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Facilities and Infrastructure Management in Improving the Quality of Student Learning

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Abstract
Effective facilities and infrastructure management represents a critical determinant of educational quality in Islamic primary education institutions, yet limited research examines how management functions operate within madrasah contexts. This study investigates the implementation of Terry's management theory—encompassing planning, organizing, implementing, and supervising functions—in facilities and infrastructure management at Madrasah Ibtidaiyah to enhance learning quality. A qualitative case study approach was employed at Madrasah Ibtidaiyah Cisarua Girang, Sukabumi City, utilizing purposive sampling to select key stakeholders including the principal, infrastructure management team, teachers, and administrative staff. Data collection involved in-depth interviews, direct observation, and document analysis of institutional records. Data validity was ensured through source and methodological triangulation, while analysis followed Miles, Huberman, and Saldana's interactive model with systematic coding according to Terry's four management functions. The madrasah implemented structured facilities management through RKAS planning documents, though only 65% of planned improvements achieved completion due to budget constraints and limited stakeholder participation (23% teacher involvement). Organizational challenges included absence of standardized procedures for 67% of infrastructure tasks and dual-responsibility constraints for personnel. Implementation strategies demonstrated creativity through dual-session learning systems and 82% community participation in infrastructure improvements. Supervision utilized regular monitoring with 45% recommendation implementation rates, though manual documentation systems limited efficiency. Findings reveal that effective infrastructure management in resource-constrained Islamic education contexts requires adaptive strategies beyond traditional administrative approaches. The madrasah's community-based solutions and innovative space utilization demonstrate institutional resilience that transcends physical limitations. However, systematic stakeholder engagement, standardized organizational procedures, and digital supervision systems represent critical areas for enhancement to optimize learning quality outcomes.

INTRODUCTION

Quality education serves as the cornerstone for developing superior and competitive human resources in the contemporary global landscape. The achievement of educational excellence fundamentally depends on multiple interconnected factors, with the availability and effective management of educational facilities and infrastructure representing critical determinants of institutional success. Educational infrastructure encompasses both physical structures such as buildings, classrooms, laboratories, and libraries, as well as organizational systems that support teaching and learning processes (Cohen & Bhatt, 2012). Hanushek (1995) defines educational infrastructure as including physical and organizational structures that support teaching and learning, encompassing buildings, classrooms, libraries, laboratories, and technology systems. While facilities include tangible resources that directly facilitate learning activities—such as desks, chairs, and instructional media—infrastructure comprises permanent installations including school buildings,

specialized learning spaces, and worship facilities (Depdiknas, 2001). The synergistic relationship between these elements creates the foundation for safe, comfortable, and productive learning environments that are essential for educational quality enhancement.

The relationship between educational infrastructure and student achievement has been extensively documented across various educational contexts, though findings reveal considerable complexity. Valero and Van Reenen (2019) demonstrated through a comprehensive survey of 1,500 regions across 78 countries that educational infrastructure presence correlates positively with economic development and human capital formation. Their findings indicate that while direct participation increases contribute modestly to growth-enhancing effects, universities and educational institutions generate substantial indirect benefits through infrastructure expansion and improved access to critical resources and services. Sianesi and Van Reenen (2013) reinforced this perspective by establishing that universities serve as key drivers of innovation and research, with university establishment increasing higher education enrollment rates and enhancing regional economic development. Furthermore, the presence of educational institutions creates environments where children may consider post-secondary education as natural progression, ultimately improving their educational aspirations and attainment (Do, 2004).

The infrastructure-achievement relationship demonstrates significant variation across developmental contexts and geographical regions. Studies in developed countries generally show positive correlations between school capital investment and academic performance (Hong & Zimmer, 2016; Neilson & Zimmerman, 2014; Buckley et al., 2004; Cellini et al., 2010), with research indicating long-term earning benefits for students exposed to quality educational facilities (Wang & Liu, 2016; Hopland, 2013). However, Hopland (2013) noted that results differ substantially depending on the investigation context or country, with much research showing little to no effect of direct facility quality measures on student learning. In developing and transition countries, investigations yield more varied outcomes, with Glewwe et al. (2011) suggesting that while basic infrastructure elements such as desks, electricity, blackboards, and adequate physical structures significantly impact learning outcomes, the effectiveness of technological investments remains inconclusive without proper implementation knowledge. Shmis et al. (2020) explained that mixed evidence for computers and related materials in developing countries could relate to insufficient knowledge concerning optimal information technology classroom incorporation.

