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OPTIMIZING INFRASTRUCTURE MANAGEMENT AS AN EFFORT TO IMPROVE EDUCATIONAL QUALITY AT MTS. MATHALIBUL HUDA MLONGGO

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Abstract

Infrastructure management is a critical component of educational quality improvement, particularly in *madrasah* settings where learning effectiveness depends on the availability, usability, and sustainability of educational facilities. This study aims to analyze the optimization of infrastructure management as an effort to improve educational quality at MTs. Mathalibul Huda Mlonggo. The research focuses on infrastructure planning and procurement, the utilization and maintenance of educational facilities, and the contribution of infrastructure management to improving the quality of *madrasah* education. A qualitative approach with a case study design was employed. Data were collected through observation, in-depth interviews, and documentation involving the head of the *madrasah*, the vice principal for infrastructure, teachers, educational staff, students, and the *madrasah* committee. Data were analyzed using the Miles, Huberman, and Saldaña model, consisting of data condensation, data display, and data verification. The findings show that infrastructure management optimization is implemented through needs-based facility planning and procurement, sustainable utilization and maintenance of educational facilities, and management practices oriented

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toward learning effectiveness. The implementation of infrastructure management contributes to improving the quality of the learning process, the comfort of the learning environment, student motivation, educational service quality, and public trust in the *madrasah*. This study concludes that systematic and participatory infrastructure management can serve as an effective strategy for sustainably improving the quality of *madrasah* education. The study contributes to educational management practice by emphasizing the strategic role of facility governance in strengthening institutional quality, learning effectiveness, and community confidence.

Keywords: Infrastructure Management; Educational Quality; *Madrasah Tsanawiyah*; Learning Effectiveness; Educational Management.

INTRODUCTION

The quality of education is one of the main indicators of the success of developing competitive human resources in the global era. Improving the quality of education is not only determined by the quality of teachers and curriculum, but also by the availability and management of adequate educational facilities and infrastructure (Abd-Elazim et al., 2025; Maula et al., 2025; Mtikitiki et al., 2025). Optimally managed facilities and infrastructure can create a comfortable, safe, and conducive learning environment, thus supporting an effective learning process. Various studies have shown that the quality of educational facilities has a significant relationship with learning motivation, academic achievement, and student satisfaction with educational services (Schmid et al., 2022; Wei, 2023). Therefore, the management of facilities and infrastructure cannot be viewed as merely an administrative aspect, but rather as a strategic instrument in improving the quality of education. In the context of national education, the success of educational institutions in managing their facilities will contribute to the achievement of broader educational goals (Ardelean et al., 2024). Optimizing the management of facilities and infrastructure is a crucial issue that requires serious attention from all educational stakeholders.

Despite its importance, the management of educational infrastructure still faces various challenges in many educational institutions, particularly at the madrasah (Islamic school) level. Frequently encountered problems include budget constraints, inadequate planning for facility needs, weak inventory systems, and poor oversight of facility utilization and maintenance. As a result, various educational facilities cannot be utilized optimally and even deteriorate before reaching their intended lifespan (El Iq Bali et al., 2020; Taha et al.,

2025). This situation has an impact on the decline in learning effectiveness and the quality of educational services received by students. The increasingly rapid development of educational technology requires educational institutions to continuously update their facilities to support the needs of 21st-century learning. However, many educational institutions still struggle to systematically integrate the planning, procurement, maintenance, and evaluation of infrastructure (Dakir et al., 2021; Mishra & Purohit, 2026). These problems indicate that infrastructure management has not yet been fully prioritized in strategies to improve educational quality.

