

Empowerment of TPQ through Integration of Digital Technology in Data Recording System and Monitoring of Student Learning Outcomes

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ABSTRACT

This report addresses the challenges faced by TPQ Awwalul Huda in managing student data and monitoring learning outcomes, highlighting the need for improved efficiency and parental involvement in the educational process. The primary objective of this study is to develop a web-based student data recording system that enhances data management and facilitates real-time monitoring of student progress. The methods employed include a comprehensive needs analysis, system design, implementation, and socialization of the new system to 12 teachers and approximately 80 parents. The findings indicate that the newly implemented system significantly improves the efficiency of data management, allowing for better tracking of student performance and attendance. Additionally, it fosters greater engagement from parents, enabling them to monitor their children's learning outcomes more effectively. The study concludes that integrating digital technology into the educational framework of TPQ Awwalul Huda not only enhances transparency and accountability in managing student data but also contributes to the overall improvement of educational quality. This initiative demonstrates the potential of digital solutions in addressing the challenges faced by non-formal educational institutions, ultimately leading to a more effective and participatory learning environment for students and their families.

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1. INTRODUCTION

1.1 Situational Analysis

Education is a fundamental need for every individual in the world that cannot be separated from humanity (Ellisia Kumalasari & Erika, 2018). Educational institutions serve as a platform for conducting the teaching and learning process, training, and development of their students (Ellisia Kumalasari, Erika,

& Mustikasari, 2017; Application of Artificial Intelligence, Yuli Astuti, & Kumalasari, 2022). Taman Pendidikan Qur'an (TPQ) is a non-formal educational institution that is independently managed by the community and serves as a support for religious education in formal educational institutions (kindergarten, elementary school, Islamic elementary school). TPQ activities are conducted in the afternoon/evening, which do not interfere with formal school hours (Muntoha, Jamroni, & Jabbar, 2015). The implementation of the Teaching and Learning Activities (KBM) is flexible according to the conditions of the administrators, teachers, and students within the TPQ (Adi Fajaryanto Cobantoro, Yovi Litanianda, & Ellisia Kumalasari, 2019). Generally, the teaching and learning activities in TPQ focus on Islamic religious education, particularly in reading and writing the Quran, as well as providing a basic understanding of faith and morals in social behavior according to Islamic teachings. Essentially, the target audience of TPQ includes all members of the community who wish to learn the Quran, both adults and children. However, the majority of participants in Quran learning activities at TPQ are usually children (Muntoha et al., 2015).

There are many TPQs in the Ponorogo area, one of which is TPQ Awwalul Huda. This TPQ is located in the village of Ngrukem, specifically on Jalan Parang Klitik, Dukuh Kedalon, Ngrukem Village, Mlarak District, Ponorogo Regency. TPQ Awwalul Huda conducts Quran reading and writing education for children not only in the surrounding area of Ngrukem but also in Tugu Village, Jorsan Village, and other villages within the same Mlarak sub-district. Currently, there are approximately 80 active students divided into classes from 1 to 6, while the number of teaching staff is 12. Below is a photo of the teachers and the learning process at TPQ Awwalul Huda presented in Figure 1.



Figure 1 Teachers of TPQ Awwalul Huda

Figure 2 shows the second-grade students of TPQ Awwalul Huda. The community service team conducted observations of the teaching and learning activities there and analyzed the academic situation (Amalia, Rachman, & Surahman, 2020) at the TPQ. Additionally, interviews were conducted with Mr. Sugeng Mahmudi, the head of TPQ Awwalul Huda, resulting in the following data:

1. TPQ Awwalul Huda has a committed and experienced teaching staff in Quran education. The teachers at TPQ possess proficient skills and are adept at operating computers.
2. The TPQ is located in Ngrukem village, situated centrally and surrounded by other villages, allowing children who wish to learn about Islam and the Quran to study at this TPQ. Given this situation, the TPQ has the potential to become a community activity center focused on Quran education.
3. All teachers and guardians of the students have smartphones. Currently, information related to student learning is communicated only through a WhatsApp group. There is no media in place that facilitates guardians in monitoring their children's activities.

