

Innovative Strategies in the Maintenance of Educational Facilities and Infrastructure: A Case Study at An-Nur Tangkit Islamic Boarding School in Jambi

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Abstract: This study aims to analyze innovative strategies in the maintenance of educational facilities and infrastructure at the An-Nur Tangkit Islamic Boarding School in Jambi. The increasingly complex maintenance needs due to the growing number of students necessitate a more effective, efficient, and sustainable management approach. This study uses a qualitative approach through observation, in-depth interviews, and documentation studies. The data were analyzed descriptively through the stages of data reduction, data presentation, and conclusion drawing. The results showed that there were three main strategies implemented by the boarding school. First, a scheduled mutual assistance system involving students, teachers, and leader in routine maintenance activities. The implementation of this strategy has been proven to significantly reduce the frequency of damage, improve the condition of assets to be much more livable and well-maintained, and result in considerable savings in maintenance costs. Second, collaboration with committees and alumni through material support, expert personnel, and technical activities such as painting dormitories by alumni during student holidays. This strategy not only improves the physical condition of the facilities but also strengthens a sense of ownership, emotional attachment, and the sustainability of the maintenance program. Third, collaboration with the surrounding community through monthly community service, renovations, and self-funded repairs of internal roads in the pesantren. This community involvement creates strong social capital and supports the creation of a more organized pesantren environment. The research findings show that the implementation of innovative participation-based strategies has a positive impact on maintenance effectiveness, cost efficiency, improvement of santri skills, and strengthening of social relations between the pesantren and the surrounding community. In addition to increasing the resilience and lifespan of assets, this strategy also fosters a sense of collective responsibility that forms the basis for sustainable maintenance in the pesantren environment. This study concludes that the participatory maintenance model can be an effective alternative for infrastructure management in educational institutions, especially pesantren with limited resources.

Keywords: Innovative strategies, infrastructure maintenance, Islamic boarding school education, participation.

Introduction

Quality education generally comes from schools or educational institutions that have good management quality, one of which is characterized by complete facilities that are able to support the learning process optimally (Fikri dan Syahrani 2022). However, the existence of adequate facilities alone is not enough; planned and sustainable maintenance is also needed so that existing facilities and infrastructure remain usable and able to meet learning needs to the maximum extent possible (Parno dan Rahayuningsih 2025).

The maintenance of educational facilities and infrastructure plays a very strategic role in supporting the sustainability of the teaching and learning process, especially in Islamic boarding schools, which have unique, heterogeneous, and complex characteristics in terms of both management and institutional culture (Ningtyas dkk. 2025). The existence of adequate and well-maintained facilities is not only important to support the effectiveness of learning activities but also contributes to the creation of a safe, clean, comfortable, and conducive educational environment for the intellectual, emotional,

spiritual, and character development of students (Sunardi dan Halimatuzzahrah 2025). In the context of Islamic boarding schools, the condition of facilities and infrastructure also reflects the quality of educational services and the institution's commitment to providing quality Islamic education.

Islamic boarding schools often face specific challenges in maintaining facilities and infrastructure, particularly related to budget constraints and a lack of professionals in the technical field (Suhaili, Remiswal, dan Sabri 2025). aints and a lack of professionals in the technical field (Suhaili, Remiswal, and Sabri 2025) . This situation is exacerbated by the fact that maintenance that relies entirely on third-party services requires considerable costs, so it cannot always be carried out regularly by Islamic boarding schools. In this situation, conventional maintenance approaches, which tend to be reactive and costly, are often unable to address the complex needs of Islamic boarding schools, which continue to grow. Therefore, more innovative and adaptive strategies are needed, both in terms of cost efficiency and the involvement of all elements of the Islamic boarding school community. This approach includes the development of a participatory maintenance system that utilizes the potential of students, teachers, alumni, and the surrounding community in a structured manner to support the sustainability of facilities. In addition to optimizing local resources, this participatory strategy also fosters a sense of ownership and collective responsibility for the boarding school's facilities and infrastructure, so that maintenance can be carried out in a more planned, sustainable, and modern manner (Riyadi 2025).

