



The Influence of Teachers' Understanding of the Merdeka Curriculum and Instructional Technology Skills on Its Implementation: The Moderating Role of Differentiated Instruction

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Article Info

Article History:

Received January 2026

Accepted January 2026

Published March 2026

Keywords:

Merdeka Curriculum,
Teachers'
Understanding,
Instructional
Technology,
Differentiated
Instruction

Abstract

This study analyzes the effects of teachers' understanding of the Merdeka Curriculum and their ability to use instructional technology on the implementation of the Merdeka Curriculum, with differentiated instruction conceptualized as a moderating variable. Grounded in curriculum implementation theory, pedagogical content knowledge, technological pedagogical content knowledge, and differentiated instruction theory, this study addresses a research gap that has traditionally treated curriculum understanding, technology, and pedagogical practice as separate domains. This quantitative study involved 207 elementary school teachers in Sirampog District, Brebes Regency, as the research sample. Data were collected using Likert-scale questionnaires and analyzed using Partial Least Squares–Based Structural Equation Modeling (PLS-SEM). The results indicate that teachers' understanding of the Merdeka Curriculum does not have a direct effect on curriculum implementation but exerts a significant indirect effect through differentiated instruction. Teachers' ability to use instructional technology has a direct and significant effect on both curriculum implementation and differentiated instruction. Differentiated instruction demonstrates the strongest influence and functions as a mediating rather than a moderating variable, bridging the effects of curriculum understanding and technological competence on Merdeka Curriculum implementation. This study advances the Synergistic Curriculum Implementation Model (SCIM), which suggests that the success of the Merdeka Curriculum is determined by the synergy among curriculum understanding, mastery of instructional technology, and differentiated instructional practices. These findings offer important theoretical and practical implications for policy development and the strengthening of teacher capacity in implementing the Merdeka Curriculum.

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p-ISSN 2252-7001

e-ISSN 2502-454X

INTRODUCTION

Education serves as a fundamental foundation for shaping individuals who are knowledgeable, possess strong character, and are capable of adapting to the dynamics of an ever-changing era. Within the educational system, there are five interrelated components: educational objectives, educators and learners,

curriculum, instructional methods, and the educational context. These components function as an integrated system to achieve educational goals. Among them, the curriculum occupies a strategic position, as it determines the direction, content, and learning processes, including the formulation of objectives, selection of learning

materials, instructional strategies, and evaluation of learning outcomes (Suharto, 2011).

Etymologically, the term curriculum originates from the Greek word *currere*, meaning a course or track that must be completed, as cited by (Suherman, 2023). In the educational context, the curriculum represents the totality of learning experiences intentionally designed for learners to undertake. Indonesian Law Number 20 of 2003 defines the curriculum as a set of plans and regulations concerning educational objectives, content, learning materials, and instructional methods used as guidelines for organizing learning activities in order to achieve national education goals.

Since Indonesia's independence, the national education system has undergone at least eleven curriculum reforms, beginning with the 1947 curriculum and continuing through the Merdeka Curriculum, which began to be implemented in the 2021–2022 academic year. These reforms include the 1952, 1964, 1968, 1975, 1984, and 1994 curricula; the 2004 Competency-Based Curriculum; the 2006 School-Based Curriculum; the 2013 Curriculum; and the Merdeka Curriculum (Priatmoko, 2020). Curriculum reform is an inevitable response to societal changes and evolving demands, with the primary objective of improving the quality of learning processes and educational outcomes (Masykur, 2019).

The Merdeka Curriculum was introduced as an effort to refine previous curricula by emphasizing learning flexibility, the strengthening of essential competencies, and a student-centered orientation. This curriculum provides teachers with greater autonomy to design learning activities that align with the context and characteristics of learners, thereby enabling learning processes that are deeper, more contextualized, and more meaningful (Purwanto, 2022). Nevertheless, such policy flexibility does not automatically guarantee successful implementation in classroom practice.

Curriculum implementation represents a critical stage that bridges educational policy and instructional practice. Oemar Hamalik, as cited in (Suherman, 2023), defines curriculum

implementation as the application of a designed curriculum program that is adapted to learners' characteristics and school conditions. This process encompasses lesson planning, instructional delivery, and learning evaluation, and is influenced by various factors, including teachers' understanding, curriculum content, school culture, the availability of facilities and infrastructure, and school leadership (Suherman, 2023). The success of Merdeka Curriculum implementation is largely determined by teachers' understanding of curriculum concepts, their ability to adapt instruction to local needs, and the consistency of reflective practice in teaching (Dilfa, 2023).