4. Attendance is still recorded conventionally, using manual paper-based attendance sheets. Additionally, the recording of student data from grades 1 to 6 is also conventional and noted in a ledger. This presents a risk, as student data is vulnerable to loss. Furthermore, documentation of TPQ activities is not well organized, there are limited ICT facilities, student achievement data is managed manually, and there is no existing database for students and teachers at the TPQ (Risqi Ekanti Ayuningtyas Palupi, Pranoto Suryo Herbanu, S.T., Danik Riawati, S.S.T., Veronia, & Sihombing, 2022).



Figure 2 Second-grade students of TPQ Awwalul Huda

From the results of the observations and situational analysis during discussions with the partner organization, TPQ Awwalul Huda (Figure 3), several issues have been identified, including:

1. The system for recording student data and processing academic information is not optimal, as it remains conventional and relies on manual bookkeeping methods, such as recording in ledgers and storing data in Excel files. This makes student and teacher data susceptible to loss or damage. Additionally, retrieving necessary data is time-consuming due to the disorganized nature of the existing records, resulting in wasted time. There is a need for a centralized student database application to store student data, track student admissions and departures, record student achievements, manage TPQ teachers, and facilitate the use of ICT in TPQ management and learning.
2. The reporting process for student learning outcomes at TPQ Awwalul Huda still relies on manual records that include student identities, book volumes, page numbers, and graduation status. Common issues include the loss of student learning record books, difficulties in locating these records, and instances where teachers fail to consistently fill out student progress reports. Consequently, many parents receive insufficient information regarding their children's learning outcomes, including grades and Quran reading achievements. TPQ Awwalul Huda requires an application that can provide real-time information on students' Quran learning progress, thereby enhancing parents' confidence in monitoring their children's educational development.



Figure 3 Observation at the Partner Location

1.2 Objectives of the Activity

The objectives of this community service activity are as follows:

1. This program aims to develop a detailed student data system for TPQ Awwalul Huda and to illustrate how this system can enhance the monitoring and evaluation of the Teaching and Learning Activities at TPQ Awwalul Huda. The data system referred to in this program is not only intended as an administrative tool but also as an evaluation and improvement tool for the curriculum and teaching methods at TPQ Awwalul Huda. By having strong and structured data, the institution's management can conduct more effective monitoring of student progress. The information collected in this data system serves as a foundation for evaluating the quality of religious education at this institution, thereby enabling continuous improvement.
2. This program also aims to facilitate guardians in accessing information about their children's learning outcomes. Guardians can monitor the learning process, examination processes, and daily grades of the students. The monitoring system allows guardians to oversee and evaluate the Quran learning activities undertaken by their children at the TPQ.

1.3 Partner Issues

The priority issues that have been addressed fall into two areas, namely:

1. The issue in the area of improving educational service facilities is the absence of a digital student data recording system. The student data recording and academic data processing system, which includes student data, admissions and departures, student achievements, TPQ teachers, as well as TPQ management and learning, is still conventional and relies on manual bookkeeping methods, such as recording in ledgers and storing data in Excel files. This makes student and teacher data vulnerable to loss or damage. The partner hopes that the service team can assist in building a Student Data Recording System so that the storage of student data, student achievement data, teacher data, and TPQ management and learning can be centralized in a single database.
2. The issue in the area of service improvement is the lack of a system that guardians can use to monitor their children's learning activities and evaluation results during their studies at TPQ Awwalul Huda. The current reporting process for learning outcomes still relies on manual records that include student identities, book volumes, page numbers, and graduation status. This situation often leads to several problems, such as the loss of student learning record books, difficulties in locating student record books, and challenges in reading notes from other teachers. Additionally, some teachers do not consistently fill out student progress reports. The partner hopes that the service team can help build a monitoring system for guardians, which can then be integrated with the Student Data Recording System mentioned in point 1.

1.4 Problem Solutions

After conducting a situational analysis and identifying the existing issues, the solutions that have been implemented to address the priority problems faced by our partner, TPQ Awwalul Huda, include:

1. Designing and building a web-based Student Data Recording System, which includes features required by the partner, such as inputting student data, teacher data, exam scores, achievement data, management and learning, as well as TPQ data management. The School Information System serves as a supporting facility for educational activities, utilizing information technology.
2. Providing assistance to TPQ teachers and administrators in operating and managing the Student Data Recording System developed by the service team.
3. Designing and building a Learning Outcome Monitoring and Evaluation System for TPQ Awwalul Huda that can be accessed by guardians from anywhere via mobile phones. The Learning Outcome Monitoring and Evaluation System will be integrated with the web-based Student Data Recording System.
4. Conducting training and support for all guardians regarding the use of the Learning Outcome Monitoring and Evaluation System.