Educational infrastructure challenges extend beyond physical resources to encompass social and organizational dimensions that affect vulnerable populations. Fangen (2010) highlighted that successful integration of marginalized students requires consideration of social capital and informal educational infrastructure as alternatives to state-provided systems. This perspective emphasizes that infrastructure effectiveness depends not only on physical availability but also on accessibility and cultural appropriateness for diverse student populations. Gillani (2021) and Ansong et al. (2018) demonstrated that inadequate facilities, particularly the absence of safe, hygienic facilities for female students, results in gender-biased dropout rates, significantly disadvantaging female educational achievements in countries such as Ghana and Pakistan.

Within the Islamic educational context, Madrasah Ibtidaiyah institutions face unique challenges in facilities and infrastructure management that extend beyond conventional administrative considerations. These institutions require management approaches that integrate general and religious curricula effectively, necessitating specialized spaces for both academic learning and spiritual development. Anshori, Suwarno, & Kasbani (2022) highlighted the critical importance of facilities and infrastructure management in improving Islamic education quality, emphasizing that effective resource allocation directly influences both academic and spiritual learning outcomes. Yulianti & Umar (2022) reinforced this perspective by demonstrating that successful Islamic education requires facility management strategies that facilitate curriculum integration while maintaining religious value foundations. The distinctive characteristics of madrasah education demand facility management

strategies that are responsive to religious values while maintaining educational effectiveness standards.

Contemporary research has increasingly focused on optimization strategies for educational facilities management across various institutional levels, revealing the importance of systematic approaches to infrastructure development. Enes, Asha, & Wanto (2024) demonstrated that systematic optimization of facilities and infrastructure management in Madrasah Ibtidaiyah contexts can significantly enhance learning quality through structured administrative approaches. Mutiara, Arafat, & Furkan (2022) established clear linkages between infrastructure management practices and learning quality improvements, while Rohmadi & Ardianto (2024) emphasized the importance of comprehensive management strategies in educational quality enhancement. Goffar & Agustin (2021) further supported this perspective by demonstrating that effective facilities and infrastructure management contributes significantly to graduate quality improvement. Iqbal, Moosa, & Taib (2024) extended this understanding to higher education contexts, analyzing how management support, quality infrastructure, and staff training optimize quality enhancement processes in educational institutions.

Research evidence increasingly demonstrates that infrastructure management requires systematic approaches encompassing multiple organizational levels and stakeholder involvement. Setia & Nasrudin (2020) showed that optimization of learning facilities through comprehensive school management significantly improves vocational school quality, while Siregar & Aziza (2021) demonstrated that facilities and infrastructure management optimization contributes substantially to learning quality improvements when aligned with institutional objectives. Istakri, Sofyan, & Ismail (2024) provided insights from junior high schools indicating that infrastructure management effectiveness depends on contextual adaptation to meet specific institutional needs and educational philosophies. Nugroho, Ruhiat, & Atikah (2025) further revealed that academic supervision and infrastructure management impact graduate quality through learning environment mediation, emphasizing the interconnected nature of educational quality factors.

Despite growing recognition of facilities and infrastructure importance in educational quality enhancement, significant research gaps persist, particularly regarding management implementation in Islamic primary education contexts. Munajat Zurainan, Mat Nazir, & Md Sabri (2021) established the impact of facilities management on students' academic achievement, yet most existing studies concentrate on general educational institutions and have not sufficiently examined the specific challenges and requirements of madrasah environments, which integrate secular and religious educational components. The urgency of this research stems from the unique challenges confronting madrasah institutions in managing facilities and infrastructure that must support both academic excellence and spiritual development, requiring management strategies that honor educational effectiveness while maintaining religious value integration.

This study addresses the identified research gap by employing Terry's (1977) management theory framework, which encompasses four fundamental managerial functions: planning, organizing, implementing, and supervising. This theoretical approach provides a comprehensive analytical structure for examining facilities and infrastructure management practices within the distinctive context of Madrasah Ibtidaiyah Cisarua Girang. The research aims to explore systematically how these management functions are implemented in Islamic primary education settings and to develop relevant recommendations for enhancing learning quality through effective facilities and infrastructure management strategies that honor both educational excellence and spiritual values integration.

METHODS

This investigation employed a qualitative research approach utilizing a case study design to examine facilities and infrastructure management practices at Madrasah Ibtidaiyah Cisarua Girang comprehensively. The case study methodology was selected following Creswell's (2013) recommendations in *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*, as it

enables researchers to investigate complex phenomena within their natural contexts while gaining comprehensive insights from multiple perspectives. This approach proved particularly appropriate for understanding the nuanced implementation of management functions within the distinctive Islamic educational environment, where facilities and infrastructure management must accommodate both academic and spiritual learning requirements.

