The Effect of Experiential Learning on Students' Conceptual Understanding and Science Learning Outcomes on Energy Resources in Elementary School

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ABSTRACT

This study employs a qualitative descriptive approach to explore teachers' competence at SDN 2 Suru in adapting to the Independent Curriculum, particularly in terms of administrative preparation and implementation outcomes. Data were collected through observation, interviews, and documentation, with the researcher serving as the primary instrument for observing the learning process and conducting interviews with relevant informants. The data were analyzed through data reduction, data presentation, and conclusion drawing. The findings indicate that teachers at SDN 2 Suru possess adequate competence to implement the Independent Curriculum. They can understand student characteristics, develop appropriate teaching tools, and apply varied learning strategies that support flexible, contextual, and student-centered learning. The assessment process is also more comprehensive, covering knowledge, skills, and attitudes. However, several challenges remain, including limited technological facilities, differences in students' abilities within one class, and limited understanding of the Independent Curriculum among some parents. Despite these obstacles, teachers demonstrate a strong commitment to adapting to the new curriculum demands.

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1. INTRODUCTION

Curriculum development is an essential component of the educational system and continually evolves in response to social, political, cultural, and technological changes. In Indonesia, curriculum reform has been a recurring phenomenon aimed at improving the quality and relevance of education. Curriculum changes are not merely the result of administrative decisions but are often influenced by

broader educational policies and the need to adapt to the demands of contemporary society (Mufidah, 2018). Historically, the development of the Indonesian curriculum has undergone several transformations, beginning with the 1947 Lesson Plan and continuing through various reforms designed to enhance educational outcomes and national development.

The transformation of the national education system is closely related to the objectives of education itself. According to the Indonesian National Education System Law, education aims to develop students' potential so that they become individuals who are faithful, knowledgeable, capable, creative, and responsible citizens (Republic of Indonesia, 2003). This objective emphasizes that education should not only focus on academic achievement but also on character development and social responsibility. Consequently, educational reforms are necessary to ensure equal access to education, improve the quality of learning, and enhance the relevance and efficiency of educational management in responding to the challenges of societal change.

One of the recent educational reforms implemented by the Indonesian government is the Merdeka Curriculum. This curriculum was introduced as part of the Merdeka Belajar (Freedom to Learn) policy, which aims to provide greater flexibility in the learning process and allow teachers to design learning activities that are more relevant to students' needs and potentials. The Merdeka Curriculum emphasizes student-centered learning, project-based activities, and the development of critical thinking and creativity (Sartini & Mulyono, 2022). Through this approach, students are encouraged to become active participants in the learning process rather than passive recipients of knowledge.

Despite its potential benefits, the implementation of the Merdeka Curriculum in elementary schools faces several challenges. One of the main challenges is the readiness of teachers to adapt to new teaching approaches. Teachers are required to develop more innovative learning strategies, integrate project-based learning, and apply differentiated instruction to accommodate students' diverse learning needs. However, not all teachers are fully prepared to implement these changes, particularly in schools where professional development opportunities and training are still limited (Febrianningsih & Ramadan, 2023).

In addition to teacher readiness, the availability of educational infrastructure also plays a significant role in the success of curriculum implementation. The Merdeka Curriculum encourages the integration of digital resources and the utilization of technology to support learning activities. Nevertheless, many schools, especially those located in rural areas, still face limitations in technological infrastructure, such as unstable internet access and insufficient digital devices (Rahayu, 2023). These limitations can hinder teachers from implementing innovative learning strategies that rely on digital platforms and online learning resources.

Another challenge in implementing the Merdeka Curriculum is the shift in assessment practices. Unlike previous curricula that relied heavily on traditional examinations, the Merdeka Curriculum promotes a more holistic assessment approach that evaluates students' knowledge, skills, and attitudes. This approach requires teachers to conduct continuous formative assessments and provide feedback that supports students' learning progress (Suryani, 2023). For teachers who are accustomed to conventional assessment systems, adapting to this new evaluation method can be challenging.

