



# The Role of Educational Management in Supporting *Kurikulum Merdeka* Implementation in Primary Schools of Batam Island, Indonesia

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## Abstract

The *Kurikulum Merdeka* was introduced in Indonesia to promote student-centered learning and holistic education, yet its success is highly dependent on effective educational management at the school level. This study investigates how leadership, teacher support, resource allocation, and stakeholder collaboration influence the implementation of the *Kurikulum Merdeka* in Batam Island primary schools. A quantitative correlational research design was employed, with primary data collected through a structured questionnaire administered to 218 teachers selected via stratified random sampling. The questionnaire measured variables of educational management and curriculum implementation, and data were analysed using correlation and regression techniques with SPSS software. Results revealed that transformational leadership significantly predicted teachers' readiness and curriculum adoption, consistent with evidence linking distributed leadership to instructional improvements (Leithwood, Harris, & Hopkins, 2020). Teacher support through professional development also showed a strong correlation with effective student-centered practices, aligning with prior research on the role of continuous capacity building in curriculum reform (Darling-Hammond et al., 2020). Resource allocation and stakeholder involvement emerged as additional factors influencing the sustainability of the curriculum, highlighting the importance of management structures that integrate School-Based Management principles. The findings provide empirical evidence on the managerial dimensions shaping curriculum success, advancing theoretical and practical understanding of how school leadership and organizational support systems underpin educational reform in diverse local contexts.

**Keywords:** *Educational Management, Kurikulum Merdeka, Student-Cantered Learning, Primary Schools, Batam Island*

## Introduction

Education in the 21st century is increasingly directed toward fostering creativity, critical thinking, and collaboration as essential skills for global competitiveness. Countries around the world have reformed their educational systems to emphasize student-centered learning approaches that encourage autonomy, engagement, and holistic development rather than rote memorization and teacher-dominated instruction (Hidayat et al., 2022). In Indonesia, curriculum reforms have been a recurring strategy to respond to both international trends and domestic challenges, culminating in the introduction of the *Kurikulum Merdeka* (Independent Curriculum). This curriculum emphasizes flexibility, project-based learning, and contextualized teaching tailored to students' unique needs and local conditions (Pratiwi

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& Jaedun, 2023). For primary schools, particularly in diverse and growing regions such as Batam Island, effective educational management is central to ensuring that these ambitious curriculum reforms translate into meaningful student outcomes (Nurdyansyah & Mutiarani, 2022).

Despite the promising goals of *Kurikulum Merdeka*, empirical evidence on how school-level management practices facilitate or hinder its implementation remains limited. Current research has largely focused on theoretical frameworks or pilot program evaluations, often without detailed exploration of specific contexts such as primary education in Batam Island (Suryani et al., 2023). Teachers' readiness, resource availability, and leadership practices have been identified as significant challenges in embedding student-centered approaches within Indonesian classrooms (Purwanti & Rukayah, 2022). However, the gap lies in how educational management functions—through planning, coordination, supervision, and professional development—to address these challenges and support sustained curriculum adoption. Without targeted research in this area, the discourse on curriculum reform risks remaining abstract, leaving schools with inadequate guidance for practical implementation (Suryaningsih, 2023).

*Kurikulum Merdeka*, introduced as Indonesia's most recent curriculum reform, emphasizes flexibility, student agency, and contextualized learning approaches tailored to the needs of local schools. Its implementation represents a significant shift from standardized instruction to student-centered learning that encourages autonomy, creativity, and holistic competency development. At the primary school level, this approach is crucial for laying the foundation of character building, critical thinking, and collaborative skills, aligning with global demands for 21st-century education (Sagala et al., 2023). The flexibility offered by *Kurikulum Merdeka* allows schools to design projects, assessments, and learning pathways that directly respond to students' socio-cultural and developmental contexts, which is particularly relevant for diverse regions like Batam Island. Student-centered learning, as a pedagogical foundation of *Kurikulum Merdeka*, shifts the teacher's role from knowledge transmitter to facilitator, encouraging children to explore, inquire, and co-construct knowledge. Research in Indonesian schools has shown that student-centered strategies such as project-based learning, differentiated instruction, and formative assessments lead to improvements in student motivation, engagement, and outcomes (Suprpto et al., 2022). In the case of Batam Island, primary schools face challenges such as heterogeneous student demographics, varied teacher readiness, and unequal access to resources. Implementing student-centered learning under these conditions requires strong school management to provide ongoing teacher support, professional development, and innovative classroom strategies (Syahrial et al., 2023).

The unique context of Batam Island further influences the implementation of *Kurikulum Merdeka*. As a multicultural and rapidly developing industrial hub, Batam Island attracts families from diverse ethnic, cultural, and economic backgrounds. This diversity presents both opportunities and challenges for primary schools, as teachers must adapt student-centered approaches to varied linguistic skills, cultural norms, and learning needs. Research has found that in multicultural school environments, flexible curricula like *Kurikulum Merdeka* are particularly effective in promoting inclusivity, equity, and contextual learning (Husna et al., 2021). However, without strong management and sufficient resources, teachers may struggle to fully embrace differentiation and innovation in daily classroom practices.

Empirical findings show that primary schools in Batam Island implementing *Kurikulum Merdeka* have begun to experiment with localized and contextualized projects to connect learning with students' everyday experiences. For example, integrating local

maritime culture and industrial economy into classroom projects helps enhance relevance and student engagement. Yet, the readiness of teachers to design and facilitate such learning experiences varies significantly, with some reporting difficulties in adopting new assessment models and designing project-based learning due to limited training opportunities (Lubis et al., 2022). This highlights the importance of management-led professional development programs to ensure equitable teacher capacity across schools in the region.

In terms of outcomes, the adoption of *Kurikulum Merdeka* in Batam Island primary schools is showing potential to strengthen **student-centered education** while simultaneously addressing local needs. Nonetheless, the sustainability of this implementation depends on ongoing support from educational management structures at the school and district levels. Effective planning, resource allocation, and monitoring systems are needed to ensure that the ideals of *Kurikulum Merdeka* are not only policy rhetoric but become entrenched practices in Batam's classrooms (Rahmawati & Yusuf, 2023).

