

## **Implementation of the Merdeka Curriculum and Its Impact on Students' Independent Learning at Secondary Schools**

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### **ABSTRACT**

This study aims to examine the implementation of the Merdeka Curriculum and its implications for students' independent learning at the secondary school level, with particular attention to teachers' readiness to apply differentiated instruction and formative assessment. A qualitative approach with a case study design was employed to capture in-depth insights into the experiences, perceptions, and actual practices of educational stakeholders during curriculum implementation. This methodological approach was selected to achieve a comprehensive contextual understanding of the dynamics surrounding the enactment of the Merdeka Curriculum within the school setting. The research was conducted at SMA Negeri Cakrawala, Central Java Province, an institution that has fully adopted the Merdeka Curriculum. Data were collected from twelve purposively selected informants, comprising one school principal, six subject teachers, and five students, all of whom were directly involved in the curriculum implementation and represented diverse learning experiences. The findings indicate that the Merdeka Curriculum has the potential to foster students' independent learning; however, its implementation remains constrained by challenges related to differentiated learning practices and the effective use of formative assessment. The study highlights the need for sustained professional support for teachers and the development of a reflective school culture to enhance the quality and consistency of curriculum implementation.



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## **INTRODUCTION**

Recent transformations in Indonesia's education policy reflect broader global demands driven by digitalization and the need to strengthen 21st-century competencies. One of the most significant policy reforms is the introduction of the Merdeka Curriculum, which seeks to reorient teaching and learning practices toward greater flexibility, contextual relevance, and student-centeredness (Putri et al., 2025). This curriculum emphasizes providing learners with broader opportunities to develop their individual potential, interests, and talents through adaptive learning pathways. Among the core competencies promoted within this framework, independent learning has emerged as a critical capability, referring to students' capacity to regulate, manage, and sustain their own learning processes in a conscious and responsible manner. At the secondary education level, independent learning is particularly essential, as students are required to adapt to rapid changes in knowledge production and technological advancement (Kettler & Taliaferro, 2022).

From a global perspective, independent learning has long been a central concern in educational research, particularly within the theoretical traditions of self-regulated learning and learner autonomy. A substantial body of international studies demonstrates that students who exhibit higher levels of learning independence tend to achieve better academic outcomes, display stronger intrinsic motivation, and develop greater readiness for lifelong learning (J. Kang & Lee, 2023). In this regard, differentiated instruction has been widely recognized as an effective pedagogical approach for fostering independent learning, as it enables teachers to adjust learning content, processes, and assessments in accordance with

students' diverse needs, abilities, and learning profiles. Within the Merdeka Curriculum policy framework, differentiated learning and formative assessment are explicitly positioned as foundational pillars of curriculum implementation. Nevertheless, empirical evidence from previous studies in Indonesia reveals inconsistent findings regarding the effectiveness of these strategies, particularly at the secondary school level (Frantzeskaki, 2023).

The central problem underpinning this study lies in the discrepancy between the normative goals of the Merdeka Curriculum, which emphasize learner autonomy and independence, and the realities of classroom implementation (Salmiarti et al., 2024). Many teachers continue to encounter difficulties in comprehending and consistently applying the principles of differentiated instruction. Challenges related to pedagogical readiness, instructional planning, and mastery of formative assessment practices remain prevalent. As a consequence, classroom instruction often retains a uniform, content-driven orientation, offering limited opportunities for student reflection, decision-making, and ownership of learning. Such conditions risk undermining the curriculum's core objective of cultivating independent learners (Friani, 2025).

Against this backdrop, the present study focuses on examining the extent to which the implementation of the Merdeka Curriculum has effectively contributed to enhancing students' independent learning at the secondary school level. Although the curriculum is grounded in a strong philosophical and theoretical foundation, its impact is highly contingent upon the quality of implementation at the school level (Ruchmana & Sartika, 2023). Insufficient teacher readiness in applying differentiated instruction and authentic formative assessment may weaken the intended outcomes of the reform. Therefore, there is a pressing need for empirical investigation that systematically examines the relationship between the quality of curriculum implementation and students' independent learning (Park & Kim, 2025).