The implementation of the Merdeka Curriculum also requires teachers to manage new forms of learning administration, including the preparation of teaching modules, documentation of formative assessments, and reporting of students' learning outcomes. Teachers are also encouraged to utilize the Platform Merdeka Mengajar (PMM) as a resource for developing learning materials and improving their professional competencies. These administrative adjustments require teachers to possess adequate managerial and pedagogical skills in order to effectively implement the curriculum.

At SDN 2 Suru, teachers are expected to adapt to these curriculum changes effectively. The Merdeka Curriculum introduces several modifications in learning administration, including the replacement of Core Competencies (KI) and Basic Competencies (KD) with Learning Outcomes (Capaian Pembelajaran/CP). Teachers who are able to manage these administrative changes effectively will find it easier to implement learning activities that align with the objectives of the Merdeka Curriculum.

However, adapting to the new curriculum is not without difficulties. Some teachers still experience challenges in understanding the concept and practical implementation of the Merdeka Curriculum. Based on preliminary observations conducted by the researcher, including interviews with teachers at SDN 2 Suru, it was found that not all teachers were able to immediately implement the administrative requirements of the new curriculum. These challenges indicate that the transition toward the Merdeka Curriculum requires continuous support, training, and professional development for teachers.

Therefore, this study aims to explore the competence of teachers at SDN 2 Suru in adapting to the Merdeka Curriculum, particularly in terms of learning administration and its implementation in the teaching and learning process. The findings of this study are expected to provide deeper insights into the readiness of teachers in implementing the Merdeka Curriculum and to offer constructive recommendations for improving the effectiveness of curriculum implementation in elementary schools.

2. METHODS

This study employed a qualitative approach with a descriptive research design to explore teacher competence in implementing the Merdeka Curriculum at SDN 2 Suru. Qualitative research is appropriate for examining social phenomena in depth and understanding participants' experiences and perspectives within their natural context (Waruwu, 2022). Through this approach, the researcher was able to obtain comprehensive information about how teachers adapt to curriculum changes, particularly in terms of learning administration and instructional practices.

The research was conducted at SDN 2 Suru, Ponorogo Regency, during the 2024/2025 academic year. The participants of this study consisted of several teachers who were directly involved in the implementation of the Merdeka Curriculum in the school. These teachers were selected purposively because they possessed relevant experience and knowledge regarding curriculum implementation and classroom learning processes.

Data were collected through observation, interviews, and documentation. Observation was conducted to examine the implementation of the teaching and learning process and to identify how teachers applied the principles of the Merdeka Curriculum in classroom activities. Interviews were carried out with teachers to obtain in-depth information regarding their understanding of the curriculum, the challenges they encountered, and the strategies they used in implementing learning administration. Documentation was also used to support the research data, including teaching modules, lesson plans, assessment records, and other relevant administrative documents.

In qualitative research, the researcher acts as the primary instrument for data collection and interpretation. The researcher directly observed classroom activities and conducted interviews with participants to gain a deeper understanding of the phenomenon under investigation (Sahir, 2022). This role allowed the researcher to interpret the data contextually and capture the real conditions of curriculum implementation in the school.

The collected data were analyzed using the interactive model of data analysis proposed by Miles and Huberman, which consists of three stages: data reduction, data display, and conclusion drawing (Helaludin & Wijaya, 2019). Data reduction was carried out by selecting and organizing relevant information related to teacher competence in implementing the Merdeka Curriculum. Data display involved presenting the data in a systematic and structured form to facilitate interpretation. Finally, conclusions were drawn to provide a comprehensive understanding of teacher competence and the factors influencing the implementation of the Merdeka Curriculum at SDN 2 Suru.

To ensure the validity of the data, the researcher applied triangulation techniques by comparing information obtained from different sources and data collection methods. Triangulation was conducted through cross-checking data from observations, interviews, and documentation to ensure consistency and reliability of the findings.