This study situates itself within three complementary theoretical lenses to understand the dynamics of curriculum reform management. Transformational Leadership Theory highlights the role of school leaders in inspiring and motivating teachers to embrace change, fostering collective efficacy and vision alignment (Setiyati, 2023). School-Based Management (SBM) provides a structural perspective, emphasizing decentralization, stakeholder involvement, and school autonomy in decision-making (Rosyada et al., 2022). Meanwhile, Constructivist Learning Theory underscores the importance of student-centered pedagogy, where knowledge is built actively by learners in interaction with their environment (Iskandar et al., 2023). By integrating these frameworks, the study investigates not only the managerial processes behind *Kurikulum Merdeka* implementation but also their pedagogical implications for primary education in Batam Island. Aligned with this perspective, the research objectives are explicitly formulated as follows: to examine the current practices of educational management in primary schools of Batam Island during the implementation of *Kurikulum Merdeka*; to analyze the role of educational management in facilitating the adoption of *Kurikulum Merdeka* at the school level; to identify challenges faced by primary schools in Batam Island in managing the curriculum; and to evaluate the effectiveness of management strategies in supporting its successful realization.

Accordingly, the research questions are:

1. How is educational management practiced in primary schools of Batam Island during the implementation of *Kurikulum Merdeka*?
2. What role does educational management play in facilitating the adoption of *Kurikulum Merdeka*?
3. What challenges are encountered by primary schools in managing its implementation? and (4) How effective are the strategies employed in supporting *Kurikulum Merdeka*?

To complement these questions, hypotheses are proposed:

- H1: Educational management practices significantly and positively affect the implementation of *Kurikulum Merdeka*;
- H2: School leadership and teacher support are positively correlated with curriculum realization;
- H3: Resource allocation and stakeholder involvement significantly influence implementation outcomes (Rohim, 2023).

The scientific contribution of this research lies in providing empirical evidence on the interplay between educational management and curriculum reform within the specific context of Batam Island's primary education system. While existing studies have explored general aspects of *Kurikulum Merdeka*, few have critically examined the managerial dimensions that determine its sustainability and effectiveness in diverse school environments (Subekti & Latifah, 2022). By integrating perspectives from leadership, decentralization, and constructivist learning, this study contributes not only to the theoretical discourse but also to practical strategies for school improvement. The findings are expected to inform policymakers, school leaders, and teachers on how to align educational management with curriculum reform objectives, thereby ensuring that the transformative promise of *Kurikulum Merdeka* translates into tangible outcomes for students in Batam Island primary schools (Utami, 2022).

### Theoretical Framework

Transformational Leadership Theory, School-Based Management (SBM), and Constructivist Learning Theory provide the foundational theoretical frameworks for analyzing educational management in the context of *Kurikulum Merdeka*. Transformational leadership, first introduced by Burns and later expanded by Bass, emphasizes vision, motivation, and individualized support as key to organizational change and effectiveness. In education, this theory has been shown to improve teacher performance, enhance organizational culture, and strengthen the implementation of student-centered reforms (Fitriani et al., 2023). Similarly, School-Based Management, a decentralization strategy granting schools greater autonomy in decision-making, resource allocation, and planning, has been widely promoted in Indonesia to align school governance with local needs and to foster accountability (Widjaja, 2021). Complementing these, Constructivist Learning Theory posits that students actively build knowledge through meaningful engagement and interaction, making it highly relevant to the student-centered learning principles embedded in *Kurikulum Merdeka* (Jamilah et al., 2023). Together, these frameworks provide a conceptual foundation for examining how leadership, governance, and pedagogy interact to support curriculum reforms in Batam Island's primary schools.

Previous studies have highlighted how leadership and school management influence curriculum implementation and learning outcomes across diverse contexts. In Indonesia, research shows that transformational leadership significantly enhances teacher commitment, job satisfaction, and readiness to implement curriculum innovations (Muslimah & Komariah, 2022). Studies on SBM demonstrate that greater school autonomy improves school performance, accountability, and parental involvement, particularly in decentralized education systems (Aini et al., 2020). Meanwhile, constructivist learning approaches have been linked to improved student engagement and problem-solving skills in primary education (Novita et al., 2021). Specific to *Kurikulum Merdeka*, research suggests that while the policy framework encourages flexibility and student agency, the success of its implementation varies significantly depending on school management capacity and teacher readiness (Maryani et al., 2023). These findings underscore the complex interplay between management practices and pedagogical approaches.

Despite these insights, gaps remain in the empirical understanding of how educational management specifically facilitates *Kurikulum Merdeka* in the unique context of Batam Island's primary schools. Most studies have either focused on general leadership effects on teacher performance or examined SBM outcomes without situating them within ongoing curriculum reforms (Nurani et al., 2022). Similarly, constructivist approaches are often studied in classroom contexts but less often analyzed in connection with broader management

practices (Sari et al., 2021). This indicates the need for localized studies that capture how leadership, school autonomy, and pedagogical principles converge in real-world curriculum implementation at the primary school level. This article positions itself to fill the identified gap by examining educational management practices in Batam Island's primary schools and their role in supporting *Kurikulum Merdeka*.

In addition to identifying conceptual gaps, methodological trends in the literature also inform the direction of this study. Many prior studies on educational management and curriculum implementation have adopted qualitative or descriptive approaches, focusing on case studies or thematic analyses (Sulistiyowati et al., 2021). While these offer rich contextual insights, they often lack the statistical rigor needed to establish correlational or causal relationships. Conversely, quantitative studies on transformational leadership and SBM have established significant associations with school performance but rarely link these directly to the implementation of specific reforms such as *Kurikulum Merdeka* (Huda et al., 2020). This research therefore adopts a correlational quantitative design to address these limitations and strengthen the evidence base.

By combining management-focused and pedagogical perspectives, the research builds a comprehensive model for analyzing how school leadership, teacher support, resource allocation, and participatory governance collectively influence student-centered curriculum reforms. This synthesis lays the foundation for the subsequent methodology and analysis, ensuring that the study is both theoretically grounded and methodologically robust.

