



Strengthening Madrasah Administrative Governance Through Cloud Storage and Notion-Based Collaborative Workspace: A Digital Transformation Initiative for Madrasah Aliyah

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Abstract: This community service program aims to design and implement a cloud storage-based administrative management model integrated with a collaborative workspace using Notion for madrasahs affiliated with the Semarang City Private Madrasah Family Association (PKMAS). The program adopted a participatory approach consisting of needs assessment, model development, implementation through training and mentoring, evaluation, and monitoring to ensure the achievement of program objectives. The program resulted in an integrated, practical, and readily adoptable digital administrative management model for madrasahs. In addition, it enhanced the digital competencies of educational staff and promoted more collaborative administrative work practices. The implementation of the program led to improvements in participants' knowledge, digital skills, and administrative management efficiency. Evaluation results demonstrated increased participant competence following the training, with the mean understanding score increasing from 2 to 5 in digital administration, cloud storage utilization, and collaborative work, and from 0 to 4 in the use of Notion. Furthermore, 93.9% of participants reported satisfaction with the program. The program was implemented across 13 PKMAS-affiliated madrasahs and involved 33 participants, demonstrating its potential to support more integrated, efficient, and collaborative administrative management.

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Introduction

The shift toward digitalization in education, particularly in Islamic educational institutions such as Madrasah Aliyah (Islamic Senior High Schools), is an inevitable step toward enhancing the effectiveness and transparency of school management. However, practices in the field indicate that administrative governance still relies heavily on conventional methods, such as physical archives or non-integrated technologies. This condition gives rise to several issues, including delays in accessing information, the risk of document loss, inefficient work processes, and limited collaboration among educational staff (Jalil, 2026; Zahro, Ismail, & Hadiansyah, 2025). In addition, limited digital literacy among human resources, inadequate technological infrastructure, and the lack of a collaborative management system are the main obstacles in the digitalization of madrasah administration (Mason, Turner, Hayes, Bannett, & James, 2025; Choiriyah & Lestari, 2025). Another study



revealed that most madrasas are still in the process of transitioning to digital systems and have not yet fully integrated technology into administrative management (Khairani & Hadi, 2025).

The development of information technology is driving changes that are not limited to the use of digital devices but also encompass shifts in work patterns toward interconnected, collaborative, and data-driven systems. Educational institutions are required to manage information quickly, accurately, and flexibly, ensuring accessibility for various stakeholders. This aligns with modern management approaches that emphasize process optimization, information transparency, and data-driven decision-making. Therefore, administrative digitalization has become a fundamental necessity for improving service quality and enhancing the competitiveness of educational institutions in the digital era (Helsian & Dini, 2025; Dhameria, Muazeib, Blhaj, Sugiyarsih, & Rosadah, 2025; Aripadono, Nursyamsi, Wahab, & Sultan, 2024).

Furthermore, the use of integrated digital systems has significantly contributed to the development of collaborative work patterns within madrasahs. Collaborative activities among educational staff, which were previously hampered by distance and time constraints, can now be conducted more effectively with the support of digital technology. Systems that enable real-time collaboration foster faster coordination, a more systematic division of responsibilities, and continuous performance monitoring. Thus, this provides an important foundation for establishing professional and accountable administrative management focused on improving the quality of educational services.

This community service activity was conducted in collaboration with the Semarang City Private Madrasah Family Association (PKMAS). Initial observations and preliminary surveys conducted with partners reveal that PKMAS oversees 13 private Madrasah Aliyah (Islamic senior high schools) in Semarang City that face similar administrative management challenges. The findings indicate that none of the schools have implemented an integrated digital archiving system; consequently, documents are stored on local media, such as internal computer drives and flash drives. This situation results in fragmented document management, a risk of data loss due to hardware failure, and difficulties regarding access and collaboration. Furthermore, coordination between PKMAS administrators and educational staff is still handled manually, hindering optimal information exchange and administrative management. These findings underscore the need to implement a cloud-based administrative system and a collaborative workspace to support more efficient, integrated, and sustainable madrasah governance. A partner that plays a key role in improving the quality of private madrasah management. The participants included various elements within the madrasah organizational structure, such as principals, deputy principals, operators, and other structural staff within the association. The involvement of these stakeholders demonstrates that issues in madrasah administration are not solely technical in nature but also relate to managerial aspects and inter-unit coordination. Therefore, the implementation of this activity was designed using a participatory and collaborative approach, enabling participants not only to act as recipients of the material but also to actively contribute to the design and implementation of a digital administration system tailored to the needs of each madrasah.