3. FINDINGS AND DISCUSSION

The findings of this study describe the competence of teachers in implementing the Merdeka Curriculum at SDN 2 Suru during the 2024/2025 academic year. The results were obtained through observations, interviews, and documentation conducted with several teachers who are actively involved in the teaching and learning process. Based on the analysis of the collected data, teacher competence in implementing the Merdeka Curriculum can be categorized into four main aspects: pedagogical competence, professional competence, personal competence, and social competence.

Pedagogical Competence

Pedagogical competence refers to teachers' ability to understand student characteristics, design learning activities, implement appropriate learning strategies, and conduct assessments effectively. The findings indicate that teachers at SDN 2 Suru demonstrate adequate pedagogical competence in implementing the Merdeka Curriculum.

Teachers begin the learning process by analyzing the characteristics and learning needs of students through classroom observations and formative assessments. This process helps teachers identify students' learning abilities and determine appropriate instructional strategies. One teacher explained that observing students' behavior and conducting initial assessments are important steps in understanding students' learning readiness.

In addition, teachers actively use various learning media to support classroom instruction. For example, in mathematics learning activities, teachers utilize concrete media such as counting boards and visual materials to help students understand abstract concepts. In lower grades, teachers frequently use simple learning tools such as learning cards and visual aids to maintain students' attention and motivation during the learning process.

These practices indicate that teachers attempt to apply student-centered learning approaches, which are emphasized in the Merdeka Curriculum. Teachers also adapt their teaching strategies according to students' learning abilities and classroom conditions.

Professional Competence

Professional competence refers to teachers' mastery of subject matter, ability to design learning tools, and efforts to continuously improve their professional skills. The findings show that teachers at SDN 2 Suru have begun to adapt their teaching practices to the requirements of the Merdeka Curriculum.

Teachers prepare teaching modules based on Learning Outcomes (Capaian Pembelajaran/CP) and adjust them to the needs of their students. In higher grades, particularly in Grade VI, teachers tend to develop their own teaching modules to ensure that the learning materials align with students' readiness for final examinations. Meanwhile, teachers in lower grades often utilize teaching modules available on the Platform Merdeka Mengajar (PMM) and modify them according to the characteristics of their students and the school environment.

Teachers also attempt to use various learning media to enhance students' understanding of the subject matter. Some teachers create simple learning videos or develop teaching materials using digital resources obtained from educational platforms or social media. These efforts demonstrate teachers' initiative in improving the quality of learning despite limited school facilities.

Personal Competence

Personal competence relates to teachers' attitudes, discipline, and ability to serve as role models for students. The findings reveal that teachers at SDN 2 Suru demonstrate strong personal competence in their daily teaching practices.

Teachers consistently demonstrate discipline by arriving on time, dressing appropriately, and maintaining a positive attitude toward their professional responsibilities. In addition, teachers emphasize the importance of character education by setting classroom agreements with students at the beginning of the semester. These agreements help create a structured and disciplined learning environment.

Teachers also view their role as not only delivering academic content but also guiding and nurturing students' character development. Many teachers express a sense of responsibility and commitment to treating students with care and understanding, similar to how they would guide their own children.

Social Competence

Social competence refers to teachers' ability to establish effective communication and collaboration with colleagues, students, and parents. The findings indicate that teachers at SDN 2 Suru maintain positive relationships with fellow teachers and parents.

Teachers frequently collaborate with colleagues to discuss classroom challenges and share teaching strategies. Communication with parents is also maintained through regular meetings and informal communication channels such as messaging applications. This communication allows teachers to inform parents about students' learning progress and address potential learning difficulties.

Strong collaboration between teachers and parents helps support students' academic and personal development. Teachers believe that effective communication with parents is essential in ensuring that students receive consistent support both at school and at home.