The phenomenon occurring in various madrasas (Islamic schools) demonstrates a gap between the availability of infrastructure and the quality of its management. Many madrasas have buildings, classrooms, laboratories, libraries, and other supporting facilities, but are unable to manage them effectively and sustainably (Nazyrova et al., 2025; Shaham & Kazerooni, 2025; Yin et al., 2024). In practice, some facilities are not utilized optimally, while others are damaged due to a lack of planned maintenance. On the other hand, some madrasas have succeeded in improving the quality of education through professional infrastructure management integrated with school development programs. Phenomenon can also be found in Islamic-based educational institutions, which face the challenge of meeting national education standards while maintaining the institution's Islamic character (Wang, 2021; Baharun et al., 2025). This situation emphasizes that the existence of infrastructure alone is not sufficient to improve educational quality; a management system is needed that can optimize the function and usefulness of all available educational facilities.

Many researchers have studied the management of educational facilities and infrastructure. Most studies indicate that careful planning, targeted procurement, and ongoing maintenance positively impact the effectiveness of educational delivery. Previous research also confirms that adequate facilities and infrastructure can improve student learning comfort, support learning innovation, and strengthen the achievement of educational goals (Najiburrohman et al., 2025). Furthermore, several studies highlight the importance of involving principals, educational staff, and the community in managing educational facilities. These findings provide an understanding that facility and infrastructure management is an integral part of an educational management system oriented toward quality improvement (Hudhel Sidqi et al., 2025). However, most research still focuses on the administrative aspects of facility management without examining in depth how the process of optimizing facilities and infrastructure can become a strategy for sustainable educational quality improvement,

particularly in Islamic educational institutions at the junior high school (*madrasah tsanawiyah*) level.

Other studies have examined the relationship between the availability of educational facilities and student learning outcomes, learning effectiveness, and school community satisfaction. However, previous research remains limited. Wang (2021), some studies have focused on the physical aspects of facilities and infrastructure without addressing the managerial processes involved in planning, organizing, implementing, and evaluating. Taam et al (2024) research specifically examining the optimization of facility and infrastructure management in the context of improving educational quality in madrasas is relatively limited. Maharaj & Chauke (2025) there is limited research integrating educational quality perspectives with participatory and sustainable facility management practices. This research gap highlights the need for a more comprehensive study of how facility and infrastructure management is implemented and optimized to support educational quality improvement. Therefore, this study aims to address this gap by focusing on facility and infrastructure management practices within madrasas.

The novelty of this research lies in its focus on optimizing infrastructure management as a strategy for improving educational quality, implemented comprehensively through the stages of planning, procurement, utilization, maintenance, and evaluation of educational facilities. Unlike previous research that tends to position infrastructure as a supporting factor for learning, this study views infrastructure management as a strategic instrument that directly influences the quality of educational services. Furthermore, this research was conducted at MTs. Mathalibul Huda Mlonggo, which is characterized as an Islamic educational institution that continuously strives to improve educational quality through effective facility management. This study also seeks to uncover the managerial practices implemented by the madrasah in optimizing its resources amidst various limitations. Thus, this research offers a new perspective on the relationship between infrastructure management and improving educational quality in the madrasah context.

Research on optimizing infrastructure management is crucial because the challenges of improving educational quality are increasingly complex and require a comprehensive approach. Madrasas are not only expected to produce graduates with strong academic competencies, but also to foster strong character and Islamic values. To achieve these goals, adequate and professionally managed infrastructure is essential. Furthermore, the limited

resources of some madrasas necessitate effective management strategies to ensure all facilities provide maximum benefits to the educational process. The results of this study are expected to provide an empirical overview of effective infrastructure management practices for improving educational quality. Furthermore, the research findings can serve as a reference for madrasah administrators, policymakers, and education practitioners in formulating strategies for developing more quality-oriented educational facilities.