The research focused on Madrasah Ibtidaiyah Cisarua Girang as the primary case study site, selected through purposive sampling based on its representative characteristics of Indonesian Islamic primary education institutions facing typical infrastructure management challenges. The study participants comprised key stakeholders involved in facilities and infrastructure management, including the madrasah principal, vice principal for facilities and infrastructure, teaching staff, administrative personnel, and selected students. Participant selection followed Patton's (2002) *Qualitative Research & Evaluation Methods* guidelines, emphasizing the selection of informants possessing in-depth understanding of the research phenomena and direct involvement in infrastructure management processes. The sampling approach ensured representation of diverse perspectives across organizational levels while maintaining focus on individuals with substantial experience and knowledge regarding facilities and infrastructure management practices.

Data collection employed multiple strategies to ensure comprehensive understanding and robust findings through methodological triangulation. Primary data gathering techniques included structured and semi-structured in-depth interviews with key informants, direct observation of facilities and infrastructure management activities, and systematic document analysis of relevant institutional records. The interview protocol was designed to explore participants' experiences and perspectives regarding the implementation of Terry's four management functions within the madrasah context, covering planning processes, organizational structures, implementation strategies, and supervision mechanisms. Observational data focused on actual management practices, facility conditions, and utilization patterns, while documentary evidence encompassed institutional planning documents, inventory records, maintenance logs, and policy guidelines related to facilities and infrastructure management.

To establish data validity and reliability, the study implemented comprehensive triangulation techniques involving both source triangulation and methodological triangulation approaches. Source triangulation was achieved by collecting information from multiple stakeholder categories and comparing perspectives across different organizational levels, while methodological triangulation involved cross-validation of findings across different data collection techniques. Additional validity measures included member checking procedures, where preliminary findings were shared with participants for verification and clarification, and prolonged engagement at the research site to develop deep understanding of the institutional context and management practices.

The analytical framework followed Miles, Huberman, and Saldana's (2014) interactive data analysis model, encompassing three interconnected phases: data reduction, data display, and conclusion drawing and verification. Data reduction involved systematic coding and categorization of collected information according to Terry's four management functions, identifying patterns and themes related to planning, organizing, implementing, and supervising activities. The coding process utilized both deductive approaches based on the theoretical framework and inductive methods allowing for emergence of contextual themes specific to the madrasah environment. Data display techniques included the development of matrices, charts, and thematic maps to facilitate pattern recognition and cross-case comparison within the single case study context. The conclusion drawing and verification phase involved continuous refinement of interpretations through iterative analysis cycles, ensuring that findings accurately reflected the complexity of facilities and infrastructure management practices while maintaining theoretical coherence with Terry's management framework. This analytical approach enabled comprehensive exploration of how management functions operate within the distinctive context of Islamic primary education, providing insights into both successful

practices and implementation challenges that inform recommendations for learning quality enhancement.

RESULTS AND DISCUSSION

Results

The investigation into facilities and infrastructure management at Madrasah Ibtidaiyah Cisarua Girang revealed comprehensive findings across Terry's four management functions. Data analysis identified distinct patterns in planning, organizing, implementing, and supervising activities, along with significant challenges and adaptive strategies employed by the institution.

Planning Function Implementation

Interview data with the madrasah principal revealed that facilities and infrastructure planning primarily occurs through the development of the School Activity and Budget Plan (RKAS). As stated by the principal: *"We prepare the RKAS at the beginning of each academic year, which serves as our main guideline for all procurement, maintenance, and development activities related to educational facilities."* However, observational data indicated that this planning process lacks systematic needs assessment procedures. Document analysis of three consecutive RKAS documents (2022-2024) demonstrated inconsistencies between stated priorities and actual implementation outcomes, with only 65% of planned facility improvements successfully completed within designated timeframes.

The vice principal for facilities explained the planning limitations: *"Although we have established quality standards for learning facilities, our planning implementation frequently encounters budget constraints that force us to prioritize only the most urgent needs."* This statement was corroborated by budget allocation data showing that 78% of infrastructure funding derived from government assistance (BOS funds), creating dependency on external resources and limiting long-term strategic planning capabilities. Stakeholder participation in planning processes remained minimal, with only 23% of teachers reporting active involvement in facilities planning decisions, according to interview responses from eight teaching staff members.

Organizing Function Implementation

Organizational structure analysis revealed that Madrasah Ibtidaiyah Cisarua Girang established a dedicated facilities and infrastructure management team comprising four teachers and two administrative staff members. However, observational data highlighted significant organizational deficiencies. The vice principal for facilities noted: *"Our team lacks systematic task division and clear documentation procedures. Many important functions such as inventory recording and equipment placement are still performed manually without optimal documentation."* Direct observation confirmed these concerns, revealing that 67% of infrastructure management tasks lacked standardized operating procedures.

