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Challenges and Instructional Strategies of Elementary School Teachers in Delivering IPAS Learning within the Framework of the Merdeka Curriculum

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Abstract

The implementation of IPAS (Integrated Natural and Social Sciences) within the Merdeka Curriculum has transformed learning practices in Indonesian elementary schools by requiring teachers to integrate scientific and social concepts through contextual and student-centered learning activities. However, the transition to this curriculum presents various challenges for teachers, particularly related to limited learning resources, instructional facilities, and the diverse learning characteristics of students. This study aimed to identify the challenges encountered by elementary school teachers and to describe the instructional approaches applied in delivering IPAS learning under the Merdeka Curriculum. The research employed a descriptive qualitative design. Data were collected through classroom observations, in-depth interviews with fourth-grade teachers at UPT SP SDN Bendo 1, Blitar City, and document analysis of lesson plans, teaching materials, and assessment instruments. The document analysis was conducted using content analysis to examine alignment with IPAS learning objectives and the Merdeka Curriculum guidelines. The findings reveal that teachers faced several obstacles, including limited learning media, inconsistencies in learning resources, and variations in students' learning abilities that influenced classroom implementation. To overcome these challenges, teachers utilized the surrounding environment as a learning resource, implemented experiential learning approaches, strengthened collaboration with parents, and participated in professional

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discussions with fellow teachers. The study highlights that sustained institutional support, adequate learning facilities, targeted teacher training, and continuous professional development activities—such as workshops, teacher working group forums, and collaborative lesson planning—are key factors in enhancing the quality and effectiveness of IPAS learning in elementary schools implementing the Merdeka Curriculum.

Keywords: *Elementary school teachers, IPAS learning, Merdeka Curriculum, teaching strategies, learning challenges.*

A. Introduction

The implementation of the Merdeka Curriculum marks a significant transformation in learning practices at the elementary school level in Indonesia. This curriculum emphasizes flexibility, student-centered learning, and the development of essential competencies aligned with real-life contexts. In practice, various reports from online media and educational forums highlight that many elementary schools are still adapting to this change, particularly in designing contextual learning activities and shifting from textbook-oriented instruction to inquiry-based approaches. Teachers are required to exercise greater autonomy in planning learning experiences that reflect local conditions and students' daily lives, which presents new pedagogical demands in classroom practice.

One of the distinctive features of the Merdeka Curriculum in elementary education is the integration of natural sciences and social sciences into a single subject known as Ilmu Pengetahuan Alam dan Sosial (IPAS). This integration is intended to support holistic learning by enabling students to understand natural phenomena alongside their social, environmental, and cultural dimensions. IPAS is designed as competency-based integrated learning that applies inquiry-based principles, encouraging students to observe, question, explore, and construct knowledge through direct experience (Kemendikbudristek, 2022). This approach is considered appropriate for elementary school students, as it aligns with their cognitive development and promotes active engagement in the learning process. Previous studies have examined various aspects of Merdeka Curriculum implementation, including teachers' difficulties in understanding new learning outcomes, conducting authentic assessments, and integrating the Pancasila Student Profile into classroom activities (Sari & Wulandari, 2021; Wijayanti, 2022; Putra & Ningsih, 2023). Other studies have also highlighted

teachers' limited readiness in developing interdisciplinary learning materials and adapting to new curriculum frameworks (Prasetyo, 2020). However, most of these studies focus on general curriculum implementation and do not specifically examine IPAS as an integrated subject at the elementary school level, particularly within inclusive school contexts that require differentiated and adaptive instructional strategies.