2. METHOD

The stages of implementing this community service activity are as follows:

1. Literature Study and Partner Needs Analysis

The service team conducts observations and interviews with the partner, TPQ Awwalul Huda, to identify the issues and needs that can help minimize problems as part of the community service objectives. This is followed by a review of relevant activity plans that address the identified issues to support the service. The team then performs an analysis to determine the needs of the application users. At this stage, we analyze and develop the requirements for the web-based information system and create a functional requirements document tailored to the conditions at TPQ Awwalul Huda.

2. Design and Development

The design phase focuses on creating the web-based system through coding processes. The goal of this stage is to provide an overview of what will be done and how it will look. This phase includes designing the application architecture, data design, and application interface design. Additionally, the service team will create the application project and detail the steps for developing the student data recording system and the learning outcome monitoring and evaluation system.

3. Implementation, Integration, Testing, and Validation

The next stage involves writing the program code to implement the design into an accessible web application. The coding process occurs at this stage. Software development will be divided into smaller modules, which will then be grouped together in the next steps. A closer review of the created system will be conducted to determine whether it performs the desired functions. At this stage, the previously created modules will be integrated, followed by testing to ascertain whether the software aligns with the intended design and to identify any errors. The monitoring system and student learning evaluation application will be validated by validators, and the functionality of the developed application will be tested, including debugging any issues that arise.

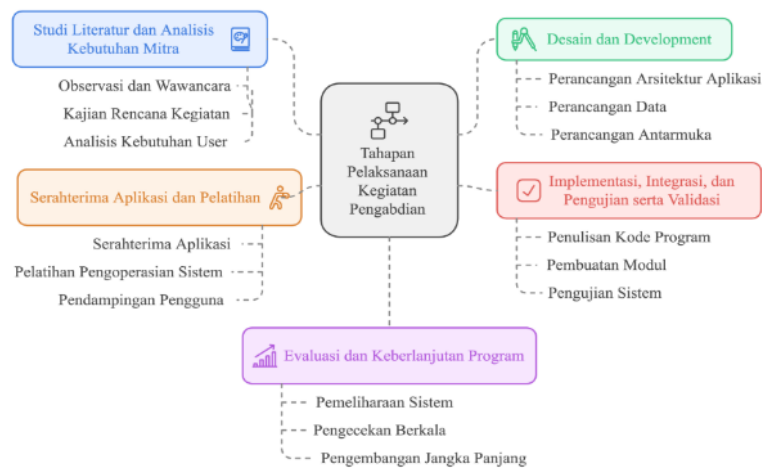


Figure 4 Overview of Activity Stages

4. Handover of the Application to the Partner and Training and Support

After ensuring that all systems meet the expected requirements and plans, the entire system is handed over to the partner, TPQ Awwalul Huda, before conducting training on system operation for teachers and guardians. This includes both the Student Data Recording System database application and the Learning Outcome Monitoring and Evaluation System. The service team also provides training and support to ensure that users of the new system possess the necessary knowledge and skills to use it effectively. The training and support sessions are conducted through lectures and workshops on the use of the Student Data Recording System and the Learning Outcome Monitoring and Evaluation System. A total of 12 teachers and 80 guardians participated in the training sessions, which were spread over several days and sessions.

5. Evaluation and Program Sustainability

The final stage involves maintaining the information system through regular use and periodic checks or testing to identify and address any issues that arise during the testing phase. For the sustainability of this program, the service team and the partner, TPQ Awwalul Huda, are committed to continuing their collaboration to develop this system. The service team is willing to perform system maintenance at least every six months or whenever the partner encounters difficulties. The long-term plan involves the partner and the service team agreeing to develop the program towards skill enhancement and collaboration.

The overview of the system developed can be presented in the form of a Data Flow Diagram (DFD) as shown in Figure 5.