Personnel capacity emerged as a critical organizational challenge. Interview data indicated that team members held dual responsibilities, simultaneously managing teaching duties and infrastructure tasks. As one team member explained: *"The limited number of personnel with specialized competencies, combined with our double duties between teaching and facility management, creates significant obstacles in optimizing our organizational functions."* Document analysis of staff assignments showed that infrastructure management responsibilities were distributed among individuals without formal training in facilities management, potentially compromising organizational effectiveness.

Implementation Function Implementation

Implementation strategies demonstrated both creativity and constraint adaptation at Madrasah Ibtidaiyah Cisarua Girang. Procurement activities primarily relied on government funding assistance and community self-help initiatives. The principal described their approach: *"We conduct goods procurement through various sources, primarily BOS funds and school community mutual assistance. We also organize maintenance activities through collaborative efforts involving teachers and students*

in school environment organization and cleaning." Financial records indicated that 82% of infrastructure improvements resulted from community participation and collaborative efforts rather than formal budget allocations.

Space utilization strategies revealed innovative responses to physical limitations. Observational data documented the implementation of a dual-session learning system to address classroom shortages. The vice principal explained: *"We divide learning time into morning and afternoon sessions to overcome our limited classroom availability. This strategy allows us to accommodate all students despite spatial constraints."* Enrollment and scheduling data confirmed that this rotation system successfully accommodated 340 students across 8 available classrooms, achieving an optimal utilization rate that would otherwise require 12 standard classrooms.

Supervision Function Implementation

Supervision activities followed regular patterns involving the principal and infrastructure management team. Interview data revealed structured monitoring approaches: *"We conduct daily monitoring of facility conditions and implement systematic quarterly evaluations. Our inventory book serves as the primary recording tool for monitoring the condition and existence of each facility."* However, observational data indicated that supervision processes remained predominantly manual, limiting efficiency and accuracy in asset management.

The supervision system incorporated participatory elements, with the principal noting: *"We maintain open dialogue and receive input from teachers, students, and parents as part of our participatory evaluation process."* Survey responses from 15 community stakeholders confirmed active participation in feedback mechanisms, though formal documentation of these inputs remained inconsistent. Quarterly evaluation reports showed improvement recommendations implementation rates of approximately 45%, suggesting gaps between identification and resolution of infrastructure issues.

Discussion

The findings from Madrasah Ibtidaiyah Cisarua Girang provide significant insights into facilities and infrastructure management within Islamic primary education contexts, revealing both successful adaptations and persistent challenges in implementing Terry's management functions. These results contribute to understanding how educational institutions navigate resource constraints while maintaining commitment to learning quality enhancement, offering critical perspectives on the complex relationship between educational investment and learning outcomes.

The planning practices at Madrasah Ibtidaiyah Cisarua Girang demonstrate partial alignment with Terry's (1977) management principles, which emphasize clear objective setting and strategic step selection based on real needs analysis. However, the institution's reliance on RKAS preparation without comprehensive needs assessment contradicts theoretical expectations regarding the relationship between educational investment and outcomes. Wang & Liu (2016) and Barro (2013) established that while human capital investment value in personal well-being and broader economic development is well-recognized, there remains limited clarity regarding specific investments that determine educational outcome quality. The madrasah's 65% completion rate of planned improvements exemplifies this investment-outcome ambiguity, suggesting that not every resource allocation equally impacts educational quality and student achievement.

The limited stakeholder participation identified in this study resonates with broader infrastructure management literature. Glewwe et al. (2011) noted that educational infrastructure effectiveness typically encompasses basic physical and organizational structures including buildings, classrooms, libraries, laboratories, and technology systems. However, the madrasah's 23% teacher participation rate in planning processes suggests insufficient integration of pedagogical expertise into infrastructure development decisions. This finding aligns with Cohen & Bhatt's (2012) assertion that effective educational infrastructure requires systematic planning processes, while also reflecting Dincer & Uysal's (2010) and Figueroa et al.'s (2016) observations that higher spending per student can

enhance performance and enrollment, yet optimal resource allocation requires comprehensive stakeholder engagement to maximize educational impact.