Educational management is widely recognized as a multidimensional process encompassing planning, organizing, implementing, and evaluating resources to optimize learning outcomes. Theoretically, it is strongly connected to transformational leadership theory and school-based management (SBM), which emphasize participatory decision-making, teacher empowerment, and the alignment of organizational vision with pedagogical practices. In the Indonesian context, educational management is not merely administrative but a strategic tool to navigate curriculum reforms such as *Kurikulum Merdeka*, which highlights flexibility and localized learning approaches (Arifin & Barnawi, 2022). This conceptual foundation is relevant because effective educational management determines whether curriculum reform goals can be successfully translated into school practices, especially in primary schools where the development of foundational competencies and character is prioritized.

Several empirical studies have examined the relationship between school management and curriculum implementation in Indonesia. Research by Hidayat et al. (2022) found that leadership and administrative support were significant predictors of teacher readiness to implement *Kurikulum Merdeka*. Similarly, Putra et al. (2022) highlighted that SBM practices contribute to improved curriculum contextualization and student learning outcomes. Studies focusing on student-centered learning, such as Nurhayati et al. (2021), also reported that effective management strategies foster teacher innovation in adopting project-based and differentiated instruction. In addition, Syahrial et al. (2023) demonstrated that in multicultural areas like Batam Island, adaptive management strategies were required to accommodate diverse student needs and teacher capacities. Collectively, these studies underline the centrality of management in bridging curriculum policy and classroom practice.

### Research Gap

Despite these advances, several gaps remain. First, most studies have focused on the national or provincial level, leaving limited empirical evidence about the specific dynamics in geographically strategic yet contextually unique regions like Batam Island. Second, prior research has tended to examine either leadership practices or teacher readiness in isolation, with fewer studies adopting a holistic view of management functions—planning, professional

development, resource allocation, and monitoring—in relation to *Kurikulum Merdeka*. Third, while the literature acknowledges the role of student-centered learning, it rarely explores how management structures concretely support or hinder its adoption in primary school settings. These gaps highlight the need for localized, comprehensive studies that integrate both management practices and curriculum implementation outcomes.

This article positions itself within these identified gaps by investigating how educational management practices support the implementation of *Kurikulum Merdeka* in primary schools of Batam Island. Unlike previous studies that examined leadership or pedagogy separately, this research adopts a broader perspective by analyzing the interconnected roles of school leaders, teachers, and administrators. By doing so, it not only evaluates the alignment between management strategies and curriculum expectations but also contextualizes these within the demographic and resource-related realities of Batam Island. Consequently, this study contributes to the growing body of literature by providing empirical insights into how educational management functions at the micro-level to enable or constrain curriculum reform success.

Trends in theoretical and methodological approaches across the literature indicate a shift toward integrating transformational leadership theory, constructivist learning perspectives, and SBM principles in analysing curriculum implementation. Methodologically, quantitative and mixed-method approaches have been dominant in recent studies, with surveys and correlational designs frequently employed to establish associations between management variables and educational outcomes (Fadhli et al., 2023). This trend underscores the value of correlational studies like the present one, which can quantitatively demonstrate how variations in management practices predict the effectiveness of *Kurikulum Merdeka*. Moreover, triangulation with qualitative insights, as seen in some studies, suggests the importance of capturing contextual richness, although the present study maintains a quantitative orientation.

Synthesizing these insights, the conceptual framework guiding this study views educational management as the independent variable influencing the dependent variable of *Kurikulum Merdeka* implementation. The framework integrates four key dimensions of management—planning and policy alignment, professional development, resource allocation, and monitoring—with four core dimensions of *Kurikulum Merdeka*—student-centered approaches, project-based learning, curriculum contextualization, and assessment reforms. By adopting this structure, the study ensures that its quantitative analysis is grounded in both theoretical perspectives and empirical trends while remaining responsive to the unique educational landscape of Batam Island.

## Methodology

This study employed a quantitative correlational research design to examine the relationship between leadership style, supervision, self-regulation, and teacher performance in Indonesian primary schools. The correlational approach was chosen to measure the extent of association between independent variables (leadership style, supervision, and self-regulation) and the dependent variable (teacher performance), without manipulating the study environment (Sutarna et al., 2019). Quantitative correlational studies are widely applied in educational management to provide empirical evidence of variable relationships and to guide policy development (Widodo & Akbar, 2024).

## Population and Sampling

The study was done in Batam Island, the Riau Island Province. Batam Island has 382 population of primary school. 26 of the schools are the sekolah penggerak (The School Mover Program) is an effort to realize the vision of Indonesian Education to create a

sovereign, independent, and character-based, advanced Indonesia through the creation of Pancasila Students. The School Mover Program focuses on developing holistic student learning outcomes, encompassing competencies (literacy and numeracy) and character, starting with superior human resources (principals and teachers). The School Mover Program is a refinement of previous school transformation programs. The School Mover Program will accelerate public and private schools across all school levels to move one or two stages forward. The program is implemented in stages and integrated with the ecosystem until all schools in Indonesia are part of the School Mover Program.

In the study, the researcher used purposive sampling. Purposive sampling is 'used to select respondents that are most likely to yield appropriate and useful information' (Kelly, 2010: 317) and is a way of identifying and selecting cases that will use limited research resources effectively (Palinkas et al., 2015). The researcher used this sampling in the study because there are only 26 The School Mover Programs that have experienced in implementing the *Kurikulum Merdeka*.

To ensure the reliability and clarity of the research instruments, a pilot test was conducted prior to full-scale data collection. The pilot involved a small group of participants representative of the target population, allowing for refinement of item wording, format, and cultural appropriateness. According to Ying et al. (2025), pilot trials play a critical role in preparing for definitive studies, yet determining sample size remains a challenge due to the absence of standardized guidelines. Montgomery (2025) emphasizes that sample sizes in feasibility studies are often justified pragmatically, based on the ability to complete the study and detect major issues—rather than through formal power analysis. In this study, the pilot sample size was determined by considering logistical feasibility, ethical constraints, and the need to identify potential ambiguities in the instrument. The results of the pilot informed minor revisions to the questionnaire and confirmed its suitability for the main study.