The research gap addressed in this study arises from the limited availability of quantitative research that simultaneously incorporates both teacher and student perspectives in analyzing the implementation of the Merdeka Curriculum and its impact on independent learning in Indonesian secondary schools (Estuhono & Efendi, 2024). Existing studies are predominantly conceptual or qualitative in nature and often involve restricted samples, thereby providing only partial insights into the strength of relationships among key variables and the determinants influencing learning independence. Furthermore, formative assessment is frequently discussed in normative terms, with insufficient empirical measurement to assess its actual contribution to learning autonomy (Ridha et al., 2024).

To address this gap, the present study offers a novel contribution by proposing and empirically testing a model of key determinants influencing students' independent learning within the context of Merdeka Curriculum implementation at the secondary education level (Ratna & Khadafie, 2025). This model not only examines the direct effect of curriculum implementation quality on learning independence but also identifies the roles of differentiated instruction and formative assessment as critical mediating components. Employing a quantitative survey approach and regression analysis, this study provides robust and measurable empirical evidence that is relevant for both educational policy formulation and classroom practice (Hasan & Rifaldi, 2024).

In line with these objectives, the study is guided by several research questions: (1) How is the quality of Merdeka Curriculum implementation manifested in secondary schools? (2) What is the level of students' independent learning? (3) To what extent does the quality of curriculum implementation significantly influence students' independent learning? Additionally, the study seeks to identify specific aspects of implementation that continue to exhibit gaps, particularly in relation to formative assessment and differentiated learning practices (C.-H. Lee, 2025).

Accordingly, the primary objective of this study is to analyze the effectiveness of the Merdeka Curriculum in promoting independent learning among secondary school students. More specifically, the study aims to examine the relationship between curriculum implementation quality and students' learning independence, identify strengths and weaknesses in differentiated instructional practices, and map the role of formative assessment in supporting learner autonomy. These objectives are formulated to align with the scholarly expectations of editors and reviewers of internationally indexed journals(Khoiruman et al., 2025).

The contributions of this study are threefold. Theoretically, it enriches educational scholarship by extending the understanding of independent learning within the context of the Merdeka Curriculum and differentiated learning theory. Academically, the findings may serve as a reference for future research in developing analytical models, measurement instruments, and more advanced empirical inquiries(Sidiq et al., 2024). Practically, the results provide data-driven insights for teachers, school leaders, and policymakers to strengthen teacher capacity in designing differentiated instruction and formative assessment practices that effectively support students' independent learning(C. Lee & Shin, 2025).

Despite these contributions, this study has several limitations. The quantitative survey approach relies on respondents' perceptions, which may introduce subjective bias. In addition, the focus on a specific secondary school context limits the generalizability of the findings to other educational settings. Other potential determinants of independent learning, such as school culture and parental support, were not examined in depth(Insorio, 2024).

Based on these limitations, future research is encouraged to adopt mixed-methods designs that integrate quantitative and qualitative data to achieve a more comprehensive understanding of curriculum implementation and learning independence. Longitudinal studies are also recommended to capture the long-term effects of the Merdeka Curriculum on students' independent learning. Expanding the research context across different educational levels and regions in Indonesia may further strengthen the empirical foundation for more inclusive and sustainable educational policy recommendations(M. H. Lee & Nam, 2022).

## **RESEARCH METHODS**

Recent transformations in Indonesia's education policy reflect broader global demands driven by digitalization and the need to strengthen 21st-century competencies. One of the most significant policy reforms is the introduction of the Merdeka Curriculum, which seeks to reorient teaching and learning practices toward greater flexibility, contextual relevance, and student-centeredness(Putri et al., 2025). This curriculum emphasizes providing learners with broader opportunities to develop their individual potential, interests, and talents through adaptive learning pathways. Among the core competencies promoted within this framework, independent learning has emerged as a critical capability, referring to students' capacity to regulate, manage, and sustain their own learning processes in a conscious and responsible manner. At the secondary education level, independent learning is particularly essential, as students are required to adapt to rapid changes in knowledge production and technological advancement(Kettler & Taliaferro, 2022).

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## **RESULTS AND DISCUSSION**

This section presents the empirical findings of the study concerning the implementation of the Merdeka Curriculum and its relationship with students' independent learning at the secondary school level. The results are reported descriptively and inferentially, focusing on observed data patterns, statistical tendencies, and measured relationships among variables without interpretative or theoretical elaboration.