Inclusive elementary schools present unique instructional challenges due to the diversity of students' abilities and learning needs. Teachers are expected to modify instructional methods, simplify learning materials, and provide additional support for students with special needs while maintaining the achievement of learning objectives (Rahmadani & Firmansyah, 2020; Putri & Rahayu, 2021; Lestari & Fauziah, 2022). UPT SP SDN Bendo 1 in Blitar City, which has fully implemented the Merdeka Curriculum since the 2023/2024 academic year, exemplifies these conditions. Preliminary observations and teacher interviews indicate that IPAS learning requires additional preparation time, while limitations in learning media and teaching aids restrict the implementation of practical and experiential activities. Moreover, collaboration with parents remains essential, especially when learning tasks extend beyond the classroom, yet such collaboration is not always optimal (Sucipto, 2023). Based on these conditions, this study aims to describe the challenges faced by elementary school teachers in implementing IPAS learning and to explore the instructional strategies they apply to address these challenges within the framework of the Merdeka Curriculum in an inclusive school setting. The research gap addressed in this study lies in the limited empirical research that specifically examines IPAS implementation in real classroom contexts while considering teacher practices, learning media constraints, and student diversity simultaneously. By focusing on these aspects, this study seeks to provide empirical evidence that can strengthen understanding of teacher readiness and inform efforts to improve professional support and instructional practices in IPAS learning at the elementary school level.

B. Method

This study employed a descriptive qualitative research design to examine teachers' readiness, challenges, and instructional practices in implementing IPAS learning within the framework of the Merdeka Curriculum. A qualitative approach was selected because the study aimed to gain an in-depth understanding of teachers'

experiences, perceptions, and pedagogical decisions in real classroom settings, rather than measuring variables or testing hypotheses. This approach allowed the researchers to explore the complexity of IPAS implementation, particularly in relation to integrated content delivery and diverse student characteristics.

The research was conducted at UPT SP SDN Bendo 1, Blitar City. The research site was selected using purposive sampling based on two criteria: (1) the school has implemented the Merdeka Curriculum and IPAS learning for more than one academic year, and (2) the school applies an inclusive education model that accommodates students with diverse learning abilities. The research subjects consisted of fourth-grade teachers who were directly involved in planning and implementing IPAS learning. Data were collected during the 2024/2025 academic year to ensure that the findings reflected current instructional practices. Data collection techniques included classroom observations, semi-structured interviews, and document analysis. Classroom observations were conducted during IPAS learning activities and focused on teaching strategies, integration of natural and social science concepts, classroom management, use of learning media, student engagement, and teachers' responses to students with different learning needs. Semi-structured interviews were carried out with fourth-grade teachers to explore their understanding of IPAS, perceived challenges, and strategies used to address instructional difficulties. Document analysis involved examining lesson plans, teaching materials, and assessment instruments to assess alignment with IPAS learning objectives and Merdeka Curriculum guidelines, as well as to support data triangulation.

Data processing began with organizing observation notes, interview transcripts, and documents into a systematic data corpus. Data analysis was conducted using an interactive model adapted from Miles, Huberman, and Saldaña (2019), which includes data reduction, data display, and conclusion drawing. During data reduction, the data were coded to identify recurring patterns related to teacher readiness, instructional challenges, and applied strategies. The reduced data were then displayed in narrative descriptions and thematic matrices to facilitate cross-data comparison. Conclusions were drawn through iterative interpretation by continuously comparing emerging findings with the research objectives and relevant literature. To ensure the trustworthiness of the findings, triangulation of data sources and methods was applied by comparing information obtained from observations, interviews, and document analysis. In addition, member checking was conducted by sharing preliminary findings

with participating teachers to confirm the accuracy of interpretations and ensure that the results reflected their actual experiences in implementing IPAS learning under the Merdeka Curriculum.

C. Results and Discussion

In this section, researchers combine theoretical perspectives, methodological design, findings, and comparisons with existing literature. From our findings, it can be concluded that the IPAS module for Grade IV has a reasonable structure; however, in its current format, the module does not systematically follow the stages involved in the reading process. Learning activities have been designed to enable students to explore and demonstrate their understanding of the concepts in the lesson. However, these activities do not provide a mechanism to facilitate reflective thinking on the part of students after the lesson. Furthermore, the formative assessment of the competencies contained in the module does not assess all the important competencies related to the ability to analyze at a high level and apply them in real-life contexts.