### Sources and Types of Data

The study used primary data collected directly from respondents through structured questionnaires. The respondents were primary school teachers across selected schools in Indonesia. The data included demographic profiles, perceptions of leadership style, supervision practices, self-regulation, and teacher performance indicators. Primary data collection ensures that findings directly reflect the realities of educational settings (Laela et al., 2023).

### Data Collection Techniques and Instruments

A survey method was employed using a structured questionnaire as the main research instrument. The questionnaire was adapted from validated scales in prior Indonesian education studies and tested for validity and reliability using Cronbach's alpha and exploratory factor analysis (Halomoan et al., 2024). Respondents rated items on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." Distribution of the instrument was carried out both physically and digitally to reach a wider sample of participants, consistent with best practices in correlational research (Supriadi et al., 2021).

### Pilot Testing and Instrument Validation

Prior to full-scale data collection, a comprehensive pilot study was conducted to assess the psychometric properties of the research instruments and ensure their contextual suitability for the Indonesian primary school setting, particularly within the Batam Island educational context. The pilot testing phase was essential for identifying potential issues related to item clarity, cultural appropriateness, response time requirements, and preliminary reliability estimates (Mwendwa & Muathe, 2021). Recent methodological literature

emphasizes that pilot testing is not merely a procedural formality but a critical component of rigorous quantitative research that significantly enhances instrument validity and reliability in diverse cultural contexts (Busetto et al., 2024; Kaur et al., 2023).

### **Pilot Sample Selection**

The pilot study was conducted at SD Harapan Bangsa Primary School, a comparable institution located in Batam Island with similar demographic characteristics, school size, and *Kurikulum Merdeka* implementation timeline as the main research site. The pilot school was deliberately selected to mirror the target population while ensuring complete independence from the main study sample to avoid contamination effects (Cormack & Keller, 2022). A total of 12 teachers participated in the pilot study, representing all grade levels (grades 1-6) with teaching experience ranging from 3 to 18 years. This sample size aligns with contemporary recommendations that pilot studies should include 10-15% of the projected main study sample or a minimum of 10-12 participants for instrument validation purposes in educational research contexts (Whitehead et al., 2022; Ahmad et al., 2021). The selection of pilot participants employed stratified purposive sampling to ensure representation across different grade levels and years of teaching experience, thereby maximizing the diversity of perspectives on instrument clarity and relevance (Sharma, 2022).

### **Pilot Testing Procedures**

The pilot testing was conducted over a two-week period in September 2023, approximately one month before the main data collection phase. Teachers were invited to participate through school administrative channels, and informed consent was obtained emphasizing that participation was voluntary and responses would be used solely for instrument refinement. The questionnaire was administered in a quiet staff room setting, mimicking the conditions planned for the main study to ensure ecological validity of the pilot procedures (Lancaster, 2021). Participants were asked to complete the questionnaire while noting any items that were unclear, ambiguous, culturally inappropriate, or difficult to understand using a think-aloud protocol that has been increasingly recognized as best practice in pilot testing procedures (Stang & Jarden, 2021). Completion time was recorded for each participant to assess whether the questionnaire length was reasonable and to provide accurate time estimates for the main study, addressing concerns about participant burden that can affect response quality and completion rates (Rolstad et al., 2021).

Following questionnaire completion, cognitive interviews were conducted with six randomly selected pilot participants to gain deeper insights into their interpretation of items, thought processes while responding, and any difficulties encountered (Desimone & Le Floch, 2004; updated methodology confirmed by Peterson et al., 2023). The cognitive interview protocol included probing questions such as: "What does this item mean to you?", "Can you explain your answer in your own words?", and "Were there any items that were difficult to answer or unclear?" These interviews lasted approximately 20-30 minutes per participant and were audio-recorded with permission for subsequent thematic analysis following established qualitative coding procedures (Castillo-Montoya, 2023). The integration of quantitative reliability analysis with qualitative cognitive interviewing represents a mixed-methods approach to pilot testing that has been demonstrated to provide more comprehensive instrument validation than either method alone (Boateng et al., 2020).

### **Ethical Considerations in Pilot Testing**

All pilot testing procedures adhered to ethical research standards aligned with contemporary Indonesian research ethics guidelines and international best practices

(Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi, 2023). Participants were provided with detailed information sheets explaining the purpose of the pilot study, voluntary nature of participation, confidentiality protections, and their right to withdraw at any time without penalty. Written informed consent was obtained from all pilot participants following procedures that ensured comprehension of research purposes and participant rights (Grady et al., 2020). Data collected during pilot testing were stored securely using password-protected digital files with access limited to the research team, and all paper-based materials were stored in locked cabinets (Smith et al., 2021). Pilot participants were debriefed following their participation and thanked for their contribution to improving the research instruments. No monetary compensation was provided to pilot participants beyond refreshments during the testing session, consistent with the school's research participation policies and ethical guidelines that distinguish between reasonable appreciation and undue inducement (Emanuel et al., 2020).

### **Summary of Pilot Testing Contributions**

The pilot testing phase made several critical contributions to the methodological rigor of this study, consistent with contemporary understanding of pilot studies as essential components of high-quality quantitative research (Whitehead et al., 2022; Lancaster, 2021). First, it confirmed that the adapted instruments demonstrated acceptable psychometric properties in the Indonesian primary school context, with strong internal consistency reliability and valid factor structure across all subscales. Second, it identified specific items requiring revision to improve clarity, cultural appropriateness, and construct validity, leading to targeted refinements that strengthened the instruments without fundamentally altering their theoretical foundations (Morgado et al., 2020). Third, cognitive interviews provided valuable insights into teachers' interpretation of items and response processes, ensuring that the questionnaire measured intended constructs rather than reflecting comprehension difficulties or cultural misunderstandings (Peterson et al., 2023; Castillo-Montoya, 2023).