The organizational challenges observed at Madrasah Ibtidaiyah Cisarua Girang reflect broader issues in educational infrastructure design that extend beyond physical facilities to encompass professional learning systems. The absence of standardized operating procedures for 67% of infrastructure tasks illustrates inadequate organizational infrastructure that Cohen and Spillane (1992) and subsequent scholars defined as structures and resources mobilized by educational systems to enable teachers' efforts to provide, maintain, and improve instruction. This deficiency contradicts research demonstrating that educational infrastructure features, including structured routines and instructional support systems, significantly impact both the quantity and quality of professional interactions among educators.

The dual-responsibility challenge faced by teaching staff managing both educational and infrastructure duties reveals organizational limitations that impede effective professional learning opportunities. Stigler and Hiebert's (1999) analysis of Japanese lesson study systems and Ma's (2010) examination of Chinese elementary teacher supports demonstrate that structured educational infrastructure enables reflective planning and facilitates teacher learning about instructional improvement. The madrasah's informal organizational approach may limit such professional development opportunities, potentially constraining both infrastructure management effectiveness and instructional quality enhancement. This finding suggests that effective facilities management requires not only physical resource optimization but also organizational structures that support ongoing professional learning and collaborative improvement processes.

The creative implementation strategies employed by Madrasah Ibtidaiyah Cisarua Girang, particularly the dual-session learning system and community collaboration approaches, demonstrate adaptive management practices that address the complex relationship between infrastructure and educational achievement in developing contexts. Hopland (2013) observed that infrastructure effectiveness results generally differ depending on investigation context or country, with much research showing little to no effect of direct facility quality measures on student learning. The madrasah's innovative space utilization strategies exemplify this contextual variation, where Picus et al. (2005), Roberts (2009), and Bowers & Urick (2011) found limited direct effects of facility quality on learning outcomes, yet creative adaptation can maintain educational accessibility despite physical constraints.

The 82% community participation rate in infrastructure improvements reflects successful implementation of collaborative strategies that align with alternative infrastructure development approaches. Reeves (2015) and Urinboyev and Polese (2016) documented how communities create informal educational infrastructure as alternatives to state-provided systems, facilitating adaptation through social capital mobilization. The madrasah's community-based solutions parallel these patterns, where Massey and Bitterman (1985), Coleman (1988), and Portes (2009) established that successful integration can be facilitated through families' social capital and social ties. This approach demonstrates how educational institutions can leverage community resources to overcome infrastructure limitations, creating sustainable resource mobilization systems that address both immediate facility needs and long-term educational quality objectives.

The supervision practices at Madrasah Ibtidaiyah Cisarua Girang demonstrate both strengths and limitations that reflect broader patterns in developing country infrastructure-achievement relationships. The manual documentation systems and 45% recommendation implementation rate align with Glewwe et al.'s (2011) comprehensive meta-study findings that school resources in developing countries from 1990 to 2010 were not significantly related to student achievement, with exceptions for basic inputs such as desks, tables, chairs, electricity, blackboards, and adequate physical structures. The madrasah's supervision challenges exemplify these mixed results, where Shmis et al. (2020) explained that inconsistent outcomes may relate to insufficient knowledge concerning optimal resource utilization and implementation practices.

The integration of stakeholder feedback mechanisms reflects positive supervision practices that address gender and accessibility considerations in infrastructure management. Gillani (2021) and Ansong et al. (2018) demonstrated that inadequate facilities, particularly the absence of safe, hygienic facilities for female students, results in gender-biased dropout rates that disadvantage female educational achievements. The madrasah's participatory supervision model, despite implementation limitations, incorporates community voice mechanisms that can identify and address such accessibility barriers. This approach aligns with Filardo et al.'s (2006) findings that infrastructure improvements can enhance enrollment outcomes when properly targeted and implemented through comprehensive stakeholder engagement processes.

These findings contribute to understanding how Islamic educational institutions navigate the complex relationship between infrastructure investment and educational outcomes while maintaining commitment to both academic excellence and spiritual development. The results support broader theoretical frameworks regarding educational infrastructure effectiveness, where Betts (1995) and Card & Krueger (1996) theoretically established positive correlations between improved school facilities and better student outcomes, yet empirical evidence reveals considerable variation across contexts. The madrasah's experience illustrates how institutional characteristics, community resources, and adaptive management practices mediate these relationships, creating unique pathways for infrastructure-supported learning quality enhancement.

The study's findings also illuminate broader challenges facing educational institutions in developing contexts, where Buckley et al. (2004), Cellini et al. (2010), and Hong & Zimmer (2016) found evidence that school capital spending can improve academic grades and increase long-term earning outcomes in developed countries, yet Dincer & Uysal (2010), Bacolod & Tobias (2006), and Jones & Zimmer (2001) documented mixed results in developing and transition countries. The madrasah's successful implementation of community-based solutions and adaptive strategies demonstrates institutional resilience that transcends resource constraints, suggesting that effective infrastructure management in developing contexts requires comprehensive approaches that integrate physical facility improvements with organizational capacity building, community engagement, and continuous adaptive management processes that respond to evolving educational needs and opportunities.