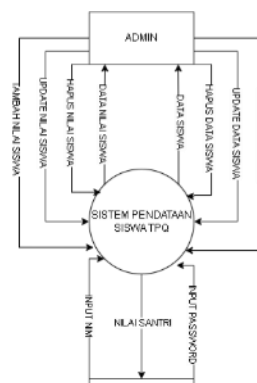


Figure 5 Data Flow Diagram Level 0

In Figure 5, the Level 0 Data Flow Diagram (DFD) illustrates that the system has two types of users: the admin and the user. The admin has the following capabilities:

- Add student data
- Update student data
- Delete student data
- Delete student scores
- Update student scores
- Add student scores

The system provides the admin with information in the form of a list of students and their scores.

On the other hand, the user (guardian/parent) only needs to log in using the student's NIM (student identification number) and password. After logging in, the system displays the student's score list corresponding to the NIM entered during login. The functionality of the features available in the user interface is designed to help parents/guardians monitor their children's scores at TPQ, thereby minimizing misunderstandings between teachers and parents/guardians during the student promotion process at TPQ.

3. FINDINGS AND DISCUSSION

3.1 Results

The system is built based on a needs analysis that results in features with the following specifications:

1. User Needs

TPQ Awwalul Huda, as the user, requires three different features according to its needs. These features include: admin account, teacher account, and student account. The creation of new teacher accounts can only be performed by the admin account.

2. Administrator Account Features (Admin)

This account feature represents the highest authority within the TPQ Awwalul Huda management information system. The admin account can add or delete teacher accounts, assign teachers to classes, manage student classes, and handle other account management tasks.

3. Teacher Account Features (Ustadz/Ustadzah)

In this account, teachers have access to input student scores, make announcements to guardians of their class, or send notifications to specific guardians.

4. Guardian Account Features

In this account, guardians can access information such as student achievement data, student attendance, and announcements provided by the teachers regarding their students.

In this Community Empowerment Program, we have developed two systems: the Student Data Recording System and the Student Learning Outcome Monitoring System. The Student Data Recording System is intended for teachers and includes features for student data, teacher data, subjects, class data, and exam results for each semester. The Student Data Recording System also includes an administrator account that has full authority to manage the features within the data recording system.

The following is a depiction of the interface for the Student Data Recording System:

a. Teacher Login Page

On this page, teachers can log in using their respective email addresses (see Figure 6). This login interface is designed to ensure secure access for teachers to the system, allowing them to manage their classes and input student data effectively. The simplicity of the login process facilitates quick access to the features available to teachers, enhancing their ability to monitor and support student learning.

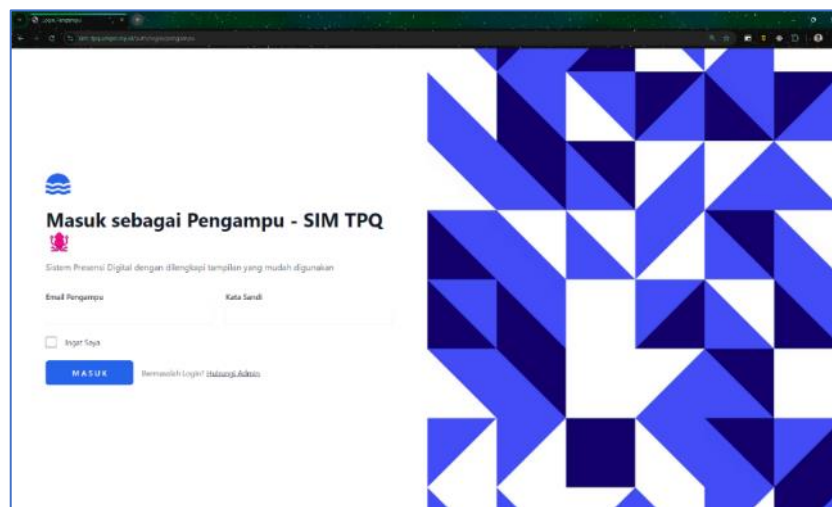


Figure 6 Initial Website Display

b. Teacher Dashboard Page

After logging into the system, teachers will enter the Teacher Dashboard page. On this page, teachers can access student data, create attendance records, and input assessments for students. Additionally, teachers have the capability to create announcements or notifications that can be sent to the guardians of the students (see Figure 7).