Based on the above description, this study begins with the main question of how the optimization of infrastructure management is implemented as an effort to improve the quality of education at MTs. Mathalibul Huda Mlonggo. This question covers various aspects, starting from the process of planning facility needs, procurement of infrastructure, utilization in learning activities, maintenance, and evaluation of the effectiveness of their management. The argument developed in this study is that the quality of education is not only influenced by the availability of facilities, but is more determined by the institution's ability to manage and optimize all owned infrastructure. The better the infrastructure management system implemented, the greater the opportunity for madrasahs to improve the quality of educational services and student learning outcomes. Therefore, this study is expected to be able to provide theoretical contributions to the development of Islamic education management studies as well as practical contributions in the form of recommendations for effective and sustainable infrastructure management for madrasah educational institutions.

METHODS

This research uses a qualitative approach with a case study research type. The qualitative approach was chosen because this study aims to understand in depth the phenomenon of optimizing infrastructure management as an effort to improve the quality of education at MTs. Mathalibul Huda Mlonggo. This approach allows researchers to gain a comprehensive understanding of various infrastructure management activities including planning, procurement, utilization, maintenance, and evaluation of educational facilities. Meanwhile, the case study design was chosen because the research focuses on an educational institution that has unique characteristics in managing educational facilities and infrastructure. Through case studies, researchers can examine phenomena in depth in a real context so as to produce a complete description of the strategies, processes, and various factors that influence

the success of infrastructure management in supporting the improvement of educational quality.

This research was conducted at MTs. Mathalibul Huda Mlonggo, located in Jepara Regency, Central Java. The selection of the research location was based on several academic and empirical considerations. This madrasah has various educational facilities and infrastructure that support the learning process, such as classrooms, a library, laboratories, an administration room, worship facilities, and various other supporting facilities that require planned and sustainable management. In addition, MTs. Mathalibul Huda Mlonggo continues to strive to improve the quality of education by strengthening the school's management system, including in the area of facilities and infrastructure. These conditions make this madrasah relevant as a research location because it is able to provide rich information regarding educational facility management practices and their contribution to improving the quality of educational services provided to students. The following is some information from informants in this study:

Table 1. Informan Informasi

Informant	Information
Head of Madrasah	Person responsible for infrastructure management policies
Deputy Head of Facilities and Infrastructure	Technical manager of infrastructure facilities
Head of Administration	Infrastructure administration manager
Teacher	Users of infrastructure in learning
Learners	Users of educational facilities
Madrasah Committee	Partners in the development of educational facilities

Data collection in this study was conducted through observation, interviews, and documentation techniques. Observations were conducted directly to obtain a factual picture of the condition of facilities and infrastructure and their management activities within the madrasah environment. In-depth interviews were conducted with the madrasah principal, deputy principal for facilities and infrastructure, head of administration, teachers, students, and other parties involved in the management of educational facilities. Through these interviews, researchers obtained information regarding policies, strategies, obstacles, and efforts made to optimize facilities and infrastructure (Bhatty, 2025). In addition, documentation was used as a supporting data source, including madrasah profiles, facility and infrastructure inventory data,

work programs, activity reports, planning documents, activity photos, and various archives relevant to the research focus.

The data analysis in this study used an interactive analysis model developed by Miles, Huberman, and Saldaña, which consists of data condensation, data presentation, and verification or drawing conclusions. Data condensation was carried out by selecting, simplifying, grouping, and focusing data obtained from observations, interviews, and documentation according to the research focus. After that, the collected data was presented in the form of narrative descriptions, matrices, or thematic categorizations to facilitate researchers in understanding the relationships between the data found. The next stage was verification and drawing conclusions, which were carried out continuously throughout the research process (Rosmiati et al., 2025). At this stage, researchers interpreted the analyzed data to find patterns, meanings, and conclusions that could answer the research focus on optimizing infrastructure management in improving education quality.

To ensure data validity, this study employed source triangulation, technical triangulation, member checking, and observational persistence. Source triangulation was conducted by comparing information obtained from various informants to obtain consistent and reliable data. Technical triangulation was conducted by comparing data from observations, interviews, and documentation to ensure the accuracy of the information obtained. Furthermore, member checking was conducted by reconfirming the interview results and data interpretation with informants to ensure the data presented corresponded to the actual conditions (Saabye et al., 2025). The researcher also applied observational persistence by conducting repeated observations of various infrastructure management activities at the madrasah. Through these various techniques, the data obtained is expected to have a high level of credibility, dependability, transferability, and confirmability so that the research results can be scientifically accounted for.