Conceptually, the Merdeka Curriculum is designed to promote student-centered, adaptive, and contextualized learning. However, empirical findings indicate that curriculum implementation does not always align with policy design. Curriculum Implementation Theory proposed by (Fullan, 2007) asserts that the success of educational reform is more strongly influenced by the capacity of change agents namely teachers to interpret and translate policy into practice than by the clarity of policy documents themselves. Accordingly, curriculum implementation requires a process of sense-making, referring to teachers' cognitive and reflective processes in constructing meaningful understanding of policy and actualizing it through pedagogical actions (Munson, 2023).

In this context, teachers' understanding of the Merdeka Curriculum should not be construed merely as conceptual or administrative mastery, but must be manifested in instructional practice. The framework of Pedagogical Content Knowledge (PCK) proposed by (Shulman, 1986) emphasizes that curriculum knowledge influences learning only when it is integrated with pedagogical knowledge. Furthermore, the Technological Pedagogical Content Knowledge (TPACK) framework developed by (J.Koehler, 2006) highlights the integration of instructional technology as a critical factor in strengthening the design and implementation of learning that is responsive to students' needs.

One concrete manifestation of the pedagogical sense-making process within the Merdeka Curriculum is the implementation of differentiated instruction. Within the Differentiated Instruction Theory framework (Tomlinson, 1999), differentiated instruction is defined as a pedagogical approach that adapts instructional strategies to students' readiness, interests, and learning profiles in order to achieve optimal learning outcomes.

Within the context of the Merdeka Curriculum, differentiation is not merely an instructional strategy but functions as a pedagogical mechanism that enables teachers to translate their curriculum understanding and use of technology into student-centered instructional practices.

However, a review of previous studies indicates that teachers' understanding of the Merdeka Curriculum, the use of instructional technology, and differentiated instruction are generally examined as separate constructs. As a result, the mechanism through which policy understanding and teachers' technological capacity are transformed into concrete instructional practices has not been comprehensively articulated. Moreover, empirical studies examining the role of differentiated instruction whether as an independent variable, a moderating variable, or a mediating variable in the implementation of the Merdeka Curriculum remain limited.

Based on these conditions, this study identifies three research gaps. First, there is a lack of an empirical model that explains the synergistic relationship among teachers' understanding of the Merdeka Curriculum, their ability to use instructional technology, and differentiated instruction in the implementation of the Merdeka Curriculum. Second, empirical evidence examining the role of differentiated instruction within this relationship remains limited. Third, field findings suggest that teachers' understanding of the Merdeka Curriculum is often conceptual and administrative in nature, and has not yet been fully translated into consistent pedagogical actions.

Therefore, this study aims to analyze the effects of teachers' understanding of the Merdeka Curriculum and their ability to use instructional technology on the implementation of the Merdeka Curriculum, as well as to examine the role of differentiated instruction as a moderating variable. Theoretically, this study seeks to clarify the mechanisms of Merdeka Curriculum implementation through an integrative approach grounded in Curriculum Implementation Theory (Fullan, 2007), Pedagogical Content Knowledge (Shulman, 1986), Technological Pedagogical Content Knowledge (J.Koehler, 2006), and Differentiated Instruction Theory (Tomlinson, 1999). Practically, the findings are expected to provide direction for the development of more applicable, practice-based teacher training programs and to encourage a shift in curriculum implementation from administrative compliance toward meaningful and impactful learning for students.

METHOD

This study employs a quantitative approach using a Structural Equation Modeling Partial Least Squares (SEM-PLS) design. This approach was selected because it enables the simultaneous testing of causal relationships among latent variables, the analysis of both direct and indirect effects, and the evaluation of mediating and moderating variables within a single structural model (Hair, 2021). In addition, SEM-PLS is particularly suitable for predictive and limited exploratory research models with relatively high construct complexity.

The study population consists of all elementary school teachers in Sirampog District, Brebes Regency, Central Java, totaling 428 teachers. The sample size was determined using Slovin's formula with a 5% margin of error, resulting in 207 respondents. Proportional sampling was applied to ensure adequate representation of the research population.

Data were collected using a questionnaire instrument with a five-point Likert scale (1–5), developed based on the theoretical indicators of each research variable, namely teachers'

understanding of the Merdeka Curriculum, ability to use instructional technology, differentiated instruction, and Merdeka Curriculum implementation. The development of indicators was guided by the conceptual frameworks of curriculum implementation theory, pedagogical content knowledge, technological pedagogical content knowledge, and differentiated instruction theory.

