provision of adequate learning resources, and school policies that support pedagogical innovation. With this

support, differentiated learning has great potential to improve the equitable distribution of the quality of IPAS learning and become a real strategy in realizing the spirit of Freedom of Learning that respects the diversity and unique potential of each student. Therefore, it is recommended that teachers continue to develop differentiated competencies through training, learning communities, and continuous reflective practices so that the implementation of differentiated learning can run more effectively and sustainably in elementary schools.

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