Supporting and Inhibiting Factors in Curriculum Implementation

The implementation of the Merdeka Curriculum at SDN 2 Suru is supported by several factors. One of the main supporting factors is the strong commitment of teachers to adapt to the new curriculum. Teachers actively seek learning resources, participate in teacher working groups (KKG), and collaborate with colleagues to improve their teaching practices.

However, several challenges were also identified. One of the main obstacles is the limited availability of technological facilities in the school. The absence of equipment such as LCD projectors and stable internet access limits the use of digital learning media. As a result, teachers often rely on printed materials and simple teaching aids.

Another challenge is the diversity of students' learning abilities within a single classroom. Teachers must adjust their teaching strategies to accommodate both fast learners and students who require additional guidance. This situation requires additional time and effort in preparing differentiated learning activities.

Furthermore, some parents still have limited understanding of the Merdeka Curriculum, particularly regarding the holistic assessment system that evaluates not only academic achievement but also students' attitudes and skills. Teachers therefore need to provide continuous explanations and communication to help parents understand the objectives of the new curriculum.

Overall, despite several challenges, teachers at SDN 2 Suru demonstrate a strong commitment to implementing the Merdeka Curriculum and continuously strive to improve their competence in supporting effective learning.

Discussion

The findings of this study indicate that teachers at SDN 2 Suru demonstrate adequate competence in implementing the Merdeka Curriculum in the 2024/2025 academic year. Teacher competence is reflected in several aspects, including pedagogical competence, professional competence, personal competence, and social competence. These competencies play a crucial role in determining the effectiveness of curriculum implementation and the overall quality of the teaching and learning process. Teacher competence is widely recognized as a key factor influencing educational quality and student learning outcomes (Kurnia et al., 2024).

From a pedagogical perspective, teachers at SDN 2 Suru show the ability to understand students' characteristics and adjust learning strategies accordingly. Teachers conduct initial observations and formative assessments to identify students' abilities, interests, and learning difficulties. This practice reflects the principles of student-centered learning emphasized in the Merdeka Curriculum. Student-centered learning encourages teachers to create learning environments that allow students to actively participate in the learning process and develop their potential through meaningful learning experiences

(Sartini & Mulyono, 2022). By identifying students' needs at the beginning of the learning process, teachers can design instructional strategies that are more responsive and relevant to students' learning conditions.

In addition to understanding student characteristics, teachers also utilize various learning media to support classroom instruction. The use of simple media such as visual materials, learning cards, and real objects indicates teachers' efforts to create interactive learning environments despite limited technological resources. The use of concrete media is particularly important in elementary education because students at this stage tend to understand concepts more effectively through direct experiences and visual representations. This finding supports the argument that effective pedagogy in elementary schools requires teachers to combine theoretical knowledge with practical teaching strategies that accommodate students' developmental characteristics (Kurnia et al., 2024).

Professional competence is another important aspect observed in this study. Teachers at SDN 2 Suru have begun to adapt to the administrative and instructional requirements of the Merdeka Curriculum. They prepare teaching modules based on Learning Outcomes (Capaian Pembelajaran/CP) and develop learning plans that align with curriculum objectives. Some teachers independently design their teaching modules, particularly in higher grades, while others utilize resources from the Platform Merdeka Mengajar (PMM) and modify them according to the needs of their students and the school environment. These practices demonstrate teachers' efforts to improve their professional competence and adapt to curriculum changes.

The use of PMM as a learning resource also reflects teachers' efforts to continuously develop their professional knowledge. Professional development is essential for teachers to remain responsive to changes in educational policies and teaching approaches. Previous studies have emphasized that teacher readiness and professional competence significantly influence the successful implementation of the Merdeka Curriculum (Febrianningsih & Ramadan, 2023). Teachers who actively engage in professional development activities, such as training programs and teacher working groups (KKG), tend to have better understanding of curriculum objectives and teaching strategies.