Instrument validity was assessed in two stages. The first stage involved an initial validity and reliability pre-test conducted with 30 respondents using a Classical Test Theory (CTT) approach supported by SPSS version 24. Item validity was examined using corrected item-total correlations, while construct reliability was evaluated using Cronbach's Alpha coefficients, with a threshold value of ≥ 0.60 indicating acceptable internal consistency.

The second stage was conducted through SEM-PLS analysis using SmartPLS version 4.1. Following (Hair, 2021), model evaluation was carried out in two main stages: assessment of the outer model and assessment of the inner model. The outer model evaluation aimed to examine the quality of latent construct measurement through convergent validity (factor loadings and Average Variance Extracted [AVE]), discriminant validity, and construct reliability, including composite reliability and Cronbach's Alpha.

Subsequently, the inner model evaluation was performed to assess the structural relationships among latent variables. This evaluation included tests of multicollinearity using the Variance Inflation Factor (VIF), the coefficient of determination (R^2), path coefficients, and the significance of relationships among variables through bootstrapping procedures. This analysis was employed to examine direct effects, indirect effects, and interaction effects in the implementation of the Merdeka Curriculum.

RESULTS AND DISCUSSIONS

RESULTS

This study involved 207 elementary school teachers from Sirampog District, Brebes Regency, encompassing three administrative areas: Upper Sirampog, Central Sirampog, and Lower Sirampog. The distribution of respondents by administrative area and gender is presented in the following table:

Tabel 1. Distribution of Respondens

No	Population	Sample	Results
1.	Sirampog Upper area	70 Teachers	73 Teachers
2	Sirampog Central area	69 Teachers	75 Teachers
3	Sirampog lower area	68 Teachers	59 Teachers
	Total	207 Teachers	207 Teachers

Source: Processed data from Google Form questionnaires, 2025

Instrument validity was assessed in two stages. The first stage involved an initial validity and reliability test (pre-test) using a Classical Test Theory (CTT) approach with the assistance of SPSS version 24, conducted on 30 respondents. The r-table value applied was 0.361 (Sugiyono, 2019). The analysis results indicated that all 60 questionnaire items obtained correlation coefficients exceeding the r-table value (0.361), with an average value of 0.716, a highest value of 0.873, and a lowest value of 0.511; therefore, all items were considered valid. Based on these results, item selection was conducted by prioritizing items with the highest correlation values, resulting in 40 items that were subsequently used for the main data collection involving 207 respondents.

The second stage employed a Structural Equation Modeling Partial Least Squares (SEM-PLS) approach using the SmartPLS application. The analysis was conducted through the assessment of the measurement model (outer model) and the structural model (inner model).

Tabel 2. Convergent Validity Average Variance Extracted (AVE)

Variabel	Comparison of Average Variance Extracted (AVE)		Description
	AVE	$\alpha > 50$	
Implementation of the Merdeka curriculum (Y)	0,537	0,50	Valid
Teachers' Understanding of the Merdeka curriculum (X ₁)	0,518	0,50	Valid
Teachers' Competence in Using Educational Technology (X ₂)	0,527	0,50	Valid
Differentiated Instruction (X ₃)	0,511	0,50	Valid

Source: Processed data using SmartPLS, 2025

Tabel 3. Construct Reliability

Variabel	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Implementation of the Merdeka curriculum (Y)	0.904	0.905	0.921	0.537
Teachers' Understanding of the Merdeka curriculum (X ₁)	0.896	0.897	0.915	0.518
Teachers' Competence in Using Educational Technology (X ₂)	0.900	0.902	0.917	0.527
Differentiated Instruction (X ₃)	0.894	0.894	0.913	0.511

Source: Processed data using SmartPLS, 2025

The results of the convergent validity test (table 2) indicate that all indicators have loading factor values above the minimum acceptable threshold. The loading factors range from 0.667 to 0.794, with an average value of 0.722. Indicators are considered valid if they have correlation values above 0.70, although values above 0.60 are also regarded as acceptable (Setiabudhi, 2025). In addition, the Average Variance Extracted (AVE) values for all latent variables exceed 0.50, indicating that the criteria for convergent validity have been met.

Discriminant validity testing using cross-loading analysis indicates that each indicator exhibits the highest correlation with its respective latent construct. These results confirm that the criteria for discriminant validity have been satisfied. Furthermore, construct reliability testing shows that all latent variables demonstrate satisfactory reliability. The Cronbach's Alpha

and Composite Reliability values for all constructs exceed the threshold of 0.70, indicating strong internal consistency and reliability of the constructs within the research model.