As an alternative solution, the utilization of cloud-based storage and digital collaboration platforms can serve as a strategic step in optimizing educational administration. The implementation of cloud computing technology can enhance data accessibility, strengthen archive security, and support real-time collaboration in document management (Laili, 2025; Maharani & Mu'arif, 2025). The use of cloud storage in the field of education



also provides convenience in storing, managing, and distributing documents in an integrated and well-organized manner (Rina & Sugiarto, 2022). In addition, the use of technology-based collaboration models can strengthen team coordination, improve performance, and reduce redundancy in administrative tasks (Setyawan, 2025; Ramdhan, Sutriyono, & Rosmawan, 2026). The use of digital collaborative platforms also promotes the development of a more adaptive, transparent, and data-driven education management system (Hakimudin, Sari, & Ayu, 2025). Therefore, the integrated implementation of cloud storage technology and collaborative workspace platforms such as Notion has the potential to serve as an effective innovation in improving the quality of administrative governance in the madrasah environment.

The current situation indicates that although administrative digitalization has begun to be implemented in a number of Islamic educational institutions, its application remains limited and has not yet been integrated into a comprehensive management system (Istibana & Aimah, 2025). On the other hand, previous studies have tended to focus on the general use of cloud storage for document management, particularly in the context of madrasah archive management and its associated strategies. However, a gap remains in the development of a madrasah administration management model that integrates cloud storage with collaborative workspaces within a structured work ecosystem. Therefore, the novelty of this study lies in the design of an integrative model based on cloud storage and Notion as a collaborative workspace, systematically developed to enhance efficiency, strengthen collaboration, and promote transparency in madrasah administration (McHenry & Makarius, 2023; Cahalane, Kirshner, & Ting, 2022).

This community service contributes to the development and implementation of a cloud storage-based madrasah administration management model integrated with a collaborative workspace, which not only improves work efficiency but also strengthens collaboration among educational staff within a unified platform. Furthermore, this activity provides practical benefits in the form of an implementation model that can be adopted by other madrasahs, as well as conceptual contributions to the development of studies on digital technology-based Islamic education management. Thus, this community service is expected to bridge the need for the digitalization of madrasah administration with the effective and sustainable application of technology.

Method

This community service activity adopts a participatory and collaborative approach (Wahyuniar, Asfahani, Suyuti, Suyuti, & Sitopu, 2024), positioning partners as key actors who are actively involved throughout the entire process. This approach aims to ensure that the resulting solutions are not merely theoretical but are aligned with field needs and can be implemented sustainably. The partner for this activity is the Semarang City Private Madrasah Family Association (PKMAS), which comprises 13 madrasahs. The activity was attended by all PKMAS members, involving 33 participants including madrasa principals, deputy principals, administrative staff, and other structural personnel who play strategic roles in madrasa administration. The involvement of these various stakeholders is expected to support the comprehensive implementation of digital administrative systems in each madrasa and strengthen coordination among PKMAS members. The stages of this community service are as follows:



Figure 1. Stage of Service

The stages of the community service are illustrated in Figure 1, starting from the analysis of partner needs to monitoring and ensuring program sustainability, as explained in detail in the following sections.

Analyze Partner Needs

The initial phase of the activity focused on a needs analysis to map the actual conditions of madrasah administration. This process was conducted through field observations, interviews with relevant stakeholders, and a review of existing documents. Through this series of activities, a comprehensive understanding of the challenges encountered was obtained, particularly regarding the suboptimal use of technology to support the administrative system (Maharani & Wardhana, 2024) (Nurfa, 2024).

Model Design

The next stage focused on the development of an administrative management model that utilizes cloud storage technology and collaborative workspace platforms such as Notion. This design process included not only the systematic organization of digital document storage structures but also the development of a clear and integrated administrative workflow. Furthermore, a collaboration mechanism was designed to facilitate more effective coordination among educational staff, including access management, task allocation, and progress monitoring. Thus, the resulting model is expected to support more organized, efficient, and easily implementable administrative management tailored to the needs of each madrasah (Bygstad, Ovrelid, Ludvigsen, & Daehlen, 2022).