Despite these positive findings, this study also identifies several challenges in the implementation of the Merdeka Curriculum at SDN 2 Suru. One of the most significant challenges is the limited availability of technological infrastructure. The absence of digital learning facilities such as LCD projectors and stable internet access restricts teachers from integrating digital media into the learning process. As a result, teachers must rely on printed materials and simple learning tools to deliver instructional content. This condition reflects the broader issue of educational infrastructure inequality in Indonesia, where many schools, particularly in rural areas, still face limitations in accessing technological resources (Rahayu, 2023).

Another challenge identified in this study is the diversity of students' learning abilities within a single classroom. Teachers must deal with significant variations in students' academic readiness, from students who can quickly understand learning materials to those who require additional guidance. This situation requires teachers to implement differentiated instruction in order to accommodate students' diverse learning needs. Differentiated learning is one of the key principles of the Merdeka Curriculum, as it allows teachers to adjust learning activities according to students' abilities, interests, and learning styles. However, implementing differentiated instruction requires additional preparation, creativity, and time from teachers, which can be challenging in classrooms with limited resources.

Furthermore, the limited understanding of some parents regarding the Merdeka Curriculum also becomes a challenge in its implementation. Some parents still view academic achievement primarily through numerical scores, whereas the Merdeka Curriculum emphasizes a holistic assessment approach that includes students' attitudes, skills, and character development. This difference in perception can lead to misunderstandings between teachers and parents regarding students' learning progress. Therefore, effective communication between schools and parents is essential to ensure that parents understand the objectives and principles of the Merdeka Curriculum.

The findings of this study also highlight the importance of teacher commitment in overcoming various challenges in curriculum implementation. Despite limited facilities, teachers at SDN 2 Suru demonstrate creativity and dedication in conducting learning activities. Teachers often create simple teaching media, utilize personal digital devices such as smartphones, and collaborate with colleagues to improve the learning process. These efforts reflect teachers' adaptability and willingness to continue improving their teaching practices.

Collaboration among teachers also plays an important role in supporting curriculum implementation. Teachers frequently participate in Teacher Working Groups (Kelompok Kerja Guru/KKG) to share experiences, discuss teaching strategies, and exchange learning resources. Such collaborative activities provide opportunities for teachers to learn from each other and improve their professional competence. Previous research has shown that professional learning communities among teachers contribute significantly to improving instructional quality and supporting educational reforms (Sartini & Mulyono, 2022).

Overall, the findings of this study demonstrate that teacher competence and commitment are critical factors in the successful implementation of the Merdeka Curriculum. While structural challenges such as limited infrastructure and diverse student abilities remain significant, teachers' adaptability and professional dedication play an important role in ensuring that learning activities continue to align with curriculum objectives. Therefore, continuous support from educational institutions, including training programs, infrastructure improvement, and parental involvement, is necessary to strengthen the implementation of the Merdeka Curriculum in elementary schools.

4.   CONCLUSION

Based on the results of this study, it can be concluded that teachers at SDN 2 Suru have demonstrated adequate competence in implementing the Merdeka Curriculum. Teachers are able to understand students' characteristics, develop teaching modules aligned with learning outcomes, and apply various instructional strategies that support flexible and student-centered learning. The assessment system implemented in the school also reflects the holistic approach promoted by the Merdeka Curriculum, which evaluates students' knowledge, skills, and attitudes.

Nevertheless, several challenges were identified in the implementation of the curriculum. These challenges include limited technological infrastructure, differences in students' learning abilities within a single classroom, and the limited understanding of some parents regarding the concept of the Merdeka Curriculum. To address these challenges, teachers have implemented several strategies, such as developing simple learning media, utilizing personal digital devices, strengthening communication with parents, and participating in teacher collaboration forums such as teacher working groups (KKG).

Overall, the findings of this study indicate that teacher competence plays a crucial role in supporting the successful implementation of the Merdeka Curriculum. Continuous professional development, improved educational infrastructure, and stronger collaboration between schools and parents are necessary to enhance the effectiveness of curriculum implementation in elementary schools.

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