RESULTS

Optimization of Planning and Procurement of Facilities and Infrastructure Based on Educational Needs

The results of the research documentation indicate implements a planning and procurement system for infrastructure that is oriented towards real and sustainable educational needs. Planning is carried out through evaluations of the condition of available facilities at the

beginning of each academic year and at the end of each semester as a basis for preparing subsequent infrastructure development programs. The infrastructure work program document shows that each procurement proposal begins with the identification of needs from teachers, homeroom teachers, education personnel, and laboratory managers. Next, these needs are classified based on their level of urgency and relevance to the learning process. In addition, madrasah work meeting documents indicate the involvement of the madrasah principal, committee, and education personnel in determining procurement priorities. Budget transparency is also reflected in systematically documented reports on the use of funds. These documentation findings indicate that the management of infrastructure at the madrasah has been directed to support the effectiveness of learning and the continuous improvement of educational quality.

Table 2. Implementation of Planning and Procurement of Facilities and Infrastructure Based on Educational Needs

Finding Indicators	Documentary Evidence	Implementation
Analysis of infrastructure needs is carried out periodically.	Annual work program and facility evaluation report	Needs evaluation is carried out every semester and at the beginning of the academic year.
Preparation of priority scale for procurement of educational facilities	Planning meeting minutes and facility requirements list	Procurement is based on the level of urgency and learning needs.
Stakeholder involvement in planning	Joint meeting document with the madrasah principal, teachers and committee	Decision making is carried out in a participatory manner
Transparent infrastructure budget management	Report on use of funds and RKAM	The budget is prepared and reported openly
Procurement of facilities based on learning needs	School procurement documents and inventory	The facilities purchased are tailored to learning needs.

Source: Research documentation results, 2026.

The table shows that the optimization of planning and procurement of infrastructure is implemented through five main, integrated stages. The first stage is a needs analysis conducted periodically to identify the condition of facilities and new needs that arise in the learning process. The second stage is the preparation of a priority scale to ensure that facility procurement is carried out based on the most pressing level of need. The third stage involves various stakeholders, including the madrasah principal, teachers, education staff, and the madrasah committee, so that the resulting decisions are collective and representative. Furthermore, budget management is carried out transparently through the preparation and reporting of well-documented fund usage. The final stage is the procurement of facilities

tailored to learning needs so that each available facility has a clear function in supporting educational activities.

The success of infrastructure management is determined not only by the availability of financial resources but also by the quality of systematic and participatory planning. Regular needs analysis enables the school to identify facility gaps that could impact the quality of learning. Furthermore, prioritization helps the school allocate resources more effectively, ensuring that the most pressing needs are met first. The involvement of various stakeholders in the planning process reflects the application of participatory management principles, which improve the accuracy of decision-making while strengthening a sense of ownership over the facilities provided. Transparency in budget management also demonstrates the institution's accountability to all stakeholders

Optimizing the Utilization and Maintenance of Facilities and Infrastructure to Support Learning Effectiveness

Based on observations conducted during the research, it was found has optimized the utilization and maintenance of infrastructure as part of an effort to improve learning effectiveness. Observations indicate that various available facilities, such as classrooms, libraries, laboratories, multimedia equipment, and other supporting facilities are actively used in teaching and learning activities. Teachers utilize these facilities to create a more interactive, varied, and student-centered learning process. Furthermore, the use of educational media and technology appears to be an important part of supporting the delivery of learning materials. In terms of maintenance, the madrasah implements a regular facility maintenance program through activities such as checking the condition of facilities, repairing minor damage, and replacing facilities that are unsuitable for use. Supervision of facility use is also carried out by teachers and education staff. In addition, the madrasah builds a culture of facility maintenance by instilling discipline and responsibility among all school members.