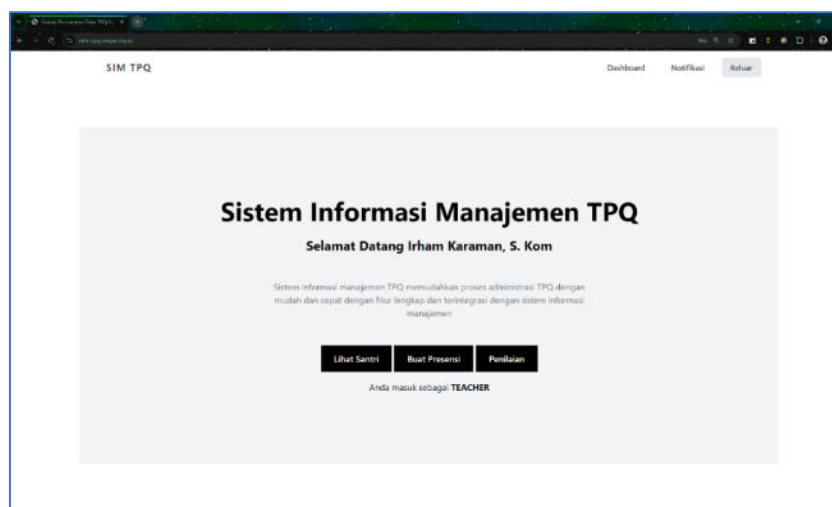


Figure 7 Teacher Dashboard Display

c. Administrator Dashboard Page

In the Student Data Recording System, there is also an administrator account. To log into the administrator dashboard, the designated teacher admin can log in using their personal email. Within the admin dashboard, the teacher can manage classes and students, as well as assign students to specific teacher accounts. The admin has full access to manage student data, teacher data, class data, subject data, and semester grades. Additionally, the admin can create summaries of all student scores that have been input by the respective teachers (see Figure 8).

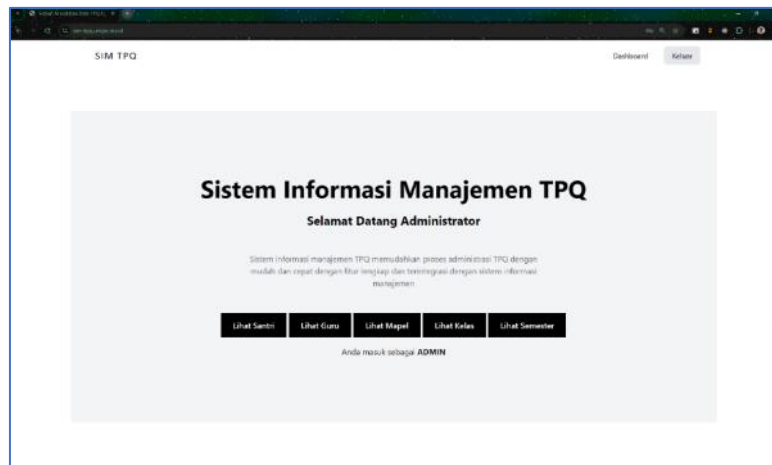


Figure 8 Administrator Dashboard Display

The display of the Student Learning Outcome Monitoring System is as follows:

a. Student Login Page

Students can log in using their Student Identification Number (NIS). The initial password provided by the team is a default password; however, guardians have the option to change the password on the profile page.

This login interface is designed to ensure that students can securely access their learning outcomes and performance data, allowing them to monitor their academic progress effectively. The system aims to enhance transparency and communication between students, guardians, and teachers.