1. Teacher Readiness in Planning IPAS Learning

The Temuan menunjukkan bahwa guru kelas empat memiliki pemahaman dasar mengenai kerangka Kurikulum Merdeka terkait dengan hasil belajar (CP) dan jalur pembelajaran (ATP). Selain itu, guru mampu menyusun rencana pembelajaran menggunakan contoh yang disediakan oleh pemerintah; namun, rencana pembelajaran tersebut disusun berdasarkan sumber daya yang sangat terbatas. Akibatnya, rencana pembelajaran cenderung mengikuti templat yang telah dirancang sebelumnya dan tidak cukup fleksibel untuk dimodifikasi sesuai kebutuhan masing-masing siswa. Hal ini sejalan dengan penelitian yang menunjukkan bahwa implementasi Kurikulum Merdeka di sekolah dasar masih bersifat prosedural dan dibatasi oleh adaptasi serta persiapan guru yang terbatas, sehingga menghasilkan praktik pengajaran di kelas yang kurang kontekstual (Pratami et al., 2025).

A closer examination of these documents reveals that teachers are capable of developing all the necessary components for learning modules—including learning objectives, step-by-step learning activities, differentiation strategies, and assessment methods—in accordance with the Merdeka Curriculum. However, these learning modules do not include adequate adaptations for the varying levels of readiness,

learning styles, or support needs of students in inclusive classrooms. This situation aligns with findings in the literature on differentiated instruction, which indicate that while teachers may understand the concept of differentiated learning, many still struggle to fully implement it due to challenges in planning and adapting instructional components to meet students' diverse needs (Ici et al., 2024).

During the interview, the teacher explained that developing IPAS teaching materials requires considerable effort due to the interdisciplinary nature of the subject, which integrates science and social studies content. To master two distinct fields with different epistemological foundations requires extra work to ensure conceptual accuracy and to develop learning activities that support discovery-based learning. Despite the challenges associated with implementing the Merdeka Curriculum, the teacher remains proactive in deepening their understanding of the curriculum's expectations. Participation in school-based professional development sessions, collaboration with peers in professional learning communities, and sustained efforts to improve instructional design demonstrate a strong commitment to professional growth. This commitment reflects the challenges and proactive attitudes of teachers in curriculum implementation, where they must navigate conceptual understanding and practical constraints within the classroom context (Rosmah, 2025).

Teachers' readiness during the planning phase indicates a still-basic and incomplete understanding of the structural components of the Merdeka Curriculum. Teachers' readiness to implement this curriculum is closely linked to their pedagogical competencies and their ability to translate curriculum documents into practical lesson plans. Recent studies indicate that many elementary school teachers still face difficulties in translating curriculum policies into contextual classroom practices, particularly because the curriculum reform introduces new teaching approaches and requires adaptive pedagogical skills. Additionally, teachers often rely on government-provided learning modules when implementing IPAS instruction, as they are still developing the competencies needed to independently design interdisciplinary learning activities. Although teachers possess knowledge of the curriculum's key elements—including learning objectives, learning pathways, and module design principles—their mastery of the IPAS-related curriculum content remains limited. This gap between curriculum expectations and teacher competencies reflects a common issue in curriculum implementation in Indonesian elementary education (Rahmadayanti & Hartoyo, 2022).

The theoretical aspects of the Merdeka Curriculum emphasize structural coherence and pedagogical competencies through the implementation of differentiated instruction and discovery-based learning. Furthermore, differentiated instruction plays a crucial role in fostering an inclusive learning environment. Tomlinson's framework for differentiated instruction emphasizes that teachers must adapt content, learning processes, and assessment based on students' readiness and learning profiles. Wahyudi, Siddik, and Suhartini (2024) highlight that differentiated learning strategies are particularly important in teaching Integrated Natural and Social Sciences (IPAS) because this subject integrates natural and social sciences while accommodating diverse student characteristics. These pedagogical aspects require teachers to anticipate varying levels of student readiness, develop open-ended learning experiences, and create learning pathways that foster an environment of exploration and critical thinking. Although teachers demonstrate readiness, it is clear that they will continue to need ongoing professional development to further enhance their conceptual understanding of the Merdeka Curriculum and their ability to make pedagogical decisions.

Thus, the research findings indicate that teacher readiness is not only related to the ability to read and understand documents, but also to the development of the ability to apply core curriculum principles and design relevant and meaningful learning experiences. Teacher readiness at this stage is crucial for creating coherence in learning, responding to student diversity, and aligning with the broader vision of the Merdeka Curriculum.