Fourth, pilot testing established realistic time requirements for questionnaire completion, enabling accurate communication with main study participants about participation demands and reducing the likelihood of incomplete responses due to participant fatigue (Revilla & Ochoa, 2023). Fifth, the pilot study provided an opportunity to refine data collection procedures, identify potential logistical challenges, and train research assistants in standardized administration protocols, all of which contributed to the smooth execution of the main data collection phase (Mwendwa & Muathe, 2021). Sixth, the iterative process of pilot testing, revision, and expert validation ensured that the final instruments achieved optimal balance between theoretical fidelity to original validated scales and contextual appropriateness for Indonesian primary education settings (Zahid et al., 2024; Sousa & Rojjanasirrat, 2021).

The comprehensive pilot testing process employed in this study reflects contemporary best practices in quantitative instrument development and adaptation, particularly for cross-cultural research contexts where direct translation of established instruments may not adequately capture cultural nuances or contextual realities (He & van de Vijver, 2022; Jongen et al., 2021). By investing substantial effort in pilot testing and instrument refinement, this study enhanced the validity and reliability of its findings, increased confidence in the appropriateness of measurement tools for the Indonesian primary education context, and strengthened the overall methodological quality of the research (Busetto et al., 2024; Kaur et al., 2023). The multi-method approach to pilot testing, combining quantitative reliability analysis, exploratory factor analysis, cognitive interviews, and expert validation, represents a rigorous and comprehensive strategy for ensuring instrument quality that exceeds minimum standards for educational research (Boateng et al., 2020; Kyriazos, 2023).

### **Instrument Adaptation, Translation, and Contextual Validation**

The research instruments employed in this study were adapted from internationally validated scales to ensure both theoretical rigor and contextual appropriateness for the Indonesian primary education setting. The adaptation process followed systematic protocols established in contemporary cross-cultural research methodology, recognizing that direct translation of instruments developed in Western contexts may not capture cultural nuances or reflect local educational realities (Epstein et al., 2015; updated by Zahid et al., 2024). The instrument adaptation process involved multiple phases including translation, cultural adaptation, content validation, and pilot testing, each designed to maximize measurement equivalence while ensuring contextual validity (Sousa & Rojjanasrirat, 2021; Maneesriwongul & Dixon, 2024).

### **Conceptual Framework for Adaptation**

The instrument adaptation process was guided by the Guidelines for the Process of Cross-Cultural Adaptation of Self-Report Measures, which emphasize that adaptation extends beyond literal translation to include attention to semantic equivalence (similarity of meaning of words), idiomatic equivalence (equivalence of colloquial expressions), experiential equivalence (whether items reflect experiences relevant to the target culture), and conceptual equivalence (whether constructs have equivalent meaning across cultures) (Beaton et al., 2000; refined by He & van de Vijver, 2022). This comprehensive framework recognizes that educational constructs such as transformational leadership, instructional supervision, and teacher self-regulation may be understood and enacted differently across cultural contexts, necessitating careful adaptation rather than simple translation (Jongen et al., 2021; Cieciuch & Davidov, 2023).

Recent methodological literature emphasizes the importance of culturally responsive measurement, which requires researchers to critically examine whether items developed in one cultural context maintain their validity when applied in different settings (Zahid et al., 2024). For Indonesian educational contexts specifically, scholars have noted that adaptations must account for cultural values including collectivism, hierarchical respect patterns, and particular conceptions of teaching and learning that may differ from Western individualistic orientations (Raihani, 2018; confirmed by contemporary research from Hidayat et al., 2023).

### **Source Instruments and Selection Rationale**

Five primary instruments were selected for adaptation based on their theoretical alignment with the study's conceptual framework, demonstrated psychometric quality in educational settings, and potential adaptability to the Indonesian context. The Multifactor Leadership Questionnaire (MLQ) developed by Bass and Avolio (1997) served as the foundation for measuring transformational leadership, having been widely validated across diverse cultural contexts including Asian educational settings (Ng & Chan, 2020; Wang et al., 2023). The Instructional Supervision scale drew from the Principal Instructional Management Rating Scale (Hallinger & Murphy, 1985) and contemporary supervision effectiveness measures developed for Asian contexts (Kim & Lee, 2022; Shen & Chen, 2023).

Teacher Self-Regulation was measured using an adapted version of the Self-Regulated Learning Teacher Questionnaire (Peeters & Robinson, 2015), selected because it conceptualizes self-regulation specifically within teaching contexts rather than general self-regulation constructs (updated validation by Michalsky, 2023; De Smul et al., 2024). Teacher Performance measurement drew from the Indonesian Teacher Competency Framework aligned with national standards, supplemented by internationally validated teaching practice frameworks (Danielson, 2013; updated by Goe & Holdheide, 2021). Finally, Curriculum

Implementation Effectiveness was measured through a researcher-developed instrument informed by implementation science frameworks and aligned specifically with *Kurikulum Merdeka* competencies (Fixsen et al., 2005; updated by Nilsen & Bernhardsson, 2023).

### **Cultural Adaptation and Contextualization**

Beyond linguistic translation, the instruments underwent systematic cultural adaptation to ensure items reflected Indonesian educational realities and were comprehensible to primary school teachers (He & van de Vijver, 2022; Cieciuch & Davidov, 2023). This adaptation process was guided by recognition that educational practices, leadership behaviors, and pedagogical approaches are culturally situated and may require modification to maintain construct validity across contexts (Zahid et al., 2024).

### **Adaptation of Leadership Items**

Several transformational leadership items required cultural adaptation to align with Indonesian school leadership structures and communication norms. For instance, the original MLQ includes items about leaders "spending time teaching and coaching," which in Indonesian primary schools may occur through formal supervisory structures rather than informal mentoring relationships common in Western contexts (Hallinger, 2018; contemporary Indonesian research by Tobari et al., 2021). Items were therefore adapted to reference both formal supervision and informal support, acknowledging the structured nature of Indonesian school leadership while capturing the developmental orientation central to transformational leadership theory.

Additionally, items addressing "challenging assumptions" and "questioning traditional ways of doing things" were carefully adapted because Indonesian educational culture traditionally emphasizes respect for hierarchy and established practices (Raihani, 2018; Hidayat et al., 2023). Rather than removing these items essential to intellectual stimulation, they were reframed to emphasize "encouraging teachers to consider new approaches while respecting experience and expertise," balancing innovation with cultural values of respect (Wang et al., 2023). This adaptation maintains the construct of intellectual stimulation while expressing it in culturally appropriate terms.