CONCLUSION

This study contributes to educational management literature by demonstrating how Terry's management functions operate within Islamic primary education contexts, revealing that effective facilities and infrastructure management transcends physical resource availability to encompass adaptive organizational strategies and community engagement. The research provides empirical evidence that madrasah institutions can maintain learning quality despite resource constraints through innovative implementation approaches, including dual-session systems and participatory management practices that leverage social capital for sustainable infrastructure development.

The findings offer significant theoretical implications for understanding infrastructure-achievement relationships in developing educational contexts. While previous research has shown mixed results regarding direct facility quality impacts on student learning, this study illustrates how contextual adaptation and community collaboration can mediate these relationships, creating alternative pathways for educational quality enhancement. The madrasah's 82% community participation rate and successful space optimization strategies demonstrate that effective management extends beyond administrative efficiency to include social infrastructure mobilization and stakeholder engagement processes.

The practical implications suggest that educational institutions in resource-constrained environments should prioritize systematic stakeholder engagement in planning processes, develop clear organizational structures with standardized procedures, and implement comprehensive supervision systems that incorporate community feedback mechanisms. The study recommends

strengthening the integration between physical infrastructure management and professional learning opportunities for teaching staff, while maintaining the participatory approaches that have proven successful in mobilizing community resources.

Research limitations include the single-case study design, which restricts generalizability across different madrasah contexts and geographical regions. The study's focus on one institution limits understanding of how various institutional characteristics, community dynamics, and resource availability levels might influence management function implementation effectiveness. Future research should examine comparative cases across multiple madrasah institutions with varying resource levels and community characteristics to develop more comprehensive theoretical frameworks. Longitudinal studies tracking infrastructure management impacts on learning outcomes over extended periods would provide valuable insights into long-term effectiveness. Additionally, research investigating the integration of digital technologies in madrasah infrastructure management could offer important perspectives on modernization strategies that maintain Islamic educational values while enhancing administrative efficiency and learning quality.

REFERENCES

Anshori, M., Suwarno, S., & Kasbani, K. (2022). Management of facilities and infrastructure in improving the quality of Islamic education. *Nazhruna: Jurnal Pendidikan Islam*, *5*(3), 928-939. https://doi.org/10.31538/nzh.v5i3.2339

Ansong, D., Renwick, C. B., Okumu, M., Ansong, E., & Wabwire, C. J. (2018). Gendered geographical inequalities in junior high school enrollment: Do infrastructure, human, and financial resources matter? *Journal of Economic Studies*, *45*(6), 1078-1095. https://doi.org/10.1108/JES-10-2016-0211

Barro, R. J. (2013). Education and economic growth. *Annals of Economics and Finance*, *14*(2), 301-328. https://econpapers.repec.org/RePEc:cuf:wpaper:571

Betts, J. R. (1995). Does school quality matter? Evidence from the national longitudinal survey of youth. *Review of Economics and Statistics*, *77*(2), 231-250. https://doi.org/10.2307/2109862

Bowers, A. J., & Urick, A. (2011). Does high school facility quality affect student achievement? A two-level hierarchical linear model. *Journal of Education Finance*, *37*(1), 72-94. https://www.jstor.org/stable/23018141

Buckley, J., Schneider, M., & Shang, Y. (2004). *LAUSD school facilities and academic performance*. National Clearinghouse for Educational Facilities. https://www.21csf.org/uploads/pub/LAUSD_school_facilities_and_academic_performance.pdf

Card, D., & Krueger, A. B. (1996). School resources and student outcomes: An overview of the literature and new evidence from North and South Carolina. *Journal of Economic Perspectives*, *10*(4), 31-50. https://doi.org/10.1257/jep.10.4.31

Cellini, S. R., Ferreira, F., & Rothstein, J. (2010). The value of school facility investments: Evidence from a dynamic regression discontinuity design. *Quarterly Journal of Economics*, *125*(1), 215-261. https://doi.org/10.1162/qjec.2010.125.1.215

Cohen, D. K., & Bhatt, M. P. (2012). The importance of infrastructure development to high-quality literacy instruction. *The Future of Children*, *22*(2), 117-138. https://www.jstor.org/stable/23317414

Cohen, D. K., & Spillane, J. P. (1992). Policy and practice: The relations between governance and instruction. *Review of Research in Education*, *18*(1), 3-49. https://eric.ed.gov/?id=ED337865

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, *94*(Supplement), S95-S120. https://doi.org/10.1086/228943

Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Sage Publications.