Table 3. Observation Results of the Utilization and Maintenance of Facilities and Infrastructure to Support Learning Effectiveness

Finding Indicators	Observation Results	Condition
Utilization of facilities in the learning process	Classrooms, libraries, laboratories and other facilities are actively used in learning.	Good
Optimal use of educational media and technology	Teachers utilize LCDs, projectors, computers, and digital learning media.	Good

Finding Indicators	Observation Results	Condition
Regular facility maintenance program	There are routine inspection, maintenance and repair activities for facilities.	Good
Supervision of the use of infrastructure facilities	Teachers and officers supervise the use of school facilities	Good
Establishing a culture of maintaining school facilities	Students are accustomed to maintaining cleanliness, order and security of facilities.	Very good

Source: Research observation results, 2026.

The findings in the table above indicate that the utilization and maintenance of infrastructure have been implemented optimally through various activities that support effective learning. All available educational facilities are actively utilized to support the teaching and learning process, thus providing tangible benefits for both teachers and students. The use of educational media and technology also appears to be an integral part of learning activities, particularly in helping to deliver material in a more engaging and understandable manner. Furthermore, the madrasah has a regular facility maintenance program to ensure all infrastructure remains in good condition and ready for use. Supervision of facility use is carried out continuously by teachers and education staff to prevent damage due to inappropriate use.

The effectiveness of infrastructure management is determined not only by the availability of adequate facilities, but also by the extent to which these facilities are utilized and maintained sustainably. Active utilization of infrastructure in the learning process reflects institutional awareness that educational facilities are a crucial instrument in supporting the achievement of learning objectives. Optimal use of educational media and technology demonstrates the madrasah's ability to adapt the learning process to the demands of modern educational developments. Furthermore, routine maintenance programs demonstrate preventive efforts to maintain the quality of facilities and ensure their optimal function. Monitoring the use of infrastructure serves as a crucial control mechanism to minimize the risk of damage and misuse. Meanwhile, the development of a culture of maintaining school facilities demonstrates that infrastructure management has developed into a collective value instilled in all members of the madrasah community. This indicates that the successful utilization and maintenance of facilities directly contributes to the creation of an effective, comfortable, and conducive learning environment for improving the quality of education.

Contribution of Infrastructure Management to Improving the Quality of Madrasah Education

Interviews with the principal, deputy principal for infrastructure, teachers, education staff, the madrasa committee, and students revealed that infrastructure management significantly contributes to improving the quality of education. The informants explained that the availability of well-managed facilities has supported a more effective and efficient learning process. A comfortable, clean, and safe learning environment also has a positive impact on student concentration. Furthermore, the use of adequate learning facilities can increase student motivation and participation in academic and non-academic activities. The informants also revealed that the quality of educational services is improving because learning needs can be optimally met through the support of adequate infrastructure. This condition has an impact on increasing public trust in the madrasa, as demonstrated by the high interest of parents to send their children to the institution and the strengthening of the positive image of the madrasa in the surrounding community.