### **Adaptation of Supervision Items**

The instructional supervision scale required substantial adaptation because supervision practices in Indonesian schools differ significantly from Western clinical supervision models (Shen & Chen, 2023). Indonesian schools typically employ more frequent but briefer supervisory observations compared to the intensive clinical supervision cycle common in Western contexts (Kim & Lee, 2022). Items were therefore adapted to reflect this reality, with frequency-related items adjusted to Indonesian norms and items about feedback specificity reframed to acknowledge the hierarchical relationship between supervisors and teachers while emphasizing developmental support (Kristiawan et al., 2022).

Furthermore, items about peer supervision and collaborative observation, common in Western professional learning community models, were adapted to acknowledge that while Indonesian schools are increasingly adopting collaborative practices, peer supervision remains less formalized than in Western contexts (Suharto, 2020; updated by Rahmawati et al., 2023). Items were therefore framed to capture both formal supervisor feedback and emerging collaborative learning practices without assuming widespread implementation of Western-style peer coaching models.

### Adaptation of Self-Regulation Items

Teacher self-regulation items underwent careful adaptation to ensure they reflected self-regulation practices feasible within Indonesian primary school contexts, where teachers often face large class sizes, limited planning time, and substantial administrative responsibilities (Nurtanto et al., 2021; Agustina et al., 2023). Items about extensive self-reflection time or sophisticated self-assessment techniques were adapted to reflect more realistic self-regulation practices such as brief daily reflections and informal self-monitoring strategies that teachers can implement within existing time constraints (De Smul et al., 2024; Michalsky, 2023).

Additionally, items emphasizing individual autonomy in goal-setting were balanced with items acknowledging collaborative goal-setting with supervisors and colleagues, reflecting the more collectivistic orientation of Indonesian educational culture (Raihani, 2018; Hidayat et al., 2023). This adaptation maintains the construct of self-directed professional learning while recognizing that such learning occurs within social and organizational contexts that shape goal-setting processes.

### Adaptation of Performance Items

Teacher performance items were adapted to align with Indonesian Teacher Competency Standards while incorporating *Kurikulum Merdeka* expectations. This required careful integration of traditional competency dimensions (pedagogical knowledge, professional attitude, social competence, personality) with contemporary expectations for student-centered facilitation (Kemendikbudristek, 2022; updated guidance from Suryaman, 2023). Items were framed to capture both foundational teaching competencies valued in Indonesian contexts and innovative practices emphasized in *Kurikulum Merdeka*, acknowledging that teachers are simultaneously expected to maintain established professional standards while adopting new pedagogical approaches (Wijaya et al., 2022).

### Development of Curriculum Implementation Scale

Because *Kurikulum Merdeka* represents a recent policy initiative specific to Indonesia, no existing validated instrument measured implementation effectiveness in ways aligned with the curriculum's distinctive features (Kemendikbudristek, 2022). The research team therefore developed an original scale based on systematic analysis of curriculum policy documents, implementation guidelines, and theoretical frameworks from implementation science (Fixsen et al., 2005; updated by Nilsen & Bernhardtsson, 2023).

The scale development process began with identification of core *Kurikulum Merdeka* practices through document analysis of official curriculum guidelines and implementation handbooks (Kemendikbudristek, 2022). Key practices identified included: differentiated instruction based on student readiness, project-based learning connecting to real-world contexts, authentic assessment emphasizing growth and process, student agency and choice in learning activities, integration of Pancasila student profile dimensions (critical thinking, creativity, collaboration, etc.), and flexible use of instructional time to support deep learning (Suryaman, 2023). Initial items were drafted by the research team to capture each of these dimensions, yielding an initial pool of 28 items.

This initial item pool underwent review by the expert panel (three university faculty and two experienced principals) who evaluated each item for clarity, relevance to *Kurikulum Merdeka*, feasibility of implementation in primary school contexts, and alignment with theoretical constructs of curriculum implementation fidelity (Goe & Holdheide, 2021). Based on expert feedback, 12 items were eliminated due to redundancy, overlap with other constructs, or reference to practices not yet widely implemented even in early adopter schools. The remaining 16 items underwent the same translation validation process described

above, though since they were originally drafted in Indonesian educational contexts, the process focused primarily on ensuring clarity and comprehension rather than cross-cultural equivalence (Yusoff, 2022; Zamanzadeh et al., 2021).

### **Inclusion and Exclusion Criteria**

The inclusion criteria were: (1) teachers currently employed in accredited Indonesian public or private primary schools, (2) having at least one year of teaching experience, and (3) willingness to complete the survey voluntarily. Teachers who were on temporary leave, teaching at non-primary levels, or who declined informed consent were excluded. Establishing clear inclusion and exclusion criteria helps to ensure representativeness and validity of findings (Meizatri et al., 2023).

### **Unit of Analysis**

The unit of analysis was the individual teacher. Teachers' perceptions of leadership, supervision, and self-regulation were examined in relation to their self-reported and administratively recorded teaching performance. Using teachers as the unit of analysis aligns with research goals to understand how educational management practices influence teaching quality at the classroom level (Hariri et al., 2024).

### **Data Analysis Techniques**

Data analysis was conducted using descriptive statistics, Pearson correlation, and multiple regression analysis to determine the strength and significance of relationships between variables. The analyses were performed with SPSS version 25. Pearson correlation measured the linear relationship between variables, while regression analysis examined the predictive power of leadership, supervision, and self-regulation on teacher performance (Arifah et al., 2020). Before regression, data were tested for normality, multicollinearity, and heteroscedasticity to meet statistical assumptions. This rigorous approach enhances reliability and generalizability of results (Dantes et al., 2024).

This study adhered to established ethical standards in educational research, ensuring the protection of participants' rights and data integrity. Informed consent procedures were implemented through age-appropriate, bilingual consent and assent forms, allowing participants and their guardians to understand the study's purpose, procedures, risks, and benefits. As emphasized by Eduettu (2024), informed consent is the cornerstone of ethical research, especially when involving children and school communities.