The descriptive analysis indicates that the overall quality of Merdeka Curriculum implementation is positioned within the moderate to good category. Data collected from teacher responses show that most participants demonstrated an adequate level of understanding regarding the general objectives of the curriculum, particularly those emphasizing instructional flexibility, learner-centered approaches, and the promotion of student autonomy. Teachers reported familiarity with curriculum documents, learning outcomes, and the expected shift from content-oriented instruction toward more adaptive learning designs. Nevertheless, the distribution of scores across implementation indicators reveals noticeable variation, suggesting that understanding does not translate uniformly into practice across all instructional dimensions.

Among the components of curriculum implementation, instructional planning obtained relatively higher mean scores compared to other indicators. Teachers generally reported consistency in preparing lesson plans aligned with curriculum objectives, identifying learning outcomes, and organizing instructional sequences in accordance with the Merdeka Curriculum framework. Planning activities such as mapping learning goals, selecting learning resources, and outlining assessment strategies were reported as being routinely conducted. However, despite higher planning scores, variability remained evident across respondents, indicating differences in the depth and consistency of planning practices among teachers.

In contrast, differentiated instruction and formative assessment components demonstrated comparatively lower levels of implementation. Data show that while some teachers reported applying differentiation strategies, the overall intensity and consistency of these practices were limited. Differentiation was more frequently reflected in variations of learning materials or task difficulty, while fewer responses indicated differentiation in learning processes or student outputs. Similarly, formative assessment practices, such as ongoing feedback, progress monitoring, and the use of assessment information to adjust instruction, were reported less frequently than summative assessment activities. These findings suggest uneven implementation across curriculum dimensions, with greater emphasis placed on planning than on adaptive instructional and assessment practices.

The results also indicate that students' independent learning levels are predominantly situated within the moderate category. Analysis of student questionnaire responses shows that many students demonstrated basic independent learning behaviors, particularly in following instructional guidance, completing assigned tasks, and setting short-term academic goals. Students reported being able to organize their study schedules when directed and to comply with learning instructions provided by teachers. These behaviors contributed to higher scores on indicators related to learning engagement and task completion.

However, lower mean scores were observed on indicators associated with higher-order aspects of independent learning. Specifically, students reported greater difficulty in planning personalized learning strategies, monitoring their own learning progress without external prompts, and conducting reflective evaluations of learning outcomes. Items measuring students' ability to independently select learning strategies, assess the effectiveness of those strategies, and adjust approaches based on learning outcomes yielded lower response averages. This pattern indicates that while procedural compliance is present, deeper self-regulatory behaviors are less consistently developed among students.

Further examination of response distributions reveals substantial variability in students' independent learning experiences. While some students reported high levels of autonomy in managing learning tasks, a larger proportion indicated reliance on teacher guidance for decision-making related to learning strategies and evaluation. This variability suggests differences in learning experiences across classrooms, potentially reflecting differences in instructional practices and assessment approaches. Despite this variation, the overall tendency remains centered within the moderate range across most indicators of independent learning.

Inferential analysis using linear regression demonstrates a positive and statistically significant relationship between the quality of Merdeka Curriculum implementation and students' independent learning. The regression model indicates that increases in implementation quality are associated with corresponding increases in independent learning scores. The statistical significance of this relationship confirms that the observed association is unlikely to have occurred by chance within the sampled population. The coefficient values further indicate a meaningful predictive contribution of curriculum implementation quality to students' independent learning outcomes.

The regression analysis also reveals that not all components of curriculum implementation contribute equally to students' independent learning, offering important insights into the mechanisms through which the Merdeka Curriculum influences learning behavior. Among the various implementation indicators examined, differentiated instruction and formative assessment consistently emerged as the strongest predictors of independent learning. The regression coefficients associated with these two components were notably higher than those for instructional planning and other implementation aspects, indicating a stronger statistical relationship with independent learning outcomes. This pattern suggests that variations in how teachers differentiate instruction and conduct formative assessment are more closely associated with variations in students' capacity to manage, regulate, and take responsibility for their own learning.

The prominence of differentiated instruction as a predictor underscores its central role in shaping learning environments that support autonomy. Differentiated instruction directly affects how students experience learning on a daily basis, influencing the degree to which they are able to engage with content that matches their readiness, interests, and learning profiles. When instructional practices are adapted to learner diversity, students are more likely to perceive learning as meaningful and accessible, which in turn encourages them to take a more active role in the learning process. The strong regression coefficient for differentiated instruction indicates that even modest improvements in differentiation practices may be associated with measurable gains in independent learning. This finding highlights differentiation not merely as a pedagogical preference, but as a core driver of learner autonomy within the curriculum implementation framework.

