

## PKM Application of QR Code Technology for Infrastructure Management at MTs Mambaul Hasan Sumberrejo Paiton Probolinggo

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**Abstract**— *The management of facilities and infrastructure at MTs Mambaul Hasan Sumberrejo Paiton Probolinggo is currently still done manually, resulting in various problems such as data entry errors, lost goods, and difficulties in tracking goods mutations. This manual process is not only time consuming but also reduces efficiency in inventory management. Therefore, this study aims to design and develop a QR Code-based facility and infrastructure management information system to improve the efficiency and effectiveness of facility and infrastructure management at MTs Mambaul Hasan. The research method used is the Research and Development (R&D) method with a quantitative approach and case studies. The research process begins with an analysis of system needs through direct observation and interviews with the school, followed by system design using the Object-Oriented Analysis and Design (OOAD) approach. Furthermore, a system prototype is developed and tested to obtain feedback from users. The final stage includes system evaluation based on the feedback to make improvements before full system implementation. The discussion plan in this study includes system needs analysis, architecture and user interface design, system prototype development, and evaluation of system effectiveness and efficiency through trials and interviews with end users. The results of this study are expected to provide effective solutions for the management of facilities and infrastructure at MTs Mambaul Hasan and become a reference for other educational institutions.*

**Keywords**— *training, QR Code, management system*

### 1 Introduction

MTs Mambaul Hasan Sumberrejo Paiton Probolinggo is an educational institution located in Probolinggo Regency, East Java. As a madrasah that prioritizes the quality of education, MTs Mambaul Hasan has various facilities and infrastructure to support teaching and learning activities. These facilities and infrastructure include classrooms, laboratories, libraries, sports facilities, and various other equipment and inventory items. Good management of facilities and infrastructure is very important to maintain the quality of a conducive learning environment and support the sustainability of educational activities in this madrasah.

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In its operational activities, MTs Mambaul Hasan faces several problems related to the management of facilities and infrastructure which can be described as follows:

a. Manual and Unstructured Data Collection of Goods

The management of facilities and infrastructure is currently carried out using a manual method, where data collection of goods and equipment is carried out conventionally using notebooks. This method is not only time consuming but also prone to data collection errors and difficulty in tracking information on goods. With a manual data collection system, there is often loss or damage to goods that are not detected quickly. This causes uncertainty in the inventory of goods and hinders the maintenance process and replacement of damaged goods.

b. Difficulty in Tracking Mutation Goods

The process of mutation of goods such as moving from one location to another is not well documented, causing difficulty in tracking the status of goods and delays in the administration process of mutation goods.

c. Lack of an Effective Reporting and Monitoring System

Currently, there is no integrated system to monitor and report the condition of facilities and infrastructure periodically. This results in reports on the condition of goods often being inaccurate and unaccountable.

d. Limited Level of Staff Technological Skills

Staff involved in the management of facilities and infrastructure have limited technological skills, making it difficult to adopt new technologies such as QR Codes for goods management and reporting.

To overcome these problems, this PKM offers a solution in the form of implementing QR Code technology for infrastructure management. QR Code technology will be integrated into the infrastructure management information system that has been designed, with a focus on:

a. Digitalization of Goods Data Collection

Transferring data collection from a manual system to a QR Code-based system that is more accurate and efficient.

b. Monitoring and Tracking of Goods

Providing a more effective tracking feature for transferred goods using QR Codes to facilitate monitoring and reporting.

c. Technology Skills Training

Providing training to staff to improve their skills in using the QR Code system and other information technology for managing facilities and infrastructure.

Through the implementation of QR Code technology and staff training, it is hoped that the problems faced by MTs Mambaul Hasan in managing facilities and infrastructure can be overcome. The QR Code system will improve the data collection process, reduce loss of goods, facilitate tracking of transferred goods, and improve staff technology skills. With this solution, it is hoped that the management of facilities and infrastructure at MTs Mambaul Hasan will become more efficient, effective, and structured.

## 2 Method

The implementation method of PKM is designed in the form of stages of activities involving various parties and determining success indicators and

implementation schedules. The following is a detailed explanation of each stage of PKM activities:

- a. Preparation and Planning  
This stage includes making an activity plan, initial coordination with MTs Mambaul Hasan, and scheduling PKM activities. The PKM team and the school will agree on an activity plan and implementation schedule to ensure that all parties are ready for the next stage.
- b. Needs Analysis and System Design  
Conducting a needs analysis to design a QR Code system and preparing training materials for staff. This activity involves the PKM team and school administration staff to ensure that the system design and training materials are in accordance with needs.
- c. QR Code System Installation  
This stage involves installing and configuring the QR Code system, as well as conducting initial trials to ensure the system is functioning properly. IT technicians and the PKM team will ensure the system is ready for use.
- d. Staff Training  
Holding training sessions for administration staff on how to use the QR Code system. This training aims to enable staff to manage infrastructure effectively using new technology.
- e. Implementation and Monitorin  
Implementing the QR Code system and monitoring its use. The PKM team will provide technical support to staff and monitor the use of the system to ensure successful implementation.
- f. Evaluation and Feedback  
Collect feedback from staff and evaluate the effectiveness of the QR Code system. The evaluation results will be used to improve the system if necessary.
- g. Preparation of the Final Report  
Prepare a final report that includes the evaluation results and recommendations for further development. This report will be submitted to MTs Mambaul Hasan and used as material for future PKM activities.