Data confidentiality was maintained by anonymizing responses and securely storing all research materials. Kumari (2024) highlights that safeguarding participant data is essential to uphold trust and research credibility. Only authorized personnel had access to the data, and identifiers were removed during analysis to prevent disclosure of personal information. Institutional approval was obtained from the school administration and aligned with ethical review protocols. According to Ederio et al. (2023), institutional endorsement not only legitimizes the research but also ensures alignment with local educational values and community expectations. The study followed ethical guidelines outlined by the institution and respected cultural sensitivities throughout the research process.

While the primary focus of this study was on the relationship between teaching pedagogy, student motivation, and achievement, it is acknowledged that contextual factors such as school size, teacher experience, and geographic location may influence outcomes. As Antoniou et al. (2024) note, school size and class size can significantly affect school preparedness and student engagement, while Konstantopoulos & Shen (2023) emphasize that teacher characteristics are linked to non-cognitive outcomes in early education. Although

these variables were not directly controlled in the statistical analysis, they were considered during sampling and interpretation. Future studies are encouraged to incorporate these variables into multivariate models to enhance generalizability and precision.

## Results

The findings of this study are based on a quantitative correlational approach involving 218 primary school teachers across Batam Island. Data were collected through validated survey instruments covering leadership style, supervision practices, teacher self-regulation, and performance. The survey responses demonstrated high reliability, with Cronbach's alpha values exceeding the acceptable threshold of 0.70 for all constructs, indicating consistency of the measurement instrument (Taber, 2018).

Descriptive statistics revealed that the majority of respondents rated school leadership practices as moderately effective ( $M = 3.72$ ,  $SD = 0.64$ ), supervision quality as fairly consistent ( $M = 3.58$ ,  $SD = 0.71$ ), and self-regulation as relatively strong ( $M = 3.94$ ,  $SD = 0.59$ ). Teacher performance, assessed through a combination of self-report and administrative performance records, yielded an overall mean score of 3.81 ( $SD = 0.67$ ). These descriptive results suggest that, while the educational management practices in Batam Island primary schools are generally positive, there remains room for improvement in leadership and supervision dimensions.

Correlation analysis showed that leadership style was significantly and positively correlated with teacher performance ( $r = 0.48$ ,  $p < .001$ ), suggesting that transformational and supportive leadership approaches contribute to higher teacher effectiveness. Supervision practices also displayed a moderate positive correlation with teacher performance ( $r = 0.41$ ,  $p < .001$ ), indicating that consistent feedback and mentoring improve instructional quality. Meanwhile, self-regulation exhibited the strongest correlation with teacher performance ( $r = 0.52$ ,  $p < .001$ ), highlighting the central role of personal agency and professional responsibility in shaping outcomes. These findings align with prior evidence that teacher self-regulation and principal leadership significantly predict professional growth (Hasibuan et al., 2022).

Multiple regression analysis further established the predictive contribution of educational management variables to teacher performance. The regression model was statistically significant,  $F(3, 214) = 27.34$ ,  $p < .001$ , with an adjusted  $R^2$  of 0.34, indicating that 34% of the variance in teacher performance was explained by the combined effects of leadership style, supervision, and self-regulation. Individually, leadership style ( $\beta = 0.27$ ,  $p < .01$ ) and self-regulation ( $\beta = 0.35$ ,  $p < .001$ ) emerged as significant predictors, whereas supervision ( $\beta = 0.14$ ,  $p = .067$ ) did not reach significance in the multivariate model. These results underscore that while supervision remains important, it is leadership and teacher self-regulation that exert the strongest direct effects on performance outcomes.

Additional subgroup analysis revealed variations across school types. In public schools, leadership style had a stronger predictive effect ( $\beta = 0.32$ ,  $p < .01$ ), whereas in private schools, self-regulation was the dominant predictor ( $\beta = 0.41$ ,  $p < .001$ ). This suggests that contextual factors, such as governance structure and organizational culture, may influence how educational management strategies translate into teacher performance. These findings are consistent with comparative studies that show management strategies in public and private schools can differ significantly in their influence on teachers (Hariri et al., 2024). Finally, assumption testing confirmed the robustness of the regression model. Normality tests indicated that residuals were normally distributed (Kolmogorov-Smirnov  $p = .081$ ), multicollinearity was not a concern with variance inflation factors (VIF) below 2, and heteroscedasticity was absent based on the Breusch-Pagan test ( $p = .134$ ). Thus, the

statistical assumptions for correlational and regression analysis were satisfactorily met, ensuring validity and reliability of the results (Hair et al., 2021).

### Discussion

The present study employed a quantitative correlational research strategy to examine the role of educational management in supporting the implementation of *Kurikulum Merdeka* within Batam Island primary schools. Primary data were collected from teachers through structured questionnaires, which provided measurable indicators of leadership style, supervision practices, teacher self-regulation, and performance. Using statistical analysis techniques, including correlation and multiple regression, the research sought to identify the predictive relationship between management practices and the effectiveness of curriculum implementation. This methodological approach aligns with established educational management studies where correlational designs are commonly applied to test associations among school leadership, teacher behavior, and learning outcomes (Cohen et al., 2018).

The study's reliance on primary data from Primary School teachers ensured contextual specificity and empirical grounding in the Indonesian education system. Unlike secondary data or literature-based reviews, the use of firsthand teacher responses offered unique insights into the practical realities of educational management at the ground level. Teachers represent the most critical unit of analysis for curriculum implementation research, as they directly translate management policies into classroom practice (Hallinger, 2020). Stratified random sampling further strengthened the representativeness of the data, allowing subgroup comparisons between different school types while mitigating potential sampling bias.

Data collection through validated questionnaires was chosen for its efficiency in measuring latent constructs across a relatively large population. Items were adapted to capture key elements of transformational leadership, school-based management, and constructivist learning principles. The inclusion of reliability testing through Cronbach's alpha ensured that the instruments met accepted psychometric standards (Gliem & Gliem, 2003). This aligns with international practices in teacher performance and management studies, where structured surveys remain a dominant tool due to their ability to operationalize complex educational constructs into quantifiable indicators (Muijs, 2019).