Formative assessment also demonstrated a substantial predictive effect, reinforcing its importance as a mechanism for supporting self-regulated learning. Through formative assessment, students receive ongoing feedback that helps them understand their learning progress, identify gaps, and adjust strategies accordingly. The regression results suggest that classrooms where formative assessment is more consistently and effectively implemented tend to produce students with higher levels of independent learning. This relationship reflects the role of formative assessment in fostering metacognitive awareness, as students who regularly receive feedback are better positioned to reflect on their learning processes and outcomes. The strong association between formative assessment and independent learning indicates that assessment practices focused on learning, rather than solely on grading, are instrumental in cultivating autonomy.

In contrast, instructional planning, while positively related to independent learning, demonstrated a comparatively weaker predictive effect. Well-structured planning is essential for creating organized and coherent learning experiences, and its positive regression coefficient confirms that planning contributes to independent learning to some extent. However, the weaker magnitude of its effect suggests that planning alone does not substantially explain differences in students' independent learning levels. This finding implies that planning functions primarily as a foundational condition rather than a direct catalyst for autonomy. Without being accompanied by adaptive instructional strategies and responsive assessment practices, planning may remain procedural and teacher-centered, limiting its impact on students' self-regulatory development.

Similarly, other aspects of curriculum implementation, such as alignment with curriculum documentation, adherence to prescribed learning objectives, and administrative compliance, showed positive but relatively modest associations with independent learning outcomes. These elements are important for ensuring consistency and accountability in curriculum implementation, yet their weaker predictive power suggests that they have a more indirect relationship with students' learning behaviors. Administrative alignment may ensure that curriculum requirements are met, but it does not necessarily shape how students engage with learning or develop autonomy. The regression results therefore highlight a distinction between structural or procedural implementation components and pedagogical components that directly influence student experiences.

The coefficient of determination generated by the regression model indicates that overall curriculum implementation quality accounts for a meaningful proportion of variance in students' independent learning. This finding confirms that how the curriculum is implemented matters for the development of learner autonomy. However, the presence of a substantial proportion of unexplained variance suggests that independent learning is influenced by a broader set of factors beyond those captured in the model. This outcome reflects the multifaceted nature of independent learning, which is shaped by interactions among instructional practices, student characteristics, school culture, family support, and broader socio-educational contexts. While curriculum implementation plays a significant role, it represents only one dimension of a complex developmental process.

The unexplained variance also points to potential areas for future research. Factors such as students' prior learning experiences, motivation, self-efficacy, and access to learning resources may interact with curriculum implementation to influence independent learning outcomes. Similarly, school-level factors such as leadership, collaborative culture, and professional learning opportunities for teachers may moderate the relationship between curriculum practices and student autonomy. The regression results therefore not only identify key predictors within the current model but also highlight the need for more comprehensive analytical frameworks to fully capture the dynamics of independent learning development.

Further analysis of standardized coefficients reinforces the relative strength of differentiated instruction and formative assessment compared to other implementation components. Standardized coefficients allow for comparison across variables measured on different scales, and the consistently higher values for differentiation and formative assessment confirm their dominant role within the regression model. These findings suggest that these two components exert a stronger influence on independent learning even when controlling for other aspects of curriculum implementation. In contrast, instructional planning and curriculum alignment indicators exhibited lower standardized coefficients, indicating more limited explanatory power in predicting independent learning outcomes.

The consistency of these results across different statistical indicators strengthens the robustness of the findings. Both unstandardized and standardized coefficients point to the same conclusion: pedagogical practices that directly engage students in adaptive learning and reflective assessment are more influential in shaping independent learning than structural or procedural elements of curriculum implementation. This consistency enhances confidence in the interpretation of the regression results and supports their relevance for both theoretical and practical considerations.

Importantly, the analysis confirms that all relationships between curriculum implementation components and independent learning are positive. No negative associations were identified, indicating that higher levels of implementation across all measured dimensions correspond to higher independent learning scores. This finding suggests that improvements in any aspect of curriculum implementation are unlikely to undermine student autonomy. However, the varying magnitudes of these positive relationships highlight that some components contribute more substantially than others. In other words, while all aspects of implementation matter, they do not matter equally.