An-Nur Tangkit Islamic Boarding School in Jambi is one of the Islamic educational institutions that has shown an interesting initiative in developing innovative and participatory-based strategies for maintaining facilities and infrastructure. This pesantren implements various creative approaches that involve students, alumni, leader, and the surrounding community in the maintenance process. The uniqueness of the strategies developed makes An-Nur Tangkit Islamic Boarding School a relevant object of study to understand how community-based participatory

innovation can be integrated into the maintenance system of educational facilities and infrastructure.

Although the importance of facility and infrastructure maintenance has been widely discussed in educational management literature, in-depth studies on innovative strategies developed contextually by Islamic boarding schools are still limited. In particular, understanding how stakeholder collaboration can be integrated into an effective and sustainable maintenance model still requires further exploration. The case study at the An-Nur Tangkit Islamic Boarding School in Jambi is expected to fill this knowledge gap and provide practical contributions to the development of a maintenance model that can be adopted by similar educational institutions.

Based on this background, this study aims to identify and analyze the innovative strategies implemented by the

An-Nur Tangkit Islamic Boarding School in Jambi in maintaining the sustainability, efficiency, and quality of educational facilities and infrastructure, as well as exploring how collaboration, innovation based on local wisdom, and the use of appropriate technology can be effective models in the maintenance of educational facilities and infrastructure in Islamic boarding schools.

Materials and Methods

This research is qualitative research with a case study approach (Yin 2018). Qualitative research is a type of research that aims to deeply understand various phenomena experienced by research subjects, such as behavior, perceptions, motivations, and actions as a whole. This approach is presented through descriptions in the form of words and language, takes place in a natural context, and utilizes various scientific methods (Moleong 2010). Data sources were obtained through observation, interviews, and documentation. Data was found through observation, where researchers directly observed the research location (Cholid Narbuko dan Abu Achmadi 2010), particularly regarding the condition of educational facilities and infrastructure, the ongoing maintenance process, and the innovative strategies applied at the An-Nur

Tangkit Islamic Boarding School in Jambi. The researchers observed scheduled mutual assistance activities, the use of simple technology to monitor asset conditions, and the involvement of students, alumni, leader, and the surrounding community in the maintenance process. Furthermore, in-depth interviews were conducted with the boarding school administrators, particularly those responsible for the maintenance of facilities and infrastructure, teachers, students and alumni who were actively involved, as well as community representatives who participated in maintenance activities after obtaining approval from An-Nur Tangkit Jambi Islamic Boarding School leader. The data analysis technique used was the interactive model analysis technique by Miles and Huberman (Sugiyono 2011). Interactive model analysis includes three important components, namely data reduction, data presentation, and conclusion drawing.

Results and Discussion

Profile of An-Nur Tangkit Islamic Boarding School in Jambi

An-Nur Tangkit Islamic Boarding School is an Islamic educational institution located in Muaro Jambi Regency, Jambi Province. This boarding school provides formal and non-formal education with the number of students continuing to grow each year. The facilities and infrastructure include student dormitories, study rooms, a mosque, a library, an administration office, sports facilities, and various other supporting facilities. Based on observations and interviews with the boarding school management, the existing facilities and infrastructure require ongoing maintenance to support an optimal learning process. The increasingly complex maintenance requirements have prompted the boarding school to develop innovative strategies that involve the active participation of all components of the boarding school and the surrounding community.