Multicollinearity testing was conducted using the Variance Inflation Factor (VIF). The results indicate that all predictor variables have VIF values below the maximum threshold of 10. The highest VIF value is observed for Differentiated Instruction (5.429), followed by Teachers' Understanding of the Merdeka Curriculum (5.086), and Ability to Use Instructional Technology (2.807). Therefore, the model can be considered free from problematic multicollinearity.

The coefficient of determination (R^2) values indicate that the endogenous variables fall within the strong category (Sihombing, 2024), as presented in the following table:

Tabel 4. R-square

Variabel Endogenus	R-square	R-square adjusted
Implementation of the Merdeka Curriculum	0.926	0.924
Differentiated Instruction	0.806	0.804

Source: Processed data using SmartPLS, 2025

Hypothesis testing was conducted through path coefficient analysis to examine direct effects, interaction (moderation) effects, and indirect (mediation) effects among latent variables. The results of the analysis are presented as follows:

Hypothesis testing was conducted through path coefficient analysis to examine the direct effects, interaction effects (moderation), and indirect effects (mediation) among the latent variables.

The results of the analysis show that teachers' understanding of the Independent Curriculum (X1) has a positive coefficient on the implementation of the Independent Curriculum (Y), but the effect is not statistically significant ($\beta = 0.072$; $t = 1.303$; $p = 0.193$). Therefore, H1 is rejected.

Teachers' ability to use learning technology (X2) has a positive and significant effect on the implementation of the Independent Curriculum ($\beta = 0.205$; $t = 5.261$; $p < 0.001$); thus, H2 is

accepted. Differentiated learning (X3) shows a positive and significant influence on the implementation of the Independent Curriculum, with the largest coefficient among all variables ($\beta = 0.730$; $t = 11.550$; $p < 0.001$). Thus, H3 is accepted.

Teachers' understanding of the Independent Curriculum (X1) has a positive and significant influence on differentiated learning (X3) ($\beta = 0.677$; $t = 13.772$; $p < 0.001$); therefore, H4 is accepted.

The ability to use learning technology (X2) also has a positive and significant influence on differentiated learning (X3) ($\beta = 0.275$; $t = 4.733$; $p < 0.001$). Thus, H5 is accepted.

Moderation analysis shows that the interaction between differentiated learning (X3) and teachers' understanding of the Independent Curriculum (X1) does not have a significant influence on the implementation of the Independent Curriculum ($\beta = 0.044$; $t = 1.050$; $p = 0.294$). Therefore, H6 is rejected. Similarly, the interaction between differentiated learning (X3) and the ability to use learning technology (X2) did not show a significant effect on the implementation of the Independent Curriculum ($\beta = -0.066$; $t = 1.781$; $p = 0.075$). Thus, H7 is rejected. Create a description first, then the table below. The results of the analysis are presented in the following table:

Tabel 5. Results of Hypothesis Testing Using Path Coefficients

Variabel	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Description
$X_1 \rightarrow Y$	0,072	0,071	0,055	1,303	0,193	Non-significant
$X_2 \rightarrow Y$	0,205	0,206	0,039	5,261	0,000	significant
$X_3 \rightarrow Y$	0,730	0,729	0,063	11,550	0,000	significant
$X_1 \rightarrow X_3$	0,677	0,676	0,049	13,772	0,000	significant
$X_2 \rightarrow X_3$	0,274	0,276	0,058	4,733	0,000	significant
$X_3 \times X_1 > Y$	0,044	0,038	0,042	1,050	0,294	Non-significant
$X_3 \times X_2 > Y$	-0,066	-0,065	0,037	1,781	0,075	Non-significant

Source: Processed data using SmartPLS, 2025

Tabel 6. Specific Indirect Effects

Variable	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Description
$X_1 > X_3 > Y$	0,495	0,493	0,054	9,084	0,000	significant
$X_2 > X_3 > Y$	0,200	0,201	0,044	4,491	0,000	significant

Source: Processed data using SmartPLS, 2025

The analysis of specific indirect effects indicates that the indirect (mediated) path from X_1 to Y through X_3 ($X_1 \rightarrow X_3 \rightarrow Y$) is statistically significant ($\beta = 0.495$; $t = 9.084$; $p < 0.001$). Similarly, the indirect path from X_2 to Y through X_3 ($X_2 \rightarrow X_3 \rightarrow Y$) is also statistically significant ($\beta = 0.200$; $t = 4.491$; $p < 0.001$). These results indicate a significant indirect effect through differentiated learning, as presented in the table above.