Implementation of Activities (Training and Mentoring)

The implementation phase is carried out through training activities accompanied by ongoing mentoring. During this phase, participants are provided with a comprehensive understanding of the concept of administrative digitalization, including its importance in supporting more effective and efficient madrasah management. Furthermore, participants are introduced to the use of cloud storage as a centralized and secure document storage solution, as well as Notion as a collaborative work platform capable of integrating various administrative activities into a single system. These activities are not only theoretical but also emphasize practical aspects through simulation sessions and hands-on use of the designed system. Participants are given the opportunity to manage documents, organize workflows, and develop collaborative systems according to their respective needs. The mentoring process is conducted intensively to ensure that each participant is able to understand, adapt to, and operate the system independently in daily administrative activities. This is expected to



enhance digital competencies and shift work patterns toward a more structured, efficient, and collaborative system.

Evaluation of Activities

The data collected during the community service activities were analyzed using a combination of quantitative and qualitative descriptive approaches to provide a comprehensive overview of the program outcomes. Quantitative data obtained from the pre-test and post-test were analyzed by calculating mean scores and percentage improvements and were subsequently presented in tables and graphs to illustrate changes in participants' understanding following the training and mentoring sessions. Meanwhile, qualitative data gathered from observations, documentation, and participant feedback were analyzed through data reduction, thematic categorization, interpretation of the findings, and conclusion drawing. The findings from both types of data were then integrated to evaluate the extent to which the program objectives were achieved, identify supporting factors and implementation challenges, and formulate recommendations to support the improvement and sustainability of future community service programs.

Monitoring and Sustainability of the Program

To ensure the sustainability of the program, follow-up monitoring and mentoring activities were conducted after the main series was completed. These activities aimed to ensure that the implemented system could be used sustainably and integrated into daily administrative practices. Furthermore, the mentoring focused on providing solutions to various technical and operational challenges encountered by participants during the implementation process. Indicators of the program's success include improvements in participants' digital administrative skills, increased work efficiency, and enhanced coordination and collaboration among educational staff within the madrasah.

Result and Discussion

Result of Need Analysis

The needs analysis phase served as the foundation for designing an administrative management model tailored to the partners' specific conditions. This analysis involved observations, interviews, and preliminary surveys across 13 Madrasahs affiliated with PKMAS, engaging 33 participants including principals, vice-principals, administrative operators, and other structural staff. The baseline assessment revealed that none of the schools (100%) possessed an integrated digital filing system. Administrative documents were stored either as physical files or as digital files on local storage media (such as computers and flash drives), resulting in fragmented document management across individual work units. This situation led to longer document retrieval times, prevented simultaneous access to information, and increased the risk of data loss due to storage device failure.

Observations further indicated that administrative coordination among staff relied on manual communication rather than an integrated digital workspace. Consequently, processes such as document sharing, monitoring task completion, and synchronizing information lacked efficiency. These findings showed that the partners' needs extended beyond digital storage; they required a system that integrated document management and collaborative work within a single platform. This aligns with the concept of digital organizational transformation, which emphasizes that administrative performance improvements stem not only from technology adoption but also from integrating workflows and user collaboration (Fernandez, Gomez, Binjaku, & Mece, 2023). Based on these insights, a cloud-based administrative model



featuring integrated storage and a collaborative workspace was developed to address the specific needs identified during the initial phase of the project.

Model Design Result

Based on the results of the needs identification, an administrative management model was developed that integrates cloud storage with a Notion-based collaborative workspace platform. This model is designed using a simple yet structured approach, enabling it to be operated by users with varying levels of digital literacy. The primary objective of this design is to develop a system capable of centrally managing documents while supporting collaborative activities within a unified digital environment.

Structurally, the model is developed as a systematic document management hierarchy, encompassing classification based on administrative types, work units, and specific timeframes. On the collaborative workspace side, features such as databases, task management, and work progress monitoring in Notion are optimized to support coordination among users. Furthermore, the administrative workflow is structured sequentially, starting from data input and information processing to storage and distribution. With this design, the developed system functions not only as a document storage medium but also as a work management tool that promotes transparency, order, and accountability in administrative management.

Activity Implementation

The model was implemented through a series of training activities combined with active mentoring, directly involving all participants in each stage of the process. In the initial phase, participants were provided with an understanding of the importance of administrative digitalization and were introduced to the basic concepts of using cloud storage and the Notion platform as a collaborative work medium. This was followed by practical sessions in which participants directly developed a digital administration system tailored to the needs of each madrasah.



Figure 2. Implementation of activities

Throughout the implementation process, participant engagement increased, particularly as they began integrating administrative activities into the system. Continuous mentoring enabled participants to understand the function of each feature and facilitated the resolution of challenges encountered during use. Furthermore, interaction among participants



contributed positively, enabling the direct exchange of experiences and solutions. The results at this stage demonstrate that a practice-based approach, supported by intensive mentoring, is effective in improving participants' ability to utilize digital technology for administrative management.