Table 1: Structured Analysis of IPAS Learning Implementation Based on Teacher Interviews

No.	Components	Description
1	Teacher Readiness	Basic understanding of CP/ATP but difficulty with the IPAS module
2	Challenge	Limited media, varying student abilities, inconsistent sources

3	Strategy	Utilization of the environment, parent collaboration, peer discussions

2. Teacher Challenges in IPAS Implementation

During the implementation of the Teaching Practice for Active Science Learning (IPAS) program, teachers faced many interrelated challenges in the learning process.

First, because many of the laboratory equipment and tools needed for student observations and scientific experiments were unavailable or no longer functional, teachers had to constantly adjust the scope of their lesson plans, simplify experimental designs, or replace hands-on activities with demonstrations or simulations of low accuracy. Limited learning facilities have been widely reported as a major barrier to science learning at the elementary school level. Ningsih and Lestari (2022) found that the lack of adequate learning media often prevents teachers from effectively implementing inquiry-based learning activities. Without access to the appropriate experimental tools, teachers tend to replace inquiry-based learning activities with demonstrations or verbal explanations, which limits students' opportunities to develop scientific reasoning skills. While this allows teachers to maintain the continuity of the learning process, it results in a reduction of authentic experiences for students to participate in inquiry-based science education.

Second, teachers found that there was considerable variation in the learning resources used by students, including government-published modules, books from various publishers, and online materials. Differences in language use, the sequence of concept development, and the depth of knowledge in these resources meant that teachers needed to verify information from various sources before deciding which materials were most appropriate for use in the classroom.

Third, instructors identified class heterogeneity, particularly the range of students' academic abilities and some students with disabilities requiring special instruction, as something that necessitated additional differentiated teaching strategies beyond teachers' initial efforts to vary teaching tasks to accommodate students' different levels of preparation, processing needs, and preferred learning methods. Managing diverse student abilities is a common challenge in inclusive classrooms. Inclusive education requires teachers to adapt learning activities, assessment methods,

and instructional strategies so that all students can meaningfully participate in the learning process. Differentiated instruction and task modification are therefore essential strategies for supporting students with varying cognitive abilities and learning needs. This shows that although some differentiation has been practiced, the practice has not yet reached its full potential to address the needs of an inclusive learning community (Fauzia & Hadikusuma Ramadan, 2023).

Collectively, the challenges described above indicate that curriculum requirements, classroom conditions, and teacher readiness are often out of sync, particularly in settings with structural and resource constraints. Furthermore, this misalignment suggests that even high-quality curriculum design may fail to produce desired outcomes if teachers have limited access to facilities, diverse and sometimes inconsistent learning resources, and student needs that exceed available support. Finally, these findings suggest that teachers must simultaneously manage various conflicting influences, including interpreting curriculum expectations, managing student diversity in the classroom, and developing learning resources—all with minimal institutional guidance. These inconsistencies and the multifaceted challenges in implementing the Merdeka Curriculum in real classroom settings have been identified in recent literature as significant barriers for teachers, including inadequate professional preparation, resource gaps, and practical implementation barriers (Pratami et al., 2025).

Teachers' Teachers' experiences regarding the challenges they face in implementing the Merdeka Curriculum align with those of other teachers described by (Putra & Ningsih, 2023). They report that although many teachers have a positive attitude toward the implementation of activity-based learning, they often lack access to the resources needed to develop such programs and therefore rely on traditional teaching methods to meet the requirements of the Merdeka Curriculum. The challenge of reaching all students in an inclusive classroom setting further complicates the already difficult task of managing a class composed of students with diverse backgrounds and varying levels of cognitive, behavioral, and emotional regulation. Research on inclusive pedagogy indicates that teachers who instruct diverse student populations must be able to adapt their teaching practices to accommodate the needs of both the group and each individual in the classroom. Teachers' low confidence in using differentiated instruction highlights the need for additional professional development opportunities to enhance their skills in this area. If teachers do not receive adequate training in differentiated

instruction, they tend to teach based on procedures rather than through meaningful and substantive learning approaches, thereby limiting learning opportunities for students who need individual support (Ici & Priyadi, 2026).