Discussions

The findings of this study make an important contribution to understanding how the Merdeka Curriculum is comprehended, interpreted, and enacted in the pedagogical practices of elementary school teachers. Overall, the results indicate that the successful implementation of the Merdeka Curriculum is not determined by a single factor, but rather by a tiered mechanism involving teachers' conceptual understanding of the Merdeka Curriculum, their ability to use instructional technology, and differentiated instructional practices as the operational core of the Merdeka Curriculum.

The results further reveal that teachers' understanding of the Merdeka Curriculum has a positive but statistically insignificant effect on its implementation. This finding suggests that teachers' understanding, although essential, does not automatically translate into instructional practices aligned with the demands of the Merdeka Curriculum. The empirical pattern reflected in the questionnaire data shows a notable discrepancy between indicators of conceptual understanding of freedom to learn, which obtained very high mean scores, and indicators of reflective-pedagogical understanding, which displayed relatively lower

mean values and greater variability in responses.

This pattern indicates that teachers' understanding tends to remain at a normative and administrative level, such as recognizing the principles of flexibility and freedom to learn, but has not been fully internalized into operational pedagogical competence. In other words, teachers may conceptually understand the Merdeka Curriculum but have not yet fully enacted it in practice. This condition explains why improvements in teachers' understanding do not necessarily lead to enhanced quality of Merdeka Curriculum implementation in classroom settings.

These findings extend previous literature suggesting (Fadillah, 2024), (Prihastari, 2024) that teachers generally understand the core characteristics of the Merdeka Curriculum, yet have not empirically examined the direct relationship between understanding and implementation. Within the framework of Curriculum Implementation Theory (Fullan, 2007), the results indicate that understanding constitutes a necessary initial condition, but not a sufficient one, for driving changes in instructional practice. Understanding that is not integrated with pedagogical knowledge and classroom context may result in implementation that remains administrative rather than transformative.

In contrast to teachers' understanding, the ability to use instructional technology is found to have a positive and significant effect on Merdeka Curriculum implementation. This finding underscores the role of technology as an enabling factor that supports learning flexibility, diversification of learning resources, and adaptive instructional management.

The high scores on indicators related to the use of technology in core instructional activities indicate that technology is no longer positioned merely as an administrative supplement, but has functioned as an operational instrument in instructional implementation. Within the context of the Merdeka Curriculum, which emphasizes contextual learning, formative assessment, and multiple learning pathways, teachers' ability to utilize technology becomes a key factor that enables curriculum policy to be practically enacted in the classroom (Kemendikbudristek, 2024).

These findings extend previous studies (Iskanto, 2024), (Putri Ningrat, 2018), (Pantow, 2023) that have positioned technology primarily as a support for learning outcomes, by demonstrating that technology also serves as a direct determinant of Merdeka Curriculum implementation. Within the TPACK framework (J.Koehler, 2006), technology enhances teachers' pedagogical capacity to design learning experiences that are more flexible and responsive to students' needs.

The strongest finding of this study concerns the role of differentiated instruction, which exhibits the most dominant influence on Merdeka Curriculum implementation. This result affirms that differentiation is not merely a supporting strategy, but constitutes the operational core of the Merdeka Curriculum in instructional practice.

The high consistency of scores on indicators related to content adaptation, diagnostic assessment-based support, and instructional strategy adjustment indicates that teachers have implemented differentiation in a tangible manner in their daily teaching practices. This finding is consistent with Differentiated Instruction Theory (Tomlinson, 1999), (Digna, 2023), (Nabbila, 2023) which positions differentiation as a prerequisite for effective learning in contexts characterized by student diversity.

Within the context of the Merdeka Curriculum, differentiation functions as a pedagogical mechanism that connects curriculum flexibility with the realities of students' learning

needs. Without the capacity for differentiation, flexibility in learning outcomes and the emphasis on student-centered learning would be difficult to actualize in practice.

Another important finding is that teachers' understanding has a significant effect on differentiated instruction, but does not directly affect Merdeka Curriculum implementation. This pattern indicates that teachers' understanding operates through specific pedagogical mechanisms rather than as an independent technical factor.

In other words, teachers' understanding serves as a conceptual foundation that guides the design of differentiated instruction, and it is through differentiation that the Merdeka Curriculum is effectively implemented. This finding is consistent with the concept of Pedagogical Content Knowledge (Shulman, 1986), (Estiono, 2023) which emphasizes that curriculum understanding must be integrated with pedagogical knowledge in order to influence instructional practice.