Activity Evaluation Result

The evaluation results indicate improvements in both participants' understanding and skills in utilizing digital technology for administrative management. Based on questionnaire data, the majority of participants considered the implemented system relatively easy to use and capable of expediting administrative work processes.

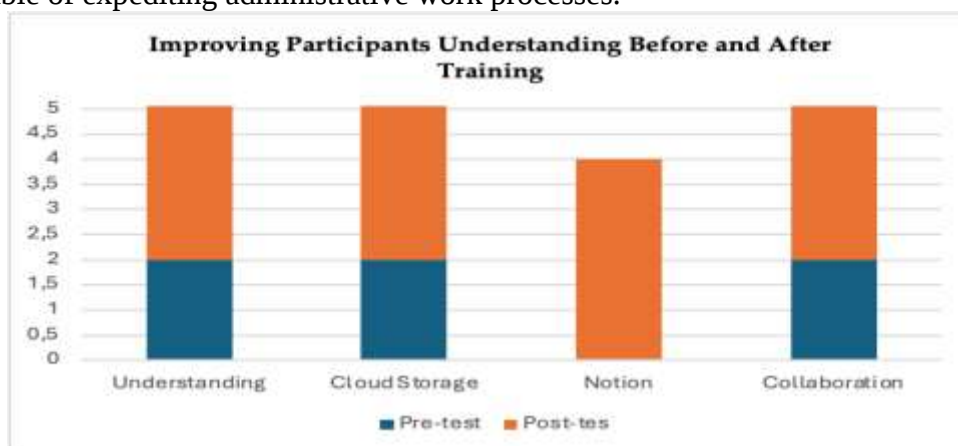


Figure 3. Improving Participants Understanding Before and After Training

Furthermore, participants also experienced improvements in coordination and collaboration among educational staff. The use of a collaborative workspace provided clearer task allocation and facilitated more structured monitoring of work progress. These findings indicate that the implemented model has had a positive impact on enhancing efficiency and effectiveness in madrasah administrative management.

Monitoring and Program Sustainability

Monitoring results indicate that most participants have begun implementing the developed system in their daily administrative activities. However, several challenges remain, particularly in adapting to the use of technology among participants with limited digital literacy. As a follow-up, ongoing mentoring is provided to ensure the sustainability of the program. These activities aim to strengthen users' understanding, address emerging technical issues, and adapt the system to better meet the needs of each madrasah. Through continuous monitoring and mentoring, the implemented system is expected to be sustainably utilized and further developed, thereby generating a long-term impact on improving the quality of madrasah administrative management.

Conclusion

Community service activities conducted in collaboration with the Semarang City Private Madrasah Family Association (PKMAS) demonstrate that the implementation of a cloud storage-based administrative management model, combined with a collaborative workspace using Notion, has a positive impact on madrasah administrative governance. The implementation results indicate that the main problems faced by partners include the lack of integrated administrative systems, low efficiency in document management, and limited collaboration among educational staff. Through a participatory approach supported by structured activity stages, these issues have been gradually addressed.



The implementation of the designed model demonstrates an increase in participants' understanding and skills in utilizing digital technology to support administrative activities. Furthermore, the integrated system enhances work efficiency, facilitates document access and management, and strengthens coordination and collaboration among educational staff. The developed model is also considered flexible and adaptable to various madrasah conditions. Overall, this community service activity successfully produces and implements a practical and effective digital technology-based madrasah administrative management model. The primary contribution lies in the availability of an integrated, collaborative, and cloud-based administrative management model with the potential to be applied to other madrasahs. Therefore, this activity is expected to support the acceleration of the digital transformation of madrasah administration and to improve the quality of educational governance in a sustainable manner.

Recommendation

Based on the results of the community service activities, madrasahs are encouraged to continue developing digital-based administrative systems by enhancing the digital literacy of educational staff, providing adequate technological infrastructure, and fostering a sustainable collaborative work culture. The developed cloud-based administrative management model, which integrates cloud storage and collaborative workspaces, can serve as a reference for other madrasahs in supporting efficient and transparent administrative governance. Furthermore, support from local governments and related institutions in the form of continuous training and mentoring is essential to ensure optimal and sustainable implementation. Similar programs are also recommended to be replicated in other educational institutions by considering the specific needs and characteristics of each institution.

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