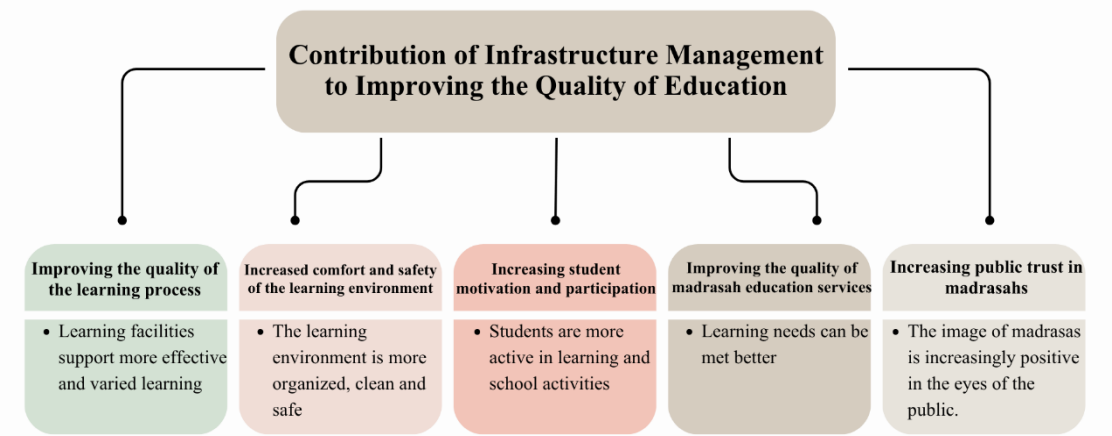

Figure 1. Contribution of Infrastructure Management to Improving the Quality of Education
Source: Research interview results, 2026.

The table above shows that infrastructure management has a significant impact on various aspects of educational quality. This contribution is evident not only in improving the quality of the learning process but also in creating a more comfortable and safe learning environment for students. Interview data indicates that well-managed facilities support more effective learning and provide a more meaningful learning experience. Furthermore, a well-organized and well-maintained school environment encourages students to focus more on their learning activities. Another impact is seen in increased student motivation and

participation in various school activities. The availability of adequate infrastructure also supports improvements in the quality of educational services, as various academic needs can be optimally met.

Infrastructure management plays a strategic role in developing the overall quality of education. Effectively managed infrastructure serves not only as administrative support but also as an integral part of the education system, influencing the quality of the learning process and outcomes. Improved learning quality experienced by teachers and students indicates that educational facilities are able to create more productive learning conditions. Furthermore, a comfortable and safe learning environment contributes to the creation of a conducive academic atmosphere, enabling students to learn optimally. Increased student motivation and participation demonstrate that adequate facilities can foster their interest and involvement in various school activities.

DISCUSSION

The first finding regarding the optimization of planning and procurement of educational infrastructure based on educational needs has important implications for improving the quality of education in madrasas. This finding indicates that the success of educational facility management does not depend on the size of the institution's resources, but rather on the institution's ability to plan and allocate resources appropriately (Arian et al., 2025; Yuniarty et al., 2025). By conducting regular needs analysis, madrasas can ensure that each facility provided truly supports learning needs. This is crucial because procurement that is not based on needs often leads to budget waste and low facility utilization rates. Furthermore, the involvement of various stakeholders in the planning process creates more accurate decisions that are aligned with field needs (Yoon, 2021; Ober & Kochmańska, 2022; Schmid et al., 2022). This finding confirms that systematic planning and procurement are the main foundations for creating a quality learning environment, as well as being an important strategy for increasing the effectiveness of educational resource use in a sustainable manner.

Optimizing the planning and procurement of infrastructure can improve the quality of education because the process ensures a match between learning needs and available facilities. Theoretically, educational management positions planning as a fundamental function that determines the success of other management functions. When facility needs are accurately identified and translated into targeted procurement programs, madrasas can provide facilities

relevant to learning demands (Wei, 2023; Abd-Elazim et al., 2025). Stakeholder involvement in the planning process also strengthens the quality of decisions because each party has different experiences and needs. Furthermore, transparency in budget management creates trust and accountability that encourage the effective use of educational funds.

The second finding, concerning the optimization of the utilization and maintenance of infrastructure, provides an understanding that the availability of educational facilities does not automatically improve the quality of education if they are not optimally utilized and maintained. An important implication of this finding is the need for a paradigm shift from simply providing facilities to facility management that is oriented towards utility (Hikmatul Hidayah et al., 2024; Sidqi & Bakhiet, 2026). The utilization of infrastructure in the learning process allows students to obtain a more varied, interactive, and contextual learning experience. Meanwhile, regular maintenance ensures that facilities remain in proper condition so they can be used sustainably. This finding also shows that a culture of maintaining school facilities plays a crucial role in extending the useful life of infrastructure while instilling the value of responsibility in students (Ardelean et al., 2024; Mtikitiki et al., 2025). Thus, the results of this study demonstrate that learning effectiveness is determined not only by the quality of teachers and curriculum, but also by the success of madrasahs in managing the utilization and maintenance of educational facilities on an ongoing basis.