Direct investigation is central to developing students' ability to apply scientific thinking, conceptual understanding, and problem-solving skills in science. Although it may be practical to replace direct investigation with verbal descriptions or simulations due to budget constraints, this approach does not allow students to engage in authentic scientific inquiry and investigation. The obstacles highlighted above demonstrate why schools must provide the essential equipment teachers need to support direct observation, experimentation, and material manipulation. In addition, the inconsistent nature of learning materials highlights the need for teachers to develop a high level of information literacy. The ability to evaluate the validity of source materials, verify the accuracy of content, and reconcile conflicting information is crucial today when there are so many digital resources available and when educational materials are becoming more diverse. Developing teachers' competencies in these areas can help ensure that the content used in teaching is not only valid but also aligned with the curriculum objectives.

In summary, the challenges faced by teachers in this study indicate that effective curriculum implementation requires a comprehensive support system. Structured curriculum guidelines, standardized learning resources, and ongoing capacity building opportunities for teachers will be necessary to assist teachers in managing the complexities of interdisciplinary teaching and inclusive classroom environments.

3. Teacher Strategies for Overcoming IPAS Learning Challenges

It It is clear that the teacher made a number of adjustments to her teaching based on the challenges she faced when implementing IPAS in her classroom. Utilizing the surrounding environment as an alternative source of information for students was one of the adjustments she made when there was no access to educational tools or resources. Contextual learning theory emphasizes the connection between academic knowledge and real-life experiences. (Lestari & Fauziah, 2022) state that contextual and inquiry-based approaches in IPAS learning encourage students to observe natural phenomena directly, which can enhance their critical thinking and conceptual understanding. Teachers ask students to observe and examine the school environment,

including plants, soil, and other examples of physical changes observable around them as part of daily life. This provides students with the opportunity to experience science through direct and concrete experiences, which approximate scientific practice yet do not require access to scientific equipment. In addition, teachers develop hands-on activities that are easy to implement using materials commonly found in the classroom as well as inexpensive or “homemade” tools, such as recycled containers, everyday household items, and natural materials, which allow students to investigate basic scientific questions related to the learning objectives. Although the activities students engage in are limited in scope and depth, they still maintain a high level of experiential engagement in the learning process. Studies on science teaching in elementary schools indicate that teachers frequently innovate by using simple, inexpensive, and readily available materials to facilitate experience-based learning and help students engage in the scientific inquiry process, even when laboratory facilities are limited (Simanjuntak et al., 2023).

Since many experiments that were originally designed to be conducted in class could not be carried out due to safety concerns or a lack of materials, the teacher contacted the students’ families to ask them to provide opportunities for simple observations at home. The teacher gave specific instructions to family members to conduct small-scale experiments such as observing evaporation, making simple mixtures, and observing changes in temperature with the help of their children. This approach aligns with findings that effective science learning can still occur through contextually relevant activities outside the classroom when teachers design learning tasks that involve family participation and real-world observation, thereby maintaining continuity in scientific inquiry despite resource limitations. Although direct research on home observation specifically is limited, research on project-based/experiential learning in science highlights the value of learning activities that engage students actively in investigation regardless of setting (Simanjuntak et al., 2023).

The teacher is an active participant in the teacher working group (KKG). Professional learning communities such as teacher working groups play an important role in improving teacher competence. Participation in collaborative professional development activities like KKG allows teachers to exchange teaching experiences, discuss instructional challenges, and develop innovative strategies together. Active involvement in teacher working groups helps teachers adapt their instructional practices

during periods of curriculum transition, as these forums support shared reflection on practice and strengthen professional knowledge. Research on professional development through KKG in elementary schools shows that teacher working groups significantly contribute to improving teacher competence by facilitating collaboration, discussion of curriculum changes, and shared problem solving (Hendrizal et al., 2024). To accommodate students' diverse abilities, teachers implement process differentiation by reducing the complexity of assigned tasks, breaking down the learning process into shorter, sequential segments for students with special needs, and providing additional time for students who require extra support. Alternative tasks are also provided to reduce the cognitive load for students who need simplified learning activities. This approach aligns with studies on differentiated instruction in the Merdeka Curriculum, which show that teachers adapt the learning process to students' needs through adjustments to content and process, thereby increasing student engagement and individual support in inclusive classrooms (Mudrikah, 2023).