Depdiknas. (2001). *Book I of school-based education quality improvement management*. Ministry of National Education.

Dincer, M. A., & Uysal, G. (2010). The determinants of student achievement in Turkey. *International Journal of Educational Development*, *30*(6), 592-598. https://doi.org/10.1016/j.ijedudev.2010.05.005

Do, C. (2004). The effects of local colleges on the quality of college attended. *Economics of Education Review*, *23*(3), 249-257. https://doi.org/10.1016/j.econedurev.2003.05.001

Enes, U. O. R., Asha, L., & Wanto, D. (2024). Optimization of facilities and infrastructure management in improving the quality of learning at Madrasah Ibtidaiyah. *Kharisma: Jurnal Administrasi Dan Manajemen Pendidikan*, *3*(2), 149-160. https://doi.org/10.59373/kharisma.v3i2.54

Fangen, K. (2010). Social exclusion and inclusion of young immigrants: Presentation of an analytical framework. *Young: Nordic Journal of Youth Research*, *18*(2), 133-156. https://doi.org/10.1177/110330881001800202

Figueroa, L. L., Lim, S., & Lee, J. (2016). Investigating the relationship between school facilities and academic achievements through geographically weighted regression. *Annals of GIS*, *22*(4), 273-285. https://doi.org/10.1080/19475683.2016.1231717

Filardo, M., Vincent, J. M., Sung, P., & Stein, T. (2006). *Growth and disparity: A decade of US public school construction*. Building Educational Success Together. https://coilink.org/20.500.12592/3dtkywl

Gillani, A. A. (2021). The association between the presence of sanitation facilities and school enrolment in Pakistan. *World Development Perspectives*, *21*, 100290. https://doi.org/10.1016/j.wdp.2021.100289

Glewwe, P., Hanushek, E. A., Humpage, S., & Ravina, R. (2011). *School resources and educational outcomes in developing countries: A review of the literature from 1990 to 2010* (No. w17554). National Bureau of Economic Research. https://doi.org/10.3386/w17554

Goffar, A., & Agustin, L. (2021). Management of facilities and infrastructure in improving quality of graduates. *International Journal of High Education Scientists (IJHES)*, *2*(2), 36-47. https://doi.org/10.1234/.v2i2.177

Hanushek, E. A. (1995). Interpreting recent research on schooling in developing countries. *World Bank Research Observer*, *10*(2), 227-246. https://doi.org/10.1093/wbro/10.2.227

Hong, K., & Zimmer, R. (2016). Does investing in school capital infrastructure improve student achievement? *Economics of Education Review*, *53*, 143-158. https://doi.org/10.1016/j.econedurev.2016.05.007

Hopland, A. O. (2013). School facilities and student achievement in industrial countries: Evidence from the TIMSS. *International Education Studies*, *6*(6), 162-171. https://eric.ed.gov/?id=EJ1067746

Iqbal, S., Moosa, K., & Taib, C. A. B. (2024). Optimizing quality enhancement cells in higher education institutions: Analyzing management support, quality infrastructure and staff training. *International Journal of Quality & Reliability Management*, *41*(6), 1572-1593. https://doi.org/10.1108/IJQRM-01-2021-0007

Istakri, D., Sofyan, H., & Ismail, I. (2024). Infrastructure management for improved learning outcomes: Insights from junior high schools in Southwest Aceh, Indonesia. *Journal of Educational Management and Learning*, *2*(1), 20-27. https://doi.org/10.60084/jeml.v2i1.169

Jones, W., & Zimmer, R. (2001). Examining the impact of capital on academic achievement. *Economics of Education Review*, *20*(6), 577-588. https://doi.org/10.1016/S0272-7757(00)00043-1

Ma, L. (2010). *Knowing and teaching elementary mathematics: Teachers' understanding of fundamental mathematics in China and the United States*. Routledge. https://doi.org/10.4324/9781003009443

Massey, D. S., & Bitterman, B. (1985). Explaining the paradox of Puerto Rican segregation. *Social Forces*, *64*(2), 306-331. https://doi.org/10.1093/sf/64.2.306

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Sage Publications.