The utilization and maintenance of infrastructure influences the effectiveness of learning because educational facilities serve as a medium that bridges the process of knowledge transfer between teachers and students. When facilities are optimally utilized, teachers have more alternatives in delivering learning materials, making learning more engaging and easier to understand. Furthermore, well-maintained facilities are always ready for use without disrupting the teaching and learning process (Hazrat et al., 2023; Woods et al., 2025). Routine maintenance programs also reduce the risk of damage that can hinder educational activities. Furthermore, monitoring the use of infrastructure creates effective control over facility use, thus minimizing misuse and damage due to negligence. A culture of maintaining facilities instilled in students further strengthens the sustainability of infrastructure management (Santosa et al., 2025). Therefore, the successful utilization and maintenance of facilities at MTs. Mathalibul Huda Mlonggo occurs due to the integration of technical, managerial, and cultural aspects in infrastructure management.

Furthermore, the contribution of infrastructure management to improving educational quality indicates that educational facility management has a broader impact than simply supporting school operations. The implication of this finding is that infrastructure needs to be positioned as a strategic asset that contributes to improving the overall quality of educational services. Improving the quality of the learning process, the comfort of the learning environment, student motivation, and public trust are clear indicators that infrastructure management can generate added value for educational institutions (Issabayeva et al., 2025; Kinias et al., 2025). This finding also shows that investment in educational facility management can provide long-term benefits in the form of improved institutional reputation and madrasah competitiveness. Thus, the results of this study provide an understanding that efforts to improve educational quality cannot focus solely on academic aspects, but must also include strengthening the infrastructure management system that supports the creation of quality and sustainable educational services (Marcellus et al., 2021).

The contribution of infrastructure management to improving educational quality occurs because educational facilities are one of the main components that shape the quality of students' learning experiences. When facilities are available in sufficient quantities and managed effectively, the learning process can proceed more smoothly, comfortably, and productively. A safe and organized learning environment provides positive psychological support for students, thus increasing their motivation to learn. Furthermore, adequate facilities enable madrasas to provide educational services that are more responsive to the needs of students and teachers (Aryee et al., 2024; Rulinawaty et al., 2024). From a community perspective, the quality of infrastructure is often an indicator used to assess the quality of an educational institution. Therefore, successful facility management will increase public trust in madrasas. In the context of MTs. Mathalibul Huda Mlonggo, infrastructure management can have a positive impact because it is oriented not only towards the provision of facilities, but also towards their utilization and management to support the achievement of educational goals effectively and sustainably.

CONCLUSION

This study shows that optimizing infrastructure management is a strategic factor in improving the quality of education at MTs. Mathalibul Huda Mlonggo. The research findings reveal that needs-based planning and procurement of infrastructure, sustainable utilization and

maintenance of facilities, and systematic management can improve the quality of the learning process, create a comfortable and safe learning environment, increase student motivation, strengthen the quality of educational services, and increase public trust in the madrasah. Thus, infrastructure not only functions as a support for learning activities but also becomes a managerial instrument that contributes to the continuous improvement of educational quality. However, this study still has limitations because it was only conducted at one madrasah, so the findings obtained cannot be generalized widely. Furthermore, this study focused more on the management aspect of infrastructure without examining the quantitative relationship between facility quality and student academic achievement. Therefore, further research is recommended to involve more educational institutions with diverse characteristics and combine qualitative and quantitative approaches to gain a more comprehensive understanding of the contribution of infrastructure management to improving educational quality.

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