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Supporting the Quality Culture of Education through the Design of an Information Technology System for Accurate Management Services at Pondok An-Nahdloh Selangor

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ABSTRACT

This research aims to design a management information system application based on the needs of internal administrative services, as well as testing the level of effectiveness of its application on service quality to support a culture of quality education, as well as assessing the constraints and challenges in the process of implementing the system based on aspects of human resources, facilities, and policy support. This research adopts a Research and Development (R&D) approach, with IPPPE stages (Identification of needs, Design, Testing, Implementation, and Evaluation). Data collection is in the form of questionnaire sheets for expert validators and users. The results showed that (1) the design of the management information system features a registration module, student and teacher data management module, grade management module, and financial management module. (2) The information system application developed has a high level of feasibility, as well as a level of effectiveness in supporting the accuracy and speed of service to internal management parties and supporting the culture of quality education. (3) There are several obstacles and challenges in the process of implementing management information systems, namely technical constraints and challenges, and user adaptation which includes the limited ability of application managers, limited infrastructure, and the need for future system development to integrate with the learning field.

Keywords: *Application, Management Services, Education, Management Information System*

1. INTRODUCTION

Information technology is a crucial aspect in the context of educational institutions to improve the quality of education and increase competitiveness. Therefore, many educational institutions are now implementing information technology systems as an innovative effort to gain a competitive advantage in competition [1] with similar institutions. In addition, the application of information technology also aims to improve efficiency and effectiveness in educational administration. The need to improve the quality of information technology in education is becoming increasingly urgent, given the increasingly important role of technology in facing the challenges of competition in the modern era. The utilisation of computers as a means of information is also an important element in the development of a more secure and efficient system [2]. This indicates that access to data or information can be done quickly and accurately. Advances in information technology provide extensive benefits, both for individuals and institutions in various fields such as government, health, education, and business.

As a newly established informal educational institution, Pondok AnNahdloh in Selangor Malaysia is dedicated to the development of professional competence of teachers, faculty and students through the implementation of Integrated Management System (IMS-SIMADU). IMS-SIMADU is an integrated management system designed to improve and enhance the teaching, learning, and financial management processes in the pesantren. The implementation of IMS-

SIMADU at Pondok Pesantren AnNahdloh Malaysia demonstrates the commitment of the pesantren to improve the quality of education and professional development of teachers through an integrated and measurable approach. IMS-SIMADU also facilitates quick access to relevant information, such as student data, grades, and attendance, allowing teachers and staff to make more informed and timely decisions [3].

Discussing the public service system for providing educational information to the public, such as information about schools, educational programmes and educational resources, the role of educational administration is no less important in shaping the direction and effectiveness of educational institutions. Education administration involves managing and coordinating various aspects of the education system, from policy development to resource allocation, personnel management and curriculum implementation [4]. Educational administration refers to the process of managing an educational institution and overseeing its operations to ensure an effective teaching and learning environment. Aspects related to management activities involve strategic planning, organising, coordinating, and evaluating educational and human programmes, policies, and resources.

Educational administration technology can be said to be highly dependent on the ability of institutions to utilise technology as one of the supporting tools for achieving success [5]. Management Information System (SIM) acts as the heart of efficient information management in collecting and storing data and processing data according to the needs of the desired range. The use of Management Information Systems (MIS) is not limited to improving the quality of internal administration, but can also provide faster and more accurate access to the delivery of educational information for the wider community. With the implementation of an integrated system, various data needed, such as data on students, teachers, grades, learning processes, and financial aspects, can be accessed in a valid and detailed manner by several interested parties.

As with any technology implementation, Management Information Systems (MIS) in educational institutions often face various challenges. One of the main issues is the limitation of technological infrastructure and the lack of legal policy support, as well as the low competency of system administrators. These limitations hinder the optimal implementation of MIS, reducing the effectiveness of services provided to both the internal stakeholders of the educational institution and the wider community. Therefore, educational institutions must not only focus on system development but also ensure alignment with the human resources who use and manage the system over a sustained period [6].

To achieve the successful implementation of a Management Information System (MIS), educational institutions must collaborate with stakeholders who share common interests. Support from management, administrative staff, teachers, and policymakers must be aligned to promote the more effective application of technology. In addition to this, regular evaluations of system efficiency should be conducted to ensure that the MIS remains updated according to current needs and technological developments. The Management Information System (MIS) at Pondok AnNahdloh Selangor, Malaysia, serves as a strategic tool in supporting educational administration that is transparent, accountable, and responsive to the dynamics of the education system.