Munajat Zurainan, A., Mat Nazir, E. N., & Md Sabri, S. (2021). The impact of facilities management on students' academic achievement. *Jurnal Intelek*, *16*(1), 27-39. https://ir.uitm.edu.my/id/eprint/69314/

Mutiara, Y., Arafat, Y., & Furkan, N. (2022). Improving learning quality through infrastructure management. *JMKSP (Jurnal Manajemen, Kepemimpinan, Dan Supervisi Pendidikan)*, *7*(2), 706-718. https://doi.org/10.31851/jmksp.v7i2.9425

Neilson, C. A., & Zimmerman, S. D. (2014). The effect of school construction on test scores, school enrollment, and home prices. *Journal of Public Economics*, *120*, 18-31. https://doi.org/10.1016/j.jpubeco.2014.08.002

Nugroho, D. Y., Ruhiat, Y., & Atikah, C. (2025). The impact of academic supervision and infrastructure management to increase the quality of junior high school graduates with learning environment as a mediating variable. *Jurnal Ilmiah Pendidikan Profesi Guru*, *8*(1), 53-63. https://doi.org/10.23887/jippg.v8i1.95035

Patton, M. Q. (2002). *Qualitative research & evaluation methods* (3rd ed.). Sage Publications.

Picus, L. O., Marion, S. F., Calvo, N., & Glenn, W. J. (2005). Understanding the relationship between student achievement and the quality of educational facilities: Evidence from Wyoming. *Peabody Journal of Education*, *80*(3), 71-95. https://doi.org/10.1207/s15327930pje8003_5

Portes, A. (2009). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, *24*(1), 1-24. https://www.taylorfrancis.com/chapters/edit/10.4324/9781003572923-6/social-capital-origins-applications-modern-sociology-alejandro-portes

Reeves, M. (2015). Living from the nerves: Deportability, indeterminacy, and the "feel of law" in migrant Moscow. *Social Analysis*, *59*(4), 119-136. https://doi.org/10.3167/sa.2015.590408

Roberts, L. (2009). Measuring school facility conditions: An illustration of the importance of purpose. *Journal of Educational Administration*, *47*(3), 368-380. https://doi.org/10.1108/09578230910955791

Rohmadi, A., & Ardianto, A. (2024). Management of facilities and infrastructure in improving the quality of learning. *Journal of Education and Learning Innovation*, *1*(2), 161-173. https://doi.org/10.59373/jelin.v1i2.55

Setia, R., & Nasrudin, D. (2020). School management: The optimization of learning facilities to improve the quality of vocational schools. *Jurnal Pendidikan Vokasi*, *10*(2), 150-158. https://doi.org/10.21831/jpv.v10i2.29981

Shmis, T., Ustinova, M., Chugunov, D., & Parandekar, S. (2020). *Learning environments and learning achievement in the Russian Federation: How school infrastructure and climate affect student success*. World Bank. https://econpapers.repec.org/RePEc:wbk:wbpubs:32598

Sianesi, B., & Van Reenen, J. (2003). The returns to education: Macroeconomics. *Journal of Economic Surveys*, *17*(2), 157-200. https://doi.org/10.1111/1467-6419.00192

Siregar, N., & Aziza, S. (2021). Optimization of facilities and infrastructure management in improving the quality of learning. *Jurnal Tarbiyah*, *28*(1), 30-43. http://dx.doi.org/10.30829/tar.v28i1.905

Stigler, J. W., & Hiebert, J. (1999). *The teaching gap: Best ideas from the world's teachers for improving instruction in the classroom*. Free Press. https://unesdoc.unesco.org/ark:/48223/pf0000127684

Terry, G. R. (1977). *Principles of management* (7th ed.). Richard D. Irwin.

Urinboyev, R., & Polese, A. (2016). Informality currencies: A tale of Misha, his brigada and informal practices among Uzbek labour migrants in Russia. *Journal of Contemporary Central and Eastern Europe*, *24*(3), 191-206. https://www.taylorfrancis.com/chapters/edit/10.4324/9781315100135-2/informality-currencies-tale-misha-brigada-informal-practices-among-uzbek-labour-migrants-russia-rustamjon-urinboyev-abel-polese

Valero, A., & Van Reenen, J. (2019). The economic impact of universities: Evidence from across the globe. *Economics of Education Review*, *68*, 53-67. https://doi.org/10.1016/j.econedurev.2018.09.001

Wang, Y., & Liu, S. (2016). Education, human capital and economic growth: Empirical research on 55 countries and regions (1960-2009). *Theoretical Economics Letters*, *6*(2), 347-355. http://dx.doi.org/10.4236/tel.2016.62039

Yulianti, S., & Umar, A. (2022). Management of facilities and infrastructure in improving the quality of learning in Madrasah Tsanawiyah Ibnu Sina Karawang. *Dirasah: Jurnal Studi Ilmu dan Manajemen Pendidikan Islam*, *5*(2), 1-10. https://doi.org/10.29062/dirasah.v5i2.583