Table 1. Condition of Facilities and Infrastructure at An-Nur Tangkit Islamic Boarding School in Jambi

No	Type of Facilities and Infrastructure	Quantity	Condition
1	Student Dormitory Building	4 units	Good
2	Study Room	13 rooms	Good
3	Mosque	1 unit	Very Good
4	Library	1 unit	Good
5	Administration Office	2 units	Good
6	Toilet facilities	12 units	Good
7	Sports field	6 units	Fair
8	Public Kitchen	1 unit	Good

The table above shows that most of the facilities and infrastructure are in good condition, indicating the effectiveness of the maintenance strategy implemented. This condition is inseparable from the implementation of various innovative

participatory-based strategies involving students, alumni, leader, and the surrounding community.

Innovative Participatory-Based Strategies Collaboration between Students, Teachers, and Leader (Internal)

Internal collaboration between students, teachers, and leader is one of the innovative strategies that plays a significant role in the maintenance of educational facilities and infrastructure at the An-Nur Tangkit Islamic Boarding School in Jambi. This pattern of cooperation is not only in the form of task sharing, but also in strengthening the collective awareness that maintaining the boarding school facilities is a shared responsibility. Through structural and cultural synergy, the maintenance process can be carried out sustainably without always having to rely on outside assistance. This has become a distinctive feature of Islamic boarding schools, where the values of mutual cooperation, discipline, and trustworthiness are part of the education system itself (Amirudin dkk. 2025).

The role of the ustadz as a mentor is crucial to the effectiveness of this collaboration. The ustadz is not only a teacher but also a mentor who guides the santri in maintaining cleanliness and caring for classroom facilities, dormitories, and worship areas (Suparlan 2006). Through an exemplary approach, ustadz encourage students to understand the importance of well-maintained facilities in supporting the teaching and learning process. This is done because the exemplary method is a very effective approach in the Islamic education process. This approach is based on human nature, which naturally tends to imitate and follow the behavior of those around them (Sodikin, Mujahidin, dan Samsuddin 2025). The ustadz also acts as a communication liaison who conveys the aspirations of the santri to the leader, regarding the need for repairs or maintenance of certain facilities.

The pesantren leader, as the highest authority, provides strategic direction in this collaboration (Ruslan dan Khaudli 2025). The leader not only sets policies on the management of facilities and infrastructure, but also develops a culture of care through instructions, examples, and deliberative mechanisms. Leader policies, such as establishing duty rosters, appointing persons in charge of specific areas, and conducting routine evaluations of facility conditions, serve as guidelines for teachers and students in carrying out their respective duties. Participatory and open leadership

from the leader allows every facility issue to be responded to quickly and appropriately, so that maintenance runs efficiently

On the students' side, their participation is an element that strengthens the success of this innovative strategy. Students are not only involved in daily cleaning activities, but also become part of small units that manage specific areas, such as gardens, classrooms, kitchens, or dormitories. This direct involvement fosters a sense of belonging, motivating students to maintain facilities with greater discipline (Maria, Sudarso, dan Perangin-Angin 2023). In addition, mutual cooperation activities at certain times, such as before exams or the arrival of guests to the boarding school, strengthen the value of togetherness while ensuring that facilities are in optimal condition.

Overall, the collaboration between students, teachers, and leader at the An-Nur Tangkit Islamic Boarding School in Jambi is an innovative strategy that supports the sustainable maintenance of educational facilities and infrastructure. Through clear coordination, effective division of roles, and a strong culture of caring, the boarding school is able to keep its facilities decent, clean, and functional. This strategy not only saves maintenance costs but also contributes to the development of students' character, fostering responsibility, environmental awareness, and a habit of collaboration—values that are at the core of boarding school education itself.

Collaboration with Committees and Alumni (External)

The second strategy that is an important part of the effort to maintain facilities and infrastructure at the An-Nur Tangkit Islamic Boarding School in Jambi is the development of ongoing cooperation with committees and alumni. This collaboration emerged as the institution's response to the increasing maintenance needs due to the growing number of students and the intensity of facility use. Alumni play a strategic role because they not only understand the culture and needs of the pesantren, but also have strong emotional ties that make it easier to mobilize them to contribute to the maintenance of the pesantren environment (Ningsih dan Mustakim 2019).

