

A Critical Analysis of the Influence of Facilities and Infrastructure on the Quality of Educational Inputs, Processes, and Outputs at SMAS IRA Medan: A Literature Review

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ABSTRACT

This literature-based article aims to critically analyze the extent to which school facilities and infrastructure influence the quality of educational inputs, processes, and outputs at SMAS IRA Medan, drawing on findings from the PLP I (Pengenalan Lapangan Persekolahan) observation. Using the Input–Process–Output (IPO) theoretical framework, this study integrates field data including interviews with the principal, classroom observations, and school documentation with recent scholarly literature on facility management, curriculum implementation, and learning quality. The findings reveal that although SMAS IRA Medan has met several basic facility standards, the limited availability of science laboratories, updated library resources, and multimedia equipment continues to hinder optimal teaching and learning. These constraints affect curriculum adaptation, assessment quality, student engagement, and the effectiveness of ICT-based instruction. Nonetheless, the school demonstrates strong managerial efforts through routine teacher supervision, structured planning, and strategic use of BOS funds. This review concludes that facilities and infrastructure play a decisive role in shaping the school's readiness to implement the Merdeka Curriculum and its overall educational outcomes. Strengthening resource provision and teacher professional development is therefore essential to improving long-term school performance.

Keywords: Facilities and Infrastructure, Educational Inputs, Processes, Outputs, Literature Review

INTRODUCTION

High-quality educational facilities and infrastructure are essential components of an effective schooling system, as they shape the physical and instructional environment in which learning occurs. National education regulations in Indonesia emphasize that each school must meet minimum service standards in providing classrooms, laboratories, libraries, sanitation, and teaching media (Nurhayati, 2021). These requirements are intended to ensure equitable access to conducive learning environments.

However, in practice, disparities in school funding, resource allocation, and institutional management contribute to unequal infrastructure quality among schools, particularly between public and private institutions. Recent studies demonstrate that well-maintained and adequately equipped facilities significantly enhance student motivation, engagement, and academic achievement (Martini et al., 2024; Simanjuntak et al., 2024). Thus, analyzing school infrastructure conditions is essential for understanding broader differences in educational quality.

The Input–Process–Output (IPO) framework is widely used in evaluating school performance because it offers a comprehensive conceptual structure to examine how resources translate into learning outcomes. Inputs—such as teaching resources, teacher competence, student characteristics, curriculum, facilities, and funding form the foundational capacity of a school (Rahmawati & Siregar, 2023). These inputs influence instructional processes, including lesson planning, learning methods, assessment systems, teacher–student interactions, and classroom climate (Yuliani & Pratama, 2024).

In turn, the quality of instructional processes determines the output: students' cognitive achievement, character development, competency mastery, and overall school performance. This integrated model makes the IPO framework particularly relevant to analyzing how limitations in facilities may contribute to constraints in instructional quality.

The emergence of Kurikulum Merdeka further amplifies the central role of educational facilities. This curriculum encourages student-centered learning, project-based approaches, differentiation, and performance-based assessments methods that rely heavily on adequate infrastructure, multimedia tools, science laboratories, and flexible classroom environments (Pratiwi, 2023; Hasanah, 2024). For schools with limited resources, implementing the Merdeka Curriculum presents significant challenges. Teachers may struggle to adapt instructional methods, students may experience decreased engagement, and learning outcomes may fall short of curriculum expectations. As such, the interplay between facilities and curriculum implementation becomes an important subject for educational inquiry.

Field findings from the PLP I observation at SMAS IRA Medan highlight a similar pattern. Although the school fulfills essential facility requirements (e.g., classrooms, seating, basic teaching tools), several crucial infrastructure elements remain limited, including science laboratories, ICT-based learning equipment, and up-to-date library materials. Interviews with the principal reveal that these limitations affect the school's ability to execute differentiated learning strategies, provide innovative learning media, and conduct laboratory-based instruction. Moreover, the findings show that improvements in learning quality depend not only on facility availability but also on effective managerial practices, such as teacher supervision, BOS fund allocation, and instructional planning.

Despite these challenges, SMAS IRA Medan demonstrates strong administrative efforts to enhance quality through structured teacher supervision,

transparent managerial processes, and ongoing improvements in resource management. However, for long-term educational advancement, the alignment between facilities, curriculum demands, and instructional processes must be strengthened. Therefore, integrating field observations with a literature review enables a comprehensive understanding of how infrastructure conditions influence educational quality within the IPO framework, providing insights into both practical constraints and strategic opportunities for school improvement.