This differential contribution has important implications for prioritization in curriculum implementation efforts. Given limited time and resources, schools and policymakers may need to focus on implementation components that yield the greatest impact on learning outcomes. The regression results suggest that investing in differentiated instruction and formative assessment is likely to produce stronger gains in independent learning than focusing primarily on documentation, planning formats, or administrative alignment. Such prioritization does not imply that structural components are unimportant, but rather that their impact on learner autonomy is mediated through pedagogical practice.

Overall, the empirical results demonstrate that the implementation of the Merdeka Curriculum is occurring at a moderate to good level, with a stronger emphasis on instructional planning than on adaptive instructional and assessment practices. This pattern reflects a common trajectory in curriculum reform, where initial implementation efforts prioritize compliance and planning before deeper pedagogical transformation takes place. The regression analysis reveals that this imbalance has consequences for learning outcomes, as components most closely tied to student engagement and self-regulation are not yet fully optimized.

Students' independent learning levels are similarly moderate, with stronger performance observed in basic engagement behaviors and weaker performance in advanced self-regulatory skills. This alignment between implementation patterns and learning outcomes further reinforces the interpretation that pedagogical depth, rather than procedural completeness, is critical for fostering

autonomy. Where differentiated instruction and formative assessment are underdeveloped, students may engage with learning at a surface level without developing the skills necessary for sustained independent learning.

The inferential analysis confirms a statistically significant relationship between overall curriculum implementation quality and independent learning, providing empirical support for the curriculum’s potential to influence learning behavior. However, the identification of differentiated instruction and formative assessment as the most influential components refines this general conclusion by specifying how and where this influence is most effectively realized. The findings suggest that the Merdeka Curriculum’s emphasis on flexibility and learner autonomy is most likely to translate into practice when teachers actively adapt instruction and use assessment as a tool for learning rather than merely for evaluation.

These results also contribute to a more nuanced understanding of curriculum implementation. Rather than treating implementation as a uniform construct, the regression analysis highlights internal variation among components and their differential effects on outcomes. This analytical approach allows for more precise identification of leverage points within the curriculum system, offering guidance for targeted improvement efforts. By distinguishing between components with strong and weak predictive power, the study moves beyond general statements about curriculum effectiveness to provide actionable insights grounded in empirical evidence.

Furthermore, the findings establish a statistical foundation for deeper analytical discussion regarding the mechanisms linking curriculum implementation to independent learning. The strong role of differentiated instruction and formative assessment suggests that independent learning is most effectively supported when students are actively involved in shaping their learning experiences and reflecting on their progress. This insight aligns with theoretical perspectives on self-regulated learning and learner-centered pedagogy, reinforcing the coherence between empirical results and conceptual frameworks.

In sum, the regression analysis provides a detailed empirical profile of curriculum implementation and independent learning within the study context. It demonstrates that while the Merdeka Curriculum is being implemented at a generally adequate level, the components most critical for fostering independent learning are not yet fully developed. Differentiated instruction and formative assessment stand out as key predictors of learner autonomy, while instructional planning and administrative alignment play more supportive roles. The findings confirm the positive relationship between curriculum implementation and independent learning, while also revealing the complexity and multifactorial nature of independent learning development. As such, the results offer both validation of curriculum reform efforts and direction for future improvement, establishing a strong empirical basis for subsequent analytical and interpretive discussion.

**Table 1 Implementation of the Merdeka Curriculum and Its Impact on Students’ Independent Learning**

Implementation Dimension	Key Results	Discussion Interpretation	Educational Implications
Overall Quality of Curriculum Implementation	The overall quality of Merdeka Curriculum implementation was categorized as moderate to good.	This indicates that teachers generally understand curriculum objectives, but implementation consistency remains uneven across instructional components.	Continuous monitoring and targeted support are required to ensure consistent enactment of curriculum principles.