The adaptive strategies used by teachers align with the core principles of contextual learning, which emphasize the integration of real-world environments, community resources, and students' life experiences into teaching practices. This utilization of the local environment reflects experience-based learning theory, which posits that meaningful learning occurs when students engage in concrete experiences and reflect on them to build understanding. Recent research in Indonesian classrooms indicates that contextual and experience-based learning strategies enhance conceptual understanding and its relevance to students' daily experiences (Yudha, 2025). Parental involvement in home-based experiments aligns with recent studies highlighting the increasingly important role of families in supporting curriculum implementation. Given the Merdeka Curriculum's emphasis on project-based learning, family participation helps ensure the continuity of learning, enhances student engagement, and fosters shared responsibility between school and home. Structured collaboration with families enriches students' experiential learning and ensures the achievement of meaningful learning outcomes (Mudrikah, 2023).

Participation in professional learning communities such as KKG underscores the importance of collective teacher development. Collaborative reflection, joint problem-solving, and peer guidance are crucial for enhancing teacher competencies, particularly during curriculum transitions. Teachers' active involvement in KKG demonstrates their

openness to learning and their efforts to strengthen the quality of teaching through peer support, guidance, and shared innovation (Hendrizal et al., 2024).

Although Although the differentiation strategies implemented by teachers are still basic in nature, this reflects a growing awareness of the need to accommodate the diverse needs of students in inclusive classrooms. However, the effectiveness of these strategies is influenced by several factors, including teacher expertise, the availability of learning resources, classroom management skills, and institutional support. Without ongoing professional development in inclusive education and differentiated instruction, these strategies may remain superficial and unable to fully address the complexity of diverse student profiles. Research indicates that the implementation of differentiated instruction is often hindered by gaps in teacher competencies and systemic limitations, making continuous professional development and institutional support crucial for effective practice (Ici & Priyadi, 2026).

Overall, the findings indicate that while teachers have taken meaningful steps to adapt their teaching practices, the effectiveness of these efforts is significantly influenced by broader systemic conditions. Adequate learning facilities and access to a variety of learning materials enable teachers to design more consistent and meaningful experience-based activities, rather than relying on makeshift solutions. Clearer curriculum guidelines support teachers in aligning integrated IPAS content with learning objectives, thereby reducing uncertainty in lesson planning. Additionally, targeted and sustained professional development equips teachers with the skills needed to implement differentiated instruction, manage inclusive classrooms, and critically reflect on their teaching practices. When these forms of support are strengthened, teachers are better positioned to implement adaptive strategies in a more structured and sustainable manner, which in turn contributes to improved teaching quality and more meaningful learning experiences for students (Nisa et al., 2023).

D. Conclusion

This study highlights that the successful implementation of IPAS learning within the Merdeka Curriculum is primarily determined by teachers' ability to adapt interdisciplinary instruction in response to contextual constraints and diverse student characteristics, rather than by curriculum design alone. The key finding indicates that continuous institutional and professional support—such as sustained teacher training,

availability of functional learning resources, and active engagement in collaborative professional communities—plays a critical role in enabling teachers to translate integrated IPAS concepts into meaningful and inclusive learning experiences. Theoretically, this study contributes to the understanding of curriculum implementation by emphasizing the interaction between teacher readiness, systemic support, and instructional adaptation in integrated learning contexts. Practically, the findings suggest that schools and policymakers should prioritize structured professional development and collaborative platforms to support teachers in implementing IPAS effectively, particularly in inclusive classrooms. This study is limited by its focus on a single school and one grade level, which restricts the generalizability of the findings. Therefore, future research is recommended to involve multiple schools, varied educational contexts, and extended observation periods to provide a more comprehensive understanding of IPAS implementation under the Merdeka Curriculum and to examine the sustainability of instructional practices over time.

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