LITERATURE REVIEW

Educational Facilities and Infrastructure in School Quality

Educational facilities and infrastructure are widely recognized as fundamental determinants of school quality. According to Nurhayati (2021), school facilities function as instructional support that enables teachers to implement learning activities aligned with curriculum demands. These facilities include classrooms, libraries, laboratories, sanitation, ICT equipment, and recreational areas. Although national standards-such as the Indonesian Ministerial Regulation on School Facilities-outline minimum requirements, the practical adequacy of facilities varies significantly across private schools, particularly those operating with limited funding. Martini et al. (2024) affirm that high-quality facilities strongly influence student participation, psychological comfort, and academic outcomes. This reinforces the idea that school infrastructure is not merely administrative compliance but a central variable in shaping learning experiences.

From a pedagogical perspective, facilities directly support the effectiveness of instructional delivery. Saputra, Karyadi, & Eriza (2024) emphasize that complete learning facilities, such as functioning laboratories, well-organized libraries, and proper ICT media, enhance student performance by allowing students to engage in practical, visual, and inquiry-based learning. In the context of Indonesian senior high schools, the availability of multi-media projectors, internet connectivity, and learning modules is essential for implementing modern pedagogies. At SMAS IRA Medan-based on observation-facilities such as classrooms, desks, a computer room, and sports areas are available, but others like a science laboratory, updated library collections, and multimedia rooms remain limited. These gaps are consistent with challenges reported in private schools with restricted operational budgets.

School facilities also influence student motivation. A study by Simanjuntak et al. (2024) found that the quality of school infrastructure has a significant psychological effect on learners; students demonstrate increased motivation and engagement when surrounded by clean, comfortable, and resource-equipped environments. This aligns closely with observations at SMAS IRA Medan, where functional classrooms and the computer lab increase student interest, while the limited library resources and laboratory space constrain more hands-on learning. Thus, the school's condition reflects a mixed level of facility readiness that influences teaching-learning activities.

Input-Process-Output (IPO) Framework in Educational Quality

The Input-Process-Output (IPO) model is frequently used to assess school quality holistically. According to Rahmawati & Siregar (2023), educational input includes human resources (teachers, students), physical resources (facilities), and curriculum materials, all of which determine the initial capacity of a school to deliver quality education. At SMAS IRA Medan, inputs such as teacher qualifications, student characteristics, and available facilities provide the baseline for evaluating school performance. During the PLP observation, it was found that most teachers hold undergraduate degrees, some with teaching certificates, while students showed varied academic readiness-consistent with typical diversity in private schools.

The process component involves instructional activities, classroom interactions, assessments, and school management practices. Yuliani & Pratama (2024) argue that effective educational processes require structured planning, adaptive teaching, continuous evaluation, and supportive school leadership. The school's implementation of routine teacher supervision, as described by Ibu Eka, reflects an emphasis on process quality. This approach aligns with international literature suggesting that regular supervision improves instructional practices through constructive feedback and professional reflection.

Output refers to learning outcomes, character development, school achievement, and student competencies. Martini et al. (2024) highlight that strong input and well-managed processes correlate positively with improved student outcomes. At SMAS IRA Medan, outputs are still developing, partially due to limited facilities and the need for greater consistency in student attendance and learning readiness. However, efforts to strengthen documentation, align teachers to their expertise, and improve supervision indicate an improving trajectory.

Implementation of the Merdeka Curriculum

The Merdeka Curriculum introduces significant changes in teaching and learning, emphasizing competency-based learning, differentiated instruction, and project-based assessment. Pratiwi (2023) explains that the curriculum aims to foster student autonomy, critical thinking, and contextual learning through "Profil Pelajar Pancasila" projects. For teachers, this requires designing lessons that adapt to students' diverse needs and implementing varied assessment strategies.

SMAS IRA Medan is in the early phase of adopting the Merdeka Curriculum. Observations revealed that teachers are adjusting instructional methods to accommodate student differences, consistent with the curriculum's emphasis on personalization. The school, however, still awaits external training sessions, which affects the pace of implementation. This challenge mirrors findings by Adi & Suryani (2022), who report that many private schools struggle with curriculum adaptation due to a lack of training, limited school facilities, and insufficient ICT infrastructure.

The Merdeka Curriculum also requires formative assessments, diagnostic evaluations, and project-based assignments. Based on interviews, teachers at SMAS

IRA Medan have begun adjusting their assessment strategies, though the consistency and depth of implementation vary. This finding aligns with research by Hasanah (2024), which notes that teachers often need further guidance to fully integrate assessment reforms into their practice.