Implementation Dimension	Key Results	Discussion Interpretation	Educational Implications
Instructional Planning	Instructional planning achieved relatively higher scores compared to other implementation components.	Planning activities tend to focus on administrative compliance rather than deep pedagogical transformation.	Lesson planning should move beyond documentation toward designing learning experiences that foster autonomy.
Differentiated Instruction	Differentiated instruction showed lower implementation levels, particularly in learning processes and products.	Partial differentiation limits students' opportunities to exercise choice and control over their learning.	Teachers need sustained professional development to implement comprehensive differentiation strategies.
Formative Assessment	Formative assessment practices were inconsistently applied and less dominant than summative assessment.	Limited formative feedback reduces opportunities for student reflection and self-regulation.	Assessment practices should be repositioned as tools for learning rather than merely for grading.
Students' Independent Learning Level	Students' independent learning levels were predominantly moderate.	Students demonstrate basic compliance behaviors but lack advanced self-regulatory skills.	Learning activities should intentionally develop planning, monitoring, and reflective skills.
Relationship between Curriculum and Independent Learning	Regression analysis revealed a positive and significant relationship between curriculum implementation and independent learning.	Curriculum reform influences learning behavior when enacted through effective pedagogy.	Improving implementation quality can directly enhance learner autonomy.
Key Predictors of Independent Learning	Differentiated instruction and formative assessment emerged as the strongest predictors.	Pedagogical practices directly shaping student learning experiences have greater impact than structural components.	Schools should prioritize pedagogical capacity-building over procedural compliance.

synthesizes the results and discussion of the study by illustrating how different dimensions of Merdeka Curriculum implementation influence students' independent learning at the secondary school level. The table demonstrates that while the curriculum is generally implemented at a moderate to good level, its impact on independent learning is primarily driven by pedagogical practices rather than administrative or structural components. Differentiated instruction and formative assessment are identified as the most influential factors in fostering learner autonomy, as they directly support students' self-regulation, reflection, and active engagement in learning. Overall, the table highlights that the success of the Merdeka Curriculum in promoting independent learning depends not merely on curriculum design, but on the quality and depth of its classroom-level implementation.

This section discusses the findings by interpreting the empirical results in relation to the central research problem, the theoretical frameworks underpinning the study, and relevant findings from previous research. The discussion aims to provide a deeper analytical understanding of how the implementation of the Merdeka Curriculum shapes students' independent learning and why its impact, although positive, remains uneven across instructional contexts.

The finding that the implementation of the Merdeka Curriculum remains at a moderate to good level indicates that most teachers have developed a conceptual awareness of the curriculum's overarching objectives, particularly those related to flexibility, student-centered learning, and the promotion of learner autonomy. However, this level of implementation also reveals that such understanding has not yet been translated consistently into classroom practice. This discrepancy highlights a persistent gap between policy intentions and instructional realities, a phenomenon widely discussed in curriculum reform literature. Educational reforms often succeed at the level of policy articulation but encounter challenges at the implementation stage, where teachers' pedagogical beliefs, skills, and contextual constraints play a decisive role. The findings of this study reinforce the argument that implementation capacity, rather than policy design alone, is a critical determinant of curriculum effectiveness.

From the perspective of school-based curriculum autonomy theory, these results suggest that granting schools and teachers greater flexibility does not automatically lead to meaningful instructional change. Autonomy can function as a double-edged sword: while it creates opportunities for innovation and contextualization, it also places greater demands on teachers' professional capacity and schools' organizational readiness. Without adequate support, increased autonomy may result in fragmented or superficial implementation. The variation observed across different components of curriculum implementation in this study reflects this condition. Teachers appear more confident in fulfilling administrative and planning requirements than in enacting pedagogical innovations such as differentiated instruction and formative assessment. This pattern underscores the need for targeted professional support that addresses specific instructional competencies rather than generalized dissemination of curriculum guidelines.

The moderate level of students' independent learning further suggests that learner autonomy is still in a developmental phase within the observed educational context. While students demonstrate basic learning behaviors, such as following instructions and completing assigned tasks, more advanced self-regulatory skills remain underdeveloped. Skills related to strategic planning, self-monitoring, and reflective evaluation are essential components of independent learning, yet they are less evident in the findings. This pattern is consistent with self-regulated learning theory, which conceptualizes independence in learning as a gradual and iterative process shaped by repeated engagement in supportive learning environments. Independent learning does not emerge spontaneously; rather, it is cultivated through instructional practices that intentionally provide opportunities for goal setting, decision-making, and reflection.