These results also explain why differentiated instruction does not function as a moderating variable, but is more appropriately positioned as a mediating variable. Differentiation is not an external amplifier of relationships among variables, but rather an internal mechanism that explains how these effects occur, this finding aligns with the study by (Jaime B. Bunga, 2025) which asserts that differentiated instruction is an integral component of teachers' professional competence rather than merely an external supporting factor.

Although the ability to use instructional technology has a significant direct effect on both differentiated instruction and Merdeka Curriculum implementation, the interaction between technology and differentiation does not demonstrate a significant moderating effect. This pattern suggests that, despite the widespread use of technology, its utilization remains largely focused on content delivery and instructional administration. These findings indicate that, within the context of this study, technology is still predominantly applied at a technical and administrative level and has not yet been deeply

integrated into differentiated instructional practices.

The gap between the availability of technological infrastructure and teachers' operational mastery in integrating instructional technology helps explain why synergistic effects through interaction have not yet emerged significantly. Accordingly, technology functions as a supporting prerequisite for differentiation rather than as an additional strengthening factor in the relationship between differentiated instruction and Merdeka Curriculum implementation.

Overall, this study demonstrates that Merdeka Curriculum implementation is a process of pedagogical sense-making (Munson, 2023) rather than merely the outcome of policy understanding or technological availability. Teachers not only need to understand the curriculum, but must also translate it into practice through differentiated instruction supported by meaningful technological competence.

These findings affirm that the success of the Merdeka Curriculum does not lie in curriculum documents themselves, but in tangible changes in classroom instructional practices. Therefore, efforts to strengthen Merdeka Curriculum implementation should focus on developing teachers' pedagogical capacity for differentiated instruction, rather than solely on enhancing conceptual understanding or providing technical training.

CONCLUSION

This study demonstrates that the implementation of the Merdeka Curriculum among elementary school teachers in Sirampog District is an adaptive and multi-layered pedagogical process, rather than one determined solely by teachers' understanding of curriculum concepts and regulations. Structural analysis reveals that teachers' understanding of the Merdeka Curriculum does not have a direct effect on its implementation. In contrast, the ability to use instructional technology and the application of differentiated instruction have significant effects on classroom implementation practices.

These findings highlight a gap between curriculum knowledge and pedagogical practice, which can only be bridged through operational and contextualized instructional strategies.

Furthermore, the results indicate that both teachers' understanding and their ability to use instructional technology have significant effects on differentiated instruction. However, differentiated instruction does not function as a moderating variable that directly strengthens the relationships among variables. Instead, it serves as a mediating variable, acting as an internal mechanism that connects teachers' understanding and capacities with Merdeka Curriculum implementation. Accordingly, differentiated instruction should not be positioned as a standalone technique, but rather as a pedagogical bridge that transforms teachers' knowledge and skills into meaningful instructional practices.

From a theoretical perspective, these findings reinforce the view that curriculum implementation is a process of pedagogical sense-making, in which teachers actively interpret, adapt, and enact curriculum policy through instructional practice. Based on the empirical evidence, this study develops the Synergistic Curriculum Implementation Model (SCIM) as a conceptual-empirical model explaining that the success of Merdeka Curriculum implementation results from the synergistic relationship among teachers' understanding of the Merdeka Curriculum, their ability to use instructional technology, and the application of differentiated instruction. Within this model, differentiation functions as a key mechanism that enables the integration of cognitive (understanding), technological (skills), and pedagogical (instructional practice) dimensions.

From a practical standpoint, the findings underscore that teacher competency development should not be limited to enhancing normative understanding of curriculum policy. Teacher professional development programs need to focus on strengthening pedagogical capacities that are responsive to the diversity of students' learning needs, particularly through differentiated instruction supported by meaningful use of

technology. Therefore, teacher training and Merdeka Curriculum implementation management strategies should emphasize experience-based approaches, collaboration, coaching, reflective practice, and the optimization of learning communities as primary spaces for pedagogical transformation, rather than relying solely on the transmission of theoretical knowledge.

This study has several limitations, primarily due to its focus on a geographically limited context and the exclusion of organizational contextual variables such as instructional supervision, school leadership, and school culture. Future research is recommended to expand the geographical scope and integrate organizational and school policy factors into structural models in order to examine the sustainable implementation of the Merdeka Curriculum more comprehensively.

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