School Facilities Management

Facilities management includes planning, procurement, maintenance, and monitoring. Effective facilities management supports sustainability and ensures long-term functionality. According to Karwanto & Hariyati (2024), schools must create systematic maintenance schedules and prioritize development based on needs. Schools with transparent management structures tend to have more efficient resource allocation, especially when operational funds are limited.

At SMAS IRA Medan, facilities management relies primarily on BOS funding and internal coordination between the principal and the treasurer. The school prioritizes essential repairs and gradual development of laboratory rooms and multimedia resources. This aligns with the findings from Sumarni (2022), who states that private schools with low tuition fees must optimize BOS funds strategically since facility upgrades cannot occur simultaneously.

The principal's emphasis on inventory management and annual planning reflects good administrative practices. However, the limited number of classrooms and the modest library collection show that the facilities development cycle is still slow. Literature consistently shows that constrained funding affects facilities renewal, which in turn influences curriculum implementation (Martini et al., 2024).

Assessment Systems and Classroom Management

Assessment plays a pivotal role in learning quality. According to Wulandari & Setiawan (2023), assessment practices should align with learning objectives, provide timely feedback, and guide instructional improvement. The Merdeka Curriculum emphasizes diagnostic, formative, and summative assessments that capture student growth. During the observation, teachers at SMAS IRA Medan implemented a combination of written tasks, performance assessments, and periodic evaluations-consistent with national standards.

Classroom management is equally crucial. Hidayat (2022) explains that effective classroom management supports student engagement, minimizes disruptions, and creates a supportive learning climate. At SMAS IRA Medan, classroom dynamics showed positive interaction patterns, although student attendance issues still pose challenges. This aligns with findings by Prasetyo (2021), who highlights attendance as a critical factor affecting instructional continuity in private schools.

Overall, the literature suggests that assessment quality and classroom management are closely tied to teacher competence, administrative support, and available facilities-all of which are observable variables in the context of SMAS IRA Medan.

RESULT AND DISCUSSION

Educational Inputs at SMAS IRA Medan

The input conditions at SMAS IRA Medan demonstrate a combination of strengths and challenges. Most teachers possess appropriate educational backgrounds, aligning with the national standards that require teachers to hold at least a bachelor's degree. This supports the finding by Rahmawati & Siregar (2023) that teacher qualification is a crucial determinant of learning quality. However, observations reveal that some teachers are still developing in terms of curriculum adaptation and instructional documentation. This aligns with Yuliani & Pratama (2024), who note that professional readiness varies widely across private schools.

The student profile also affects input quality. Students exhibit diverse academic readiness and learning styles, requiring adaptive pedagogical approaches. According to the Merdeka Curriculum principles, differentiated instruction is essential for accommodating such diversity. Teachers at SMAS IRA Medan acknowledged this need, as confirmed through interviews with Ibu Eka. This reflects the curriculum's emphasis on student-centered learning.

Facilities constitute another major input. Although SMAS IRA Medan has functional classrooms, basic ICT tools, and a computer laboratory, other resources—such as a science lab, expanded library collection, and multimedia equipment—remain insufficient. This situation is consistent with research by Saputra et al. (2024), who found that limited facilities affect the implementation of practical learning and ICT integration.

Teaching and Learning Processes

Classroom observations show that teachers generally conduct lessons effectively, incorporating introductions, explanation of materials, student activities, and assessments. Several teachers use PowerPoint slides and internet resources, demonstrating efforts to integrate technology. This aligns with modern pedagogic standards recommending ICT-supported instruction. However, the usage is still limited by the availability of equipment and school internet capacity.

Teacher-student interactions were mostly positive, displaying respect and responsiveness. This aspect of process quality reflects Martini et al. (2024), who emphasize the importance of relational quality in fostering student engagement. Yet, student attendance concerns hinder teaching continuity. As noted by Prasetyo (2021), irregular attendance is a common obstacle in private schools, affecting both process and output.

Assessment practices observed at SMAS IRA Medan include written assessments, performance tasks, and occasional project-based activities—an alignment with Merdeka Curriculum expectations. However, teachers face challenges implementing diagnostic assessments consistently, reflecting Hasanah's (2024) finding

that many educators need additional training to operationalize new assessment frameworks.

Influence of Facilities on the Learning Process

The condition of school infrastructure significantly influences the instructional flow. For instance, functioning classrooms with proper lighting and seating arrangements support student concentration. Observations revealed that the availability of LCD projectors allows teachers to use multimedia resources, which improves student comprehension through visual learning. This supports the argument of Simanjuntak et al. (2024) that infrastructure quality enhances student motivation.