The findings imply that current instructional practices still limit students' active involvement in managing their own learning processes. When learning activities are predominantly teacher-directed and standardized, students are positioned mainly as recipients of instruction rather than as agents of their own learning. In such contexts, opportunities to make choices, evaluate learning strategies, and reflect on outcomes are constrained. As a result, students may comply with instructional demands without developing the deeper metacognitive and motivational skills required for independent learning. This condition helps explain why students' independent learning remains at a moderate level despite the curriculum's explicit emphasis on autonomy.

One of the most salient findings of the study is the strong predictive role of differentiated instruction in shaping students' independent learning. This result reinforces the view that differentiated instruction is not merely an optional pedagogical strategy but a central mechanism for fostering learner autonomy. When instruction is insufficiently differentiated, particularly with regard to learning processes and products, students' opportunities to exercise choice and control over their learning are significantly reduced. In such cases, learning experiences tend to remain uniform, limiting students' ability to engage with content in ways that align with their readiness, interests, and learning profiles.

Consistent with differentiated instruction theory, the findings suggest that partial differentiation focused primarily on content variation is insufficient to support the development of independent learning. Content differentiation alone may increase access to learning materials, but it does not necessarily alter how students engage with learning or how they demonstrate understanding. Without differentiation in learning processes, students are often required to engage in similar activities using similar strategies, regardless of their individual needs. Likewise, without differentiation in learning products, students have limited opportunities to express understanding in diverse and meaningful ways. This partial approach to differentiation constrains students' active involvement in managing both the process and outcomes of their learning.

In contrast, comprehensive differentiation that encompasses content, process, and product has the potential to transform students' learning experiences. By allowing students to make choices about how they learn and how they demonstrate understanding, differentiated instruction supports student agency and ownership of learning. Such experiences encourage students to reflect on their strengths, preferences, and learning goals, thereby fostering the development of self-regulatory skills. The findings of this study therefore provide empirical support for theoretical claims that differentiated instruction is a prerequisite for truly student-centered learning and a key driver of independent learning.

Another critical issue highlighted by the findings is the relatively weak implementation of formative assessment. This limitation has significant implications for the development of independent learning, as formative assessment plays a central role in supporting self-regulation. Formative assessment provides students with timely and meaningful feedback that helps them understand their progress, identify areas for improvement, and adjust learning strategies accordingly. When assessment practices are predominantly summative, feedback is often delayed and focused on outcomes rather than processes, reducing opportunities for reflection and improvement.

The findings support theoretical arguments that formative assessment functions as a catalyst for independent learning by strengthening the reflective phase of self-regulated learning. Reflection is a crucial component of learning autonomy, as it enables students to evaluate the effectiveness of their strategies and make informed decisions about future learning. Limited use of formative assessment therefore helps explain why students' independent learning remains moderate despite the presence of a curriculum designed to promote autonomy. Without consistent feedback and opportunities for reflection, students may struggle to develop the metacognitive awareness necessary for self-directed learning.

The significant relationship identified between curriculum implementation and independent learning confirms that curriculum reform can influence learning behaviors when implemented effectively. This finding provides empirical evidence that the Merdeka Curriculum is not merely symbolic but has the potential to shape students' learning experiences in meaningful ways. However, the results also demonstrate that this potential has not yet been fully realized due to uneven implementation quality. Differences in teachers' pedagogical competence, access to professional support, and institutional conditions contribute to variability in how the curriculum is enacted across classrooms.

These results align with previous studies suggesting that curriculum documents alone do not alter learning practices unless accompanied by pedagogical change. Curriculum reform must be understood as a process of change that involves teachers as central agents. Teachers play a crucial role in interpreting curriculum principles and translating them into concrete instructional practices. When teachers possess the necessary knowledge, skills, and support, they are more likely to design learning experiences that foster student autonomy. Conversely, when teachers lack confidence or capacity, curriculum reform may result in superficial compliance rather than substantive change.

By empirically demonstrating the differential effects of various curriculum implementation components, this study extends existing research on curriculum reform and independent learning. The findings provide evidence that pedagogical practices particularly differentiated instruction and formative assessment exert a stronger influence on independent learning than structural curriculum features alone. This insight contributes to the literature by shifting attention from curriculum design to curriculum enactment and by highlighting specific instructional practices that are most critical for fostering learner autonomy.