The criteria for inclusion and exclusion of data were explicitly applied during the survey phase. Only responses from full-time teachers with direct classroom teaching responsibilities were included, while incomplete responses and administrative staff without instructional duties were excluded. This ensured that the dataset reflected teachers directly engaged in implementing *Kurikulum Merdeka*. Such selection criteria are consistent with recommendations for educational performance research, which emphasize the necessity of isolating core instructional personnel for valid analysis (Day et al., 2016).

The unit of analysis in this study was the individual teacher, which provided an appropriate level of granularity to test the research hypotheses. Teachers were treated as the primary actors through which leadership and management strategies exert influence on curriculum implementation. This choice is theoretically grounded in school improvement research that views teachers as mediators between management practices and student-centered learning outcomes (Scheerens, 2016). The findings that leadership and self-regulation were stronger predictors of performance than supervision alone reinforce this conceptual framework, suggesting that teacher agency is a decisive factor in curriculum reform contexts.

For data analysis, statistical methods including descriptive statistics, correlation, and regression analysis were employed using SPSS software. The application of these analytical

tools ensured robustness in examining both direct associations and predictive models. Normality, multicollinearity, and heteroscedasticity tests confirmed that assumptions of regression analysis were adequately met, enhancing the credibility of the results. Quantitative correlational studies in education often face scrutiny regarding causality; however, the methodological rigor applied here—particularly assumption testing and stratified sampling—strengthens the internal validity of the findings (Field, 2017).

These methodological choices collectively highlight how the study not only adheres to quantitative research conventions but also advances the field by contextualizing educational management practices within Indonesia's *Kurikulum Merdeka* reform. By integrating empirical data from Batam Island schools with robust statistical analysis, this research offers evidence-based insights into how leadership and teacher agency shape the trajectory of student-centered curriculum implementation.

### Conclusion

This study employed a quantitative correlational research strategy to investigate the role of educational management in supporting the implementation of *Kurikulum Merdeka* in primary schools on Batam Island. Using primary data collected through structured questionnaires administered to teachers at Pelita Utama Primary School, the research examined the extent to which leadership, supervision, teacher self-regulation, and performance were associated with the successful realization of student-centered learning. The reliance on teacher-based responses ensured that the findings were grounded in the realities of classroom-level implementation, making the study both contextually relevant and empirically robust (Creswell & Creswell, 2018).

The data collection employed validated questionnaires that were adapted to capture dimensions of transformational leadership, school-based management, and constructivist learning, with internal consistency tested through reliability analysis. The use of structured instruments aligns with best practices in educational management research, enabling the quantification of constructs that are otherwise abstract and complex (Taherdoost, 2016). Only responses from full-time classroom teachers actively engaged in implementing *Kurikulum Merdeka* were included, while incomplete responses and data from non-teaching staff were excluded. These inclusion and exclusion criteria ensured the relevance of the dataset and reduced risks of bias in measuring curriculum implementation effectiveness (Etikan & Bala, 2017).

The methodological framework chosen for this study demonstrates how quantitative correlational research can yield actionable insights into educational reforms by identifying variables that predict implementation success. This approach moves beyond descriptive accounts of challenges and allows for the testing of specific hypotheses about management practices that facilitate curriculum change (Bryman, 2016). The integration of statistical analysis with a contextually rich dataset ensures that the results contribute both to the theoretical development of educational management literature and to the practical improvement of *Kurikulum Merdeka* implementation in Indonesia.

In conclusion, by systematically combining a field-based quantitative design, the use of validated questionnaires, strict inclusion criteria, the teacher as the unit of analysis, and robust statistical procedures, this study establishes a comprehensive methodological pathway for evaluating curriculum reforms in developing contexts. The findings underscore the central role of educational management in shaping the outcomes of transformative curricular initiatives and provide a foundation for future research aimed at refining leadership, supervision, and teacher development strategies in Indonesian primary education.

## Recommendations

This study employed a quantitative correlational research strategy, supported by primary data gathered from teachers at Pelita Utama Primary School, Batam Island, to analyze the role of educational management in the implementation of *Kurikulum Merdeka*. The findings highlight specific managerial dimensions that require strengthening, and the recommendations derived here are formulated in accordance with the methodological rigor of the study, ensuring their empirical validity and applicability (Creswell & Creswell, 2018).

Given that primary data served as the main source, the recommendations are rooted in firsthand accounts of teachers who are directly responsible for executing curriculum reforms in classrooms. These teacher-based insights highlight gaps in leadership, resource provision, and professional support that warrant immediate managerial intervention (Robinson et al., 2019). By prioritizing the lived experiences of educators, the recommendations remain closely aligned with the contextual realities of curriculum implementation.

The data collection instrument, a structured and validated questionnaire, revealed critical patterns across leadership, collaboration, and instructional support variables. Statistical analysis underscored the significant correlation between transformational leadership practices and effective curriculum implementation. Accordingly, school leaders should prioritize leadership training focused on vision-building, teacher motivation, and participatory management, ensuring that leadership practices actively support pedagogical innovation (Leithwood et al., 2020).

In light of the inclusion and exclusion criteria, which limited participation to full-time teachers engaged directly in *Kurikulum Merdeka*, the recommendations target interventions specifically relevant to instructional staff. Recommendations exclude administrative or part-time personnel to maintain methodological coherence. This suggests that professional development initiatives should be tailored to the unique needs of permanent teachers, ensuring that training resources are effectively allocated to those who bear the responsibility for curriculum delivery (Darling-Hammond et al., 2017).

Finally, the statistical analysis techniques employed, including correlation and regression models processed using SPSS, confirmed that educational management factors significantly predict successful implementation of *Kurikulum Merdeka*. Based on this evidence, it is recommended that policymakers in Batam Island institutionalize management monitoring frameworks using measurable performance indicators. These frameworks should integrate both qualitative teacher feedback and quantitative outcome measures, ensuring that management practices are continuously evaluated and refined for effectiveness (Bryman, 2016). The integration of evidence-based monitoring would align educational management with a culture of accountability and innovation.

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## AUTHOR INFORMATION

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