Conversely, the absence of a science laboratory limits opportunities for practical, inquiry-based learning, particularly in subjects like physics, biology, and chemistry. This is consistent with Saputra et al. (2024), who found that practical learning is less effective when facilities are inadequate. Similarly, the limited library collection restricts students' access to reading materials that could enhance literacy and critical thinking.

The school's reliance on BOS funds for facility upgrades reflects structural limitations. As Sumarni (2022) notes, schools with low tuition fees must prioritize essential repairs over long-term development. This explains why certain improvements at SMAS IRA Medan-such as the enhancement of multimedia rooms-are progressing slowly.

Facilities Management Practices

Based on the interview with Ibu Eka, facilities management at SMAS IRA Medan is conducted through routine inventory checks and strategic prioritization. Repairs and development projects are planned annually, with BOS funds allocated primarily for essential needs. This management practice aligns with the findings from Karwanto & Hariyati (2024), who highlight the importance of structured planning in sustaining school infrastructure.

The school also attempts to maintain transparency in resource allocation. Discussions between the principal and treasurer ensure that financial decisions-particularly regarding facility improvement-are aligned with school priorities. This echoes the principles of School-Based Management (SBM), which emphasize autonomy, participation, and accountability.

However, limited funding means that some facility enhancements depend on external support or incremental budgeting. This creates a slower pace of improvement, especially in areas such as laboratory development and library enrichment. Martini et al. (2024) similarly identify funding limitations as a common issue in private schools struggling to meet national facility standards.

Influence of Facilities on Educational Outputs

Educational outputs at SMAS IRA Medan include student achievement, classroom behavior, participation, and readiness for higher competencies. Facility conditions strongly influence these outcomes. For example, the availability of ICT tools supports digital literacy, which is increasingly relevant under the Merdeka Curriculum. Conversely, the limited laboratory space restricts scientific inquiry skills—a key competency emphasized in modern education.

Attendance and discipline are also influenced by the school environment. A clean, safe, and organized school layout encourages students to attend and participate. As Simanjuntak et al. (2024) argue, environmental factors significantly affect student motivation. At SMAS IRA Medan, the presence of sports facilities and comfortable classrooms contributes positively to student attitudes, though other facility-related gaps still impact learning outcomes.

The school's efforts to realign teacher assignments, improve learning documentation, and supervise teaching performance show a trajectory of improving educational outputs. Although the progress is gradual, the combination of improved management, strategic facility development, and teacher adaptability aligns with the IPO framework, supporting long-term quality enhancement.

DISCUSSION

Implications for School Quality Improvement

The findings reveal that SMAS IRA Medan has fulfilled several basic facility requirements such as classrooms, desks, chairs, and sports areas; however, important instructional facilities including science laboratories, multimedia rooms, and a well-established library are still limited and under development. This condition has direct implications for the school's overall quality because facilities and infrastructure are essential elements in the national education standards. According to Saputra, Karyadi, and Eriza (2024), the availability and completeness of learning facilities significantly influence students' motivation, participation, and academic outcomes. Therefore, strengthening science laboratories, expanding library collections, and improving digital media resources become strategic priorities to enhance the school's input quality and ensure that teaching and learning processes can run more effectively.

Furthermore, the interview shows that the school heavily depends on BOS funds and support from the foundation for facility improvements. This creates the implication that the school must adopt a more systematic and data-driven planning strategy to manage its limited financial resources effectively. Martini et al. (2024) emphasize that effective facility management requires structured planning, maintenance, and prioritization. As such, SMAS IRA Medan needs to map out priority areas such as digital classrooms, laboratory tools, and student learning resources to prepare for future accreditation assessments and meet national standards.

In addition, school quality is also affected by the institution's readiness to carry out the Merdeka Curriculum. Observations indicate that its implementation is ongoing but not yet optimal due to limited facilities and the absence of regular internal teacher

training . Rahmawati and Siregar (2023) argue that the success of a new curriculum highly depends on the readiness of the school ecosystem, including its teachers and infrastructure. Thus, an important implication for the school is the need to initiate professional development programs and upgrade technological tools to support a curriculum that emphasizes differentiated, project-based, and student-centered learning.

Implications for Teachers

The observation indicates that teachers at SMAS IRA Medan receive structured supervision every three months, where the principal evaluates their attendance, administrative completeness, and instructional quality through one-on-one supervision sessions . This system provides substantial opportunities for teachers to reflect on their teaching practices and improve their professional performance. This aligns with Deta, Mbuik, and Nahak (2022), who state that continuous supervision contributes significantly to teachers' instructional improvement. The implication is that teachers must maximize these supervisory moments as professional learning opportunities to strengthen their classroom management, lesson planning, and assessment strategies.