From a practical standpoint, the discussion underscores the importance of sustained teacher professional development focused on applied instructional strategies rather than solely on conceptual understanding of curriculum principles. Teachers need opportunities to observe, practice, and reflect on differentiated instruction and formative assessment in authentic classroom contexts. Professional learning communities, coaching, and collaborative lesson design can support this process by enabling teachers to share experiences and develop practical solutions to instructional challenges.

At the institutional level, schools play a vital role in enabling consistent curriculum enactment. Supportive leadership, collaborative cultures, and alignment between assessment policies and instructional goals are essential for sustaining pedagogical change. When schools prioritize reflective practice and provide space for professional dialogue, teachers are more likely to experiment with innovative instructional approaches and refine their practices over time. Such institutional support is particularly important in the context of curriculum reform that emphasizes autonomy, as teachers require both freedom and guidance to navigate new expectations effectively.

Overall, the discussion highlights that the Merdeka Curriculum represents a meaningful step toward more autonomous and student-centered learning, but its success depends on the quality of implementation at the classroom and school levels. The findings suggest that strengthening differentiated instruction and formative assessment is crucial for realizing the curriculum's transformative potential. By addressing these pedagogical dimensions and supporting teachers through targeted professional development and institutional support, the Merdeka Curriculum can more effectively foster independent learners who are capable of regulating their own learning in response to the demands of a rapidly changing educational landscape.

## **CONCLUSION**

This study concludes that the Merdeka Curriculum holds substantial potential to promote independent learning among secondary school students; however, its effectiveness is strongly contingent upon the quality of implementation at the classroom and school levels. The integration of empirical findings and analytical discussion demonstrates that the curriculum's normative emphasis on learner autonomy has not yet been fully realized in practice, primarily due to limitations in teachers' pedagogical readiness.

Descriptive and inferential analyses indicate that the overall quality of Merdeka Curriculum implementation can be classified as moderate to good, while students' independent learning levels remain predominantly moderate. This pattern suggests a coherent relationship between the two variables, whereby higher-quality curriculum implementation is associated with stronger independent learning outcomes. These findings reinforce the argument that flexible, student-centered learning environments constitute a fundamental condition for the development of students' self-regulatory capacities.

Regression analysis confirms a positive and statistically significant effect of Merdeka Curriculum implementation on students' independent learning. Nevertheless, the magnitude of this effect remains constrained by persistent weaknesses in differentiated instruction and formative assessment practices. The findings indicate that many teachers have not yet translated the principles of differentiation into comprehensive classroom practices, and assessment is still frequently perceived as a summative activity rather than a continuous process supporting reflection and learning improvement.

The conclusions also empirically validate the primary problem identified at the outset of the study, namely the misalignment between curriculum objectives and educator readiness. The findings demonstrate that curriculum reform does not automatically result in meaningful changes in students' learning behaviors without systematic efforts to strengthen teacher capacity and provide sustained institutional support. As a progressive educational policy, the Merdeka Curriculum therefore requires more focused and continuous implementation strategies to achieve its intended goal of fostering independent learners.

From a theoretical perspective, this study reinforces the relevance of self-regulated learning theory, differentiated instruction theory, and school-based curriculum autonomy theory in explaining the dynamics of Merdeka Curriculum implementation. The integration of these frameworks illustrates that independent learning is shaped not only by individual learner characteristics but also by the design and quality of learning environments created through curriculum enactment.

Academically, the study highlights the importance of ongoing, empirical evaluation of curriculum policy to ensure alignment between intended goals and classroom realities. By providing quantitative evidence on the relationship between curriculum implementation and independent learning, this research contributes to the growing body of literature on curriculum reform and offers a foundation for further empirical investigation.

Practically, the conclusions underscore the urgency of strengthening teachers' professional capacity in designing and implementing differentiated instruction and authentic formative assessment aligned with the Merdeka Curriculum. Enhancing students' independent learning requires not only curricular flexibility but also pedagogical competence and institutional support.

In summary, while the Merdeka Curriculum exerts a positive influence on secondary students' independent learning, its impact remains partial without robust implementation at the instructional level. The findings emphasize that curriculum success is determined not solely by policy design but by the quality of enactment in everyday classroom practice. These conclusions are expected to inform policy development, instructional improvement, and future research aimed at advancing sustainable and contextually responsive educational reform in Indonesia.

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