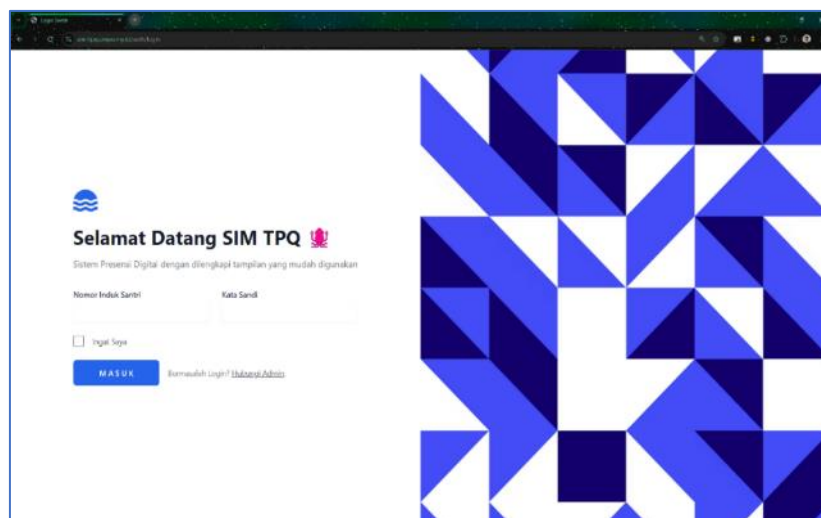


Figure 9 Student Login Display

b. Student Dashboard Page

After accessing the dashboard page, guardians can view the attendance and final grades of their children. Additionally, on this page, guardians can update their profiles, such as changing their passwords (see Figure 10).

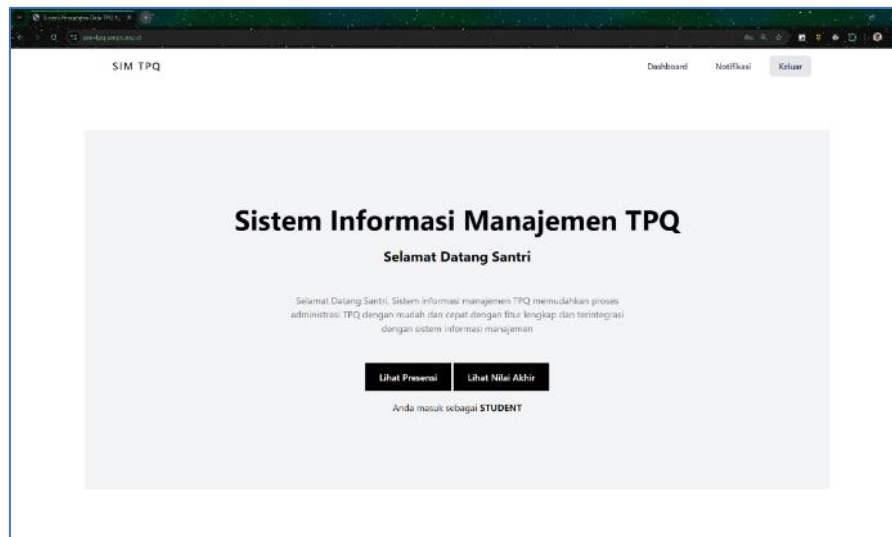


Figure 10 Student Dashboard Display

The next step is the handover of the website to our partner, TPQ Awwalul Huda. In addition to the system, we also prepared a user manual to assist in operating the system. The handover of the system took place on October 23, 2024, at TPQ Awwalul Huda. Figure 11 shows the handover of the website to the partner.



Figure 11 Handover to the Partner

Socialization of the Student Data Recording System to the Teachers of TPQ. On the same day, shortly after the handover of the system to the management of TPQ Awwalul Huda, we conducted a socialization session for the teaching staff at TPQ Awwalul Huda. A total of 12 teachers participated in the socialization and trial of the system (see Figure 12).



Figure 13 Socialization and Training for Guardians

Socialization of the Student Learning Outcome Monitoring System to Guardians. On October 24, 2024, we held a socialization and support session for guardians regarding the learning outcome monitoring system at TPQ Awwalul Huda. A total of 80 guardians participated in this socialization and support session (see Figure 13).

3.2 Discussion

a. Technology and Innovation Products

In an effort to improve the quality of education in the community, this program has successfully produced two innovative and applicable technology products. The first product is the Student Data Recording System, which is a web-based system designed to facilitate the management and digital recording of student data. With this system, administrators can easily access information about students, including personal data, teacher data, and exam scores. The second product is the Student Learning Outcome Monitoring System, which allows guardians to actively monitor their children's academic progress and learning outcomes directly from their mobile devices. This not only enhances the transparency of educational information but also empowers parents to be more involved in the teaching and learning process. To ensure the effective and efficient use of both systems, a comprehensive user manual has been provided as a reference, offering clear step-by-step instructions for users. The overall results of the activities can be presented in Figure 14.