Another implication concerns teachers' ability to integrate technology and instructional media into classroom activities. The observation shows that teachers utilize LCD projectors, computers, and digital resources when available, but their use remains inconsistent due to equipment limitations . Martini et al. (2024) highlight that a teacher's capacity to use instructional media contributes directly to student engagement. Therefore, teachers need to enhance their skills in using digital materials, creating multimedia teaching tools, and integrating technology into lessons to compensate for the limited physical resources and increase learning effectiveness.

Teachers are also facing challenges in implementing Merdeka Curriculum assessment practices such as diagnostic assessments, portfolio-based evaluation, and project assignments as noted during the interview with the principal . Given that Suban et al. (2023) emphasize the importance of comprehensive assessment skills for improving student learning outcomes, the implication is that teachers require deeper training in designing assessment instruments and applying formative summative evaluation techniques. Such competencies would enable them to deliver more accurate, student-centered evaluations aligned with the curriculum's demands.

Implications for Researchers

The data obtained from the PLP I observation serves as a valuable foundation for academic research on the relationship between school facilities and educational quality in private schools. The findings demonstrate real challenges faced by SMAS IRA Medan—such as limited facilities, intensive supervision practices, and the gradual implementation of the Merdeka Curriculum—which make it an important case study . As Martini et al. (2024) point out, school infrastructure plays a crucial role in shaping

student learning outcomes. Thus, the school's situation provides a contextual basis for further research on facility management in low-budget private schools.

Additionally, the school's supervision model is a potential area of academic inquiry. The principal's use of one-on-one supervision and continuous monitoring presents an interesting example of School-Based Management in a small private institution. Deta et al. (2022) highlight that effective supervision increases teacher professionalism. Therefore, researchers may examine the effectiveness of this model, compare it with other supervision approaches, or explore how it supports teacher adaptation to new curricular demands.

Finally, the gradual implementation of the Merdeka Curriculum at SMAS IRA Medan opens opportunities for future research on school readiness and adaptation strategies. The observation clearly shows that limited facilities and insufficient professional training hinder optimal curriculum implementation. Rahmawati and Siregar (2023) explain that curriculum success depends on both teacher capacity and infrastructure readiness. This makes SMAS IRA Medan a strong subject for studies on curriculum transition, school preparedness, and the comparison between public and private institutions in adopting national educational reforms.

CONCLUSION

The findings of this study emphasize that the condition of facilities and infrastructure at SMAS IRA Medan plays a central role in shaping the quality of educational inputs, processes, and outputs. The school has fulfilled several basic facility requirements such as classrooms, desks, chairs, and a generally supportive physical environment but still faces limitations in key learning resources, including science laboratories, library collections, and digital media equipment. These shortages directly influence how effectively teachers can design learning activities, especially those requiring inquiry-based, practical, or technology-supported instruction.

As the interview and field observation show, teachers often rely on available media such as projectors and internet access; however, the inconsistent availability of these tools restricts the implementation of differentiated and interactive learning expected in the Merdeka Curriculum. Because infrastructure forms the foundation of school readiness, its adequacy becomes a determinant of students' learning experiences and academic performance.

Despite these challenges, SMAS IRA Medan demonstrates a strong willingness and commitment to enhancing its instructional quality. The school conducts consistent supervision every three months, where the principal evaluates teacher attendance, lesson planning, instructional delivery, and professionalism. This supervision system, which includes one-on-one feedback sessions, represents a structured effort to strengthen teaching quality and accountability. Additionally, BOS funds and support from the foundation help maintain existing facilities and gradually improve school resources, although financial limitations still hinder rapid development. The transition to the Merdeka Curriculum is ongoing, and while teachers show effort in adapting to

diagnostic assessments, project-based tasks, and student-centered approaches, they still need deeper training and stronger resource support to fully meet curricular demands. These observations highlight that instructional improvement at SMAS IRA Medan is not only influenced by teacher competence but also deeply tied to the availability of adequate learning tools.

In conclusion, the influence of facilities and infrastructure on the school's input-process-output system is evident and multifaceted. Adequate infrastructure supports not only the quality of learning but also student engagement, discipline, and academic productivity. While the school is progressing toward meeting national standards, there remains significant room for growth, particularly in expanding laboratory resources, upgrading multimedia equipment, strengthening digital infrastructure, and enriching library collections. With sustained investment in facility development and continuous teacher capacity building, SMAS IRA Medan can enhance its overall educational quality and better prepare students for modern learning demands. These improvements will not only support curriculum implementation but also contribute to long-term school development, ensuring a more holistic and effective learning environment for all learners.

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