This cooperation is manifested in various forms of material and non-material support. The

committee provides assistance in the form of repair materials and financial support allocated for the maintenance of certain facilities, while alumni contribute through direct involvement in technical activities that cannot be handled by the pesantren management on a regular basis. Forms of alumni support range from minor repairs to donations of work tools. The presence of alumni in these maintenance activities creates a mutually beneficial relationship: the pesantren is assisted in maintaining the quality of its facilities, while alumni can continue to maintain their relationship with and contribution to the institution that raised them.

One concrete form of alumni contribution found in this study is the voluntary painting of student dormitories during holidays. When students are not in the pesantren environment, alumni use this time to repaint dormitory rooms and walls that have begun to fade or deteriorate. This activity is usually coordinated by representatives of a particular alumni class and carried out collaboratively over several days. In addition to improving the physical appearance of the dormitory, this painting activity also helps maintain the condition of the building so that it remains well-maintained and usable when students return at the beginning of the semester.

Through this structured collaboration, the role of the committee and alumni is not merely that of additional supporters, but has become an integral part of the boarding school's facility and infrastructure maintenance system. Their involvement helps the boarding school maintain the sustainability of facility maintenance without having to rely entirely on internal resources. In addition, this collaboration model strengthens a sense of shared ownership of the boarding school and encourages the creation of a culture of caring for sustainable facilities.

Collaboration with the Surrounding Community

The third strategy that is key to the success of facility maintenance at the An-Nur Tangkit Islamic Boarding School in Jambi is collaboration involving the surrounding community. Community involvement is an important aspect because the pesantren not only functions as an educational institution but also as an integral part of the social life of the surrounding community (Nashirah dkk.

2025). Therefore, community support contributes significantly to maintaining the sustainability of the pesantren's facilities and infrastructure.

This collaboration is realized through various forms of activities that take place regularly or incidentally. One of the main activities is a joint community service carried out every month. Through this activity, the community and pesantren administrators work together to clean the environment, tidy up the yard, and handle minor repairs. This mutual cooperation activity not only helps ease the burden on the pesantren but also strengthens the social relationship between the pesantren and the villagers.

The interviews showed that the surrounding community has a strong sense of belonging to the Islamic boarding school. This is reflected in the statement by Heri Sumarsono, a local resident, who said, "We are happy to help the Islamic boarding school because its existence is very beneficial for our children. By helping to take care of it, we feel that it also belongs to us all." This statement shows that community participation is not merely physical involvement, but also a form of strong concern and sense of ownership towards the existence of the Islamic boarding school (Suparjan dan Suyatno 2003).

In addition to community service, the community is also involved in various large-scale improvements. This involvement includes renovating damaged buildings and repairing roads within the pesantren. These contributions are often made through self-help or cooperation between community leaders, parents of students, and the pesantren so that the maintenance process can run more effectively and efficiently.

Results of Strategy Implementation

The implementation of this mutual assistance system has proven to be very effective in reducing maintenance operational costs. Based on the pesantren's budget documentation, there have been savings compared to the period before this system was implemented. These savings were achieved because most of the minor to moderate maintenance work could be done independently without having to use third-party services. The funds saved were

then allocated to improving the quality of learning and the welfare of the students.

Table 2. Comparison of Maintenance Costs Before and After Strategy Implementation

Aspect	before implementing the strategy	after implementing the strategy
Frequency of Major Repairs	Major repairs were carried out quite often and incurred high costs	Major repairs are rarely needed because routine maintenance is effective
Third-Party Involvement	Highly dependent on external services, with relatively high costs	External involvement has decreased as many tasks can be handled internally
Asset Condition	Some assets are in unstable condition and require special attention	Most assets are in good condition and better maintained
Participation of Students	Student involvement is low and incidental	Student involvement is very high and is part of the pesantren culture

These findings show that the scheduled mutual assistance system represents an adaptation of local wisdom in the context of modern management. Mutual assistance, as a social value that is deeply rooted in Indonesian culture, especially in Jambi, has been successfully transformed into a structured, scheduled maintenance system with measurable effectiveness (Bahri dkk. 2025). This indicates that local wisdom, when integrated through a structured and systematic management approach, can function as an innovative solution that has a higher level of contextual relevance and the potential to provide long-term sustainability.