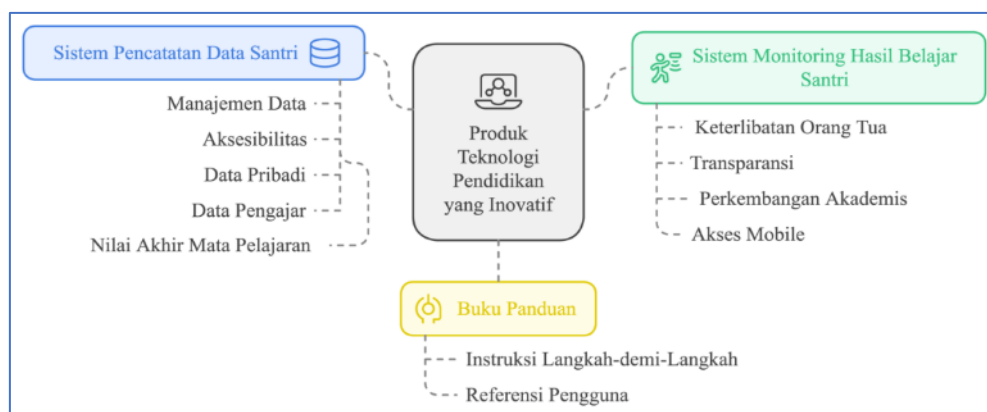


Figure 14 Technology Results of Activities Transferred to the Partner

b. Application of Technology and Innovation to the Community (Relevance and Community Participation)

The implementation of these two technology products is carried out with a strategy that involves active participation from the community, particularly the guardians and teaching staff at TPQ Awwalul Huda. Before the system launch, the implementation team conducted comprehensive socialization to ensure that users understood the benefits and functionality of the system. Additionally, intensive training was provided to 12 teaching staff to enhance their capacity to use the recording and monitoring systems. Many guardians were also involved in this training, with participation from around 80 guardians. This activity not only helped reduce resistance to change but also fostered a sense of ownership and shared responsibility in using the new technology that will improve the quality of their children's education. Through this approach, it is hoped that users will feel more comfortable and confident when using the system, thereby accelerating the adoption of technology in their environment.

c. Impact (Benefits and Productivity)

The implementation of technology in this educational process is expected to have a significant positive impact on all parties involved. One of the main benefits of this system is the increased efficiency in the recording and monitoring of student learning outcomes, which was previously done manually and prone to errors. With the new system, administrators can obtain more real-time and accurate data regarding students' academic progress. Furthermore, guardians now have easier access to information about their children's education, allowing them to be more actively involved in the learning process. This not only enhances parental engagement but also increases their trust in the educational institution they have chosen. Additionally, the data generated by this system can be used by TPQ administrators to conduct better and more in-depth evaluations of the learning process, enabling them to make decisions based on existing facts and adjust the curriculum and teaching methods as needed. With all these changes, it is hoped that the quality of education at TPQ Awwalul Huda will improve, resulting in better student outcomes that are prepared to face future challenges.

4. CONCLUSION

4.1 Conclusion

At the end of this program, it can be concluded that the implementation of technology in the form of the Student Data Recording System and the Student Learning Outcome Monitoring System at TPQ Awwalul Huda has had a significant positive impact. The implementation of this system not only facilitates the more efficient management of student data but also enhances the accessibility of information for guardians to monitor their children's academic progress. Through this web-based system, teachers can easily input and manage data, while guardians can access students' learning outcomes and attendance in real-time. Thus, transparency and parental involvement in education have also increased, which is an important step in creating a better educational ecosystem in the community.

However, the success of this program certainly requires ongoing support. Therefore, the implementation team and the management of TPQ Awwalul Huda will continue to evaluate and improve the system based on user feedback. To this end, additional training and support will be held regularly to ensure that teachers and guardians can optimally use the system. Furthermore, conducting regular maintenance and updates of the system will help improve its performance and security.

4.2 Recommendations

There are several recommendations that need to be considered for future development. First, it is important to establish further collaboration with other relevant parties, including educational institutions, government agencies, and private organizations, to gain support for technology development at TPQ. Additionally, designing a more comprehensive training program for teachers and guardians should also be a priority, so they can fully utilize all the features available in the system. Finally, exploring the potential for developing new, more interactive features, such as a mobile application for more effective

communication between teachers and guardians, could be a step that supports the sustainability of this program in the future.

Thus, this program is believed to not only provide direct benefits in improving the quality of education at TPQ Awwalul Huda but also contribute to the broader development of religious education in the community. The continuity and further development of this system will greatly contribute to advancing religious and technological education in the modern era.

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