Partner participation in the implementation of this program involves the staff of MTs Mambaul Hasan's facilities and infrastructure. As well as members of KKN OBE who will provide training in improving understanding of the application of QR code technology for managing facilities and infrastructure at MTs Mambaul Hasan Sumberrejo Paiton Probolinggo

### **3 Findings And Discussion**

#### **3.1 Finding**

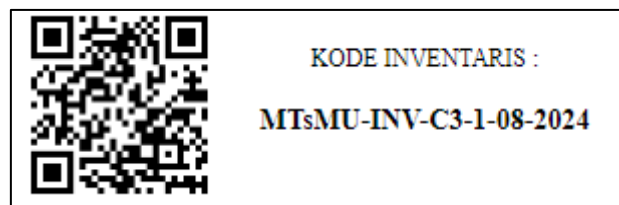
The implementation of Community Service (PKM) with the application of QR Code technology at MTs Mambaul Hasan Sumberrejo Paiton Probolinggo has provided quite significant results in the management of facilities and infrastructure.

The QR Code-based facility and infrastructure management system allows digital recording of goods, replacing the manual method previously used. Each item is labeled with a QR Code which functions as a unique identifier, allowing staff to scan and access detailed information related to the item quickly and accurately. The

implementation of this system has succeeded in reducing data recording errors and increasing the efficiency of the inventory process.



**Fig. 1.** Labeling goods with QR Code



**Fig. 2.** Inventory Code with QR Code

By using QR Code, the process of tracking the mutation of goods becomes easier and more transparent. Every mutation of goods can be recorded and tracked in real-time through QR Code scanning, allowing schools to monitor the movement of goods more effectively. This also makes it easier to prepare reports on the status and location of goods, which was previously difficult to do with a manual system.



**Fig. 3.** Recording of goods to be transferred

The implemented system is equipped with reporting and monitoring features that allow management to obtain real-time information on the condition and location of goods. Reports generated by this system help in making better decisions related to the management of facilities and infrastructure. In addition, this system provides easier and faster access to data, increasing transparency in school asset management.

Intensive training was given to the administrative staff of MTs Mambaul Hasan to ensure that they were able to operate the QR Code system properly. The training materials included how to use the QR Code application to enter goods data, track mutations, and generate reports. The results of this training showed a significant increase in the technological skills of the staff, who are now more competent in managing school assets using the new system.



**Fig. 4.** Madrasah Staff Training with TEAM

### 3.2 Discussion

The implementation of QR Code technology significantly increases the efficiency and accuracy of inventory recording. The manual system that was previously prone to errors and inefficiencies is now replaced by a more reliable digital system. The time required to conduct inventory of goods is drastically reduced, and the risk of errors in recording is almost completely eliminated. This shows that QR Code technology is an effective solution to the asset recording problems previously faced by schools.

One of the main advantages of a QR Code-based system is its ability to track the movement of goods more efficiently. Every item that is moved can be immediately updated in the system, and information about its location and movement history can be accessed directly. This makes it easier for staff to ensure that all assets are in their proper places, reducing the risk of loss or misplacement of goods.

The training provided not only focuses on mastering the QR Code system, but also improving staff's understanding of the importance of technology in managing facilities and infrastructure. This skill improvement is a long-term investment that will provide sustainable benefits, allowing schools to adapt more quickly to technological changes in the future.

Overall, the implementation of the QR Code-based management information system at MTs Mambaul Hasan has brought significant positive impacts. The management of facilities and infrastructure has become more structured, efficient, and transparent. With the support of this technology, the madrasah can ensure that the facilities and infrastructure owned are utilized optimally to support teaching and learning activities, which ultimately contributes to improving the quality of education at the madrasah.

#### **4 Conclusion**

Community Service (PKM) activities focusing on the application of QR Code technology for the management of facilities and infrastructure at MTs Mambaul Hasan Sumberrejo Paiton Probolinggo have provided significant results. The conclusion of this activity shows that the application of a QR Code-based management system is able to increase efficiency, accuracy, and transparency in data collection and tracking of facilities and infrastructure in the madrasah environment. The training provided to school staff has succeeded in improving their skills in operating this new technology, which has a direct positive impact on the quality of school asset management.

The implication of the success of this activity is that QR Code technology can be adapted more widely in various other educational institutions to overcome similar problems in the management of facilities and infrastructure. The system implemented not only speeds up the data collection process but also makes it easier to track mutations and prepare reports in real time.

However, the limitations of this activity lie in the limitations of the technological infrastructure and the initial skills of staff in using new technology. For further development, the recommendations provided include improving the technological infrastructure in the madrasah, organizing advanced training for staff, and periodic evaluation of the system that has been implemented. In addition, the development of a system that is more integrated with the specific needs of madrasahs will further increase the effectiveness of facility and infrastructure management in the future.

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