More than just cost efficiency, this strategy also fosters a sense of responsibility and collective ownership of the pesantren environment. Santri are not only users of the facilities, but also share

responsibility for maintaining them. These values are in line with the principles of character education emphasized in the pesantren education system, where learning is not only cognitive but also involves experiential learning (Gunawan dkk. 2023).

Impact of Innovative Participation-Based Strategies on Sustainability and Maintenance Quality

The implementation of innovative participation-based strategies has had a significant positive impact on the sustainability, efficiency, and quality of facility and infrastructure maintenance at the An-Nur Tangkit Islamic Boarding School in Jambi.

Table 3. Comprehensive Impact of Innovative Strategy Implementation

Aspect	Indicator	Achievement	Description
Economy	Cost savings on maintenance	Significant	funds can be allocated for other needs
Economy	Budget efficiency	Increased	More accurate planning
Education	Student skills	Developing well	Basic repair skills
Sustainability	Asset Durability	Experiencing improvement	Increased service life
Sustainability	Sense of collective ownership	Very high	Shared responsibility

From an economic perspective, savings in maintenance costs have yielded significant results, enabling Islamic boarding schools to allocate some of their funds to improving the quality of learning, the welfare of students, and the development of other educational programs. Budget efficiency has also improved as the maintenance planning process has become more focused and accurate, allowing for more controlled and targeted use of funds. From a social perspective, the level of student participation in maintenance activities is very high, demonstrating a strong sense of ownership and collective responsibility for the boarding school's facilities and infrastructure. Students not only utilize the available facilities, but also feel obliged to maintain and care for them. Community support through regular volunteer activities further strengthens the social capital built between the boarding school and the surrounding community. From an educational perspective, the participatory maintenance strategy has had a tangible impact on strengthening the skills of the students. The majority of students have mastered basic repair skills, which are not only relevant to their daily lives at the pesantren but also beneficial to them in the future. Thus, the learning process does not only take place theoretically in the classroom but also through direct, practical experience. From a sustainability perspective, the quality and durability of infrastructure have shown significant

improvement, as maintenance is carried out consistently and systematically. Moreover, the growth of a strong sense of collective ownership has become the main foundation for the sustainability of this strategy. When all parties feel a sense of ownership and responsibility, maintenance is no longer the burden of certain individuals, but has developed into a shared practice that will be maintained in the long term.

Conclusions

The innovative participation-based strategy implemented by the An-Nur Tangkit Islamic Boarding School in Jambi has proven to be an effective and sustainable approach to the maintenance of educational facilities and infrastructure. Internal collaboration between students, teachers, and leader has created a structured, efficient maintenance system rooted in Islamic boarding school values such as trust, mutual cooperation, and exemplary behavior. Through clear coordination and a strong division of roles, the pesantren is able to keep its facilities functional without excessive dependence on outside parties. External cooperation with committees, alumni, and the surrounding community further strengthens the success of this maintenance system. Financial support, manpower, and active involvement from

these stakeholders create a network of solidarity that has a direct impact on improving the quality of pesantren facilities. Mutual cooperation, independent renovations, and voluntary contributions have proven to reduce maintenance costs while significantly extending the useful life of assets. In addition to providing economic efficiency, this strategy also has a positive impact on the character building of students. Through direct involvement in facility maintenance, students gain practical learning experiences, develop a sense of responsibility, and improve basic repair skills that are useful for their lives. The integration of local wisdom, educational values, and modern management principles makes this strategy not only contextually relevant but also sustainable in the long term.

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