The focus of this academic study is to conduct a comprehensive assessment of the primary needs of academic services at AnNahdloh, with particular emphasis on strengthening educational administration through the implementation of an information technology-based system. This aims

to enhance the accuracy, efficiency, and management of services provided at the AnNahdloh Islamic Boarding School in Selangor. This paper deeply explores how an integrated, technology-based system can improve various key aspects of the institution's educational administration, such as student record management, administrator orientation, performance evaluation of the existing system, and the delivery of academic programs and support services. By thoroughly addressing the challenges currently faced by the boarding school and proposing innovative technology-based solutions, this research seeks to contribute to the overall optimization of the school's administrative operations and the quality of services provided to the broader AnNahdloh management community, particularly in the areas of finance and the creation of the AnNahdloh Financial Application System (AKUNA). It is hoped that this application will become an integral part of efforts to improve the quality culture within this educational institution.

2. LITERATURE REVIEW

2.1 Sociotechnical Systems Theory (STS)

The sociotechnical theory aims to promote knowledge sharing, learning, and innovation to facilitate collaboration and flexibility in achieving competitive advantage [5]. Sociotechnical systems refer to two aspects: social and technical. In principle, the interaction between social and technical factors creates conditions that determine the success (or failure) of a system's performance. The consequence of combining the 'socio' and 'technical' aspects is that the social components do not always function like technical components, as humans differ from machines. The second principle arising from this interaction is that optimizing only one aspect (social or technical) tends to increase the number of "unplanned" and unpredictable relationships, which often harm system performance [7]. Both subsystems need to be viewed as a unified whole and cannot be separated from each other. Figure 1 shows the relationship or interaction between the social and technical systems that influence the optimization process.

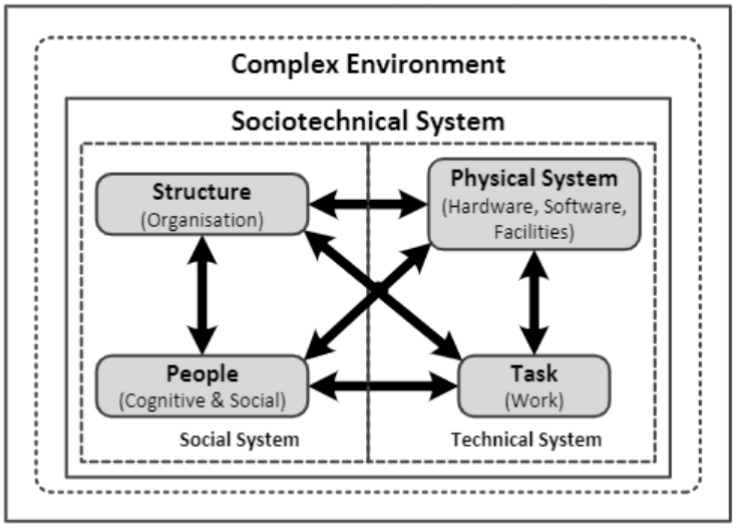

Figure 1. Sociotechnical System (STS) [8]

According to [9] the factors that facilitate sociotechnical systems in supporting human activities include: (1) hardware, which encompasses network connection devices

(such as cables, routers, hubs) to user computers. (2) Software, as an internal part of the sociotechnical system, where interaction between humans and computers takes place to operate the system. This software serves as the intermediary between users and hardware. However, the use of different software in several sociotechnical systems may cause issues due to incompatibility. Therefore, it is advisable for each sociotechnical system to use software that is specifically designed or customized for that system to minimize errors. (3) The physical environment, such as physical buildings, also affects the rules established within the sociotechnical system. (4) People, the system must be adapted to its users. People here include not only individuals but also roles or groups involved in the implementation of the system. (5) Procedures, which are the system's workflow steps. Procedures play a crucial role in the design of software that is tailored to the system. (6) Laws and regulations, similar to procedures but more focused on actions outside standard procedures. (7) Data and data structures, referring to the data required in a specific system. The data storage format can influence the design of the sociotechnical system.

2.2 Management Information Systems Theory

This theory focuses on the critical role of information systems in managerial decision-making. In the context of Pondok AnNahdloh, an IT-based information system can provide accurate and real-time data to support managerial decisions, such as student data management, academic evaluations, and financial management [10]. With this system, the management of the pesantren can enhance the efficiency and effectiveness of services to students and staff.

A Management Information System (MIS) is essentially an acronym derived from three fundamental terms: management, information, and system. Management encompasses activities such as planning, organizing, directing, and controlling resources to achieve predefined objectives. To perform these functions, a manager or administrator must make various decisions. For these decisions to be rational, information becomes a crucial element. Information, in essence, is processed data that can be used in managerial decision-making. A system is defined as a collection of interrelated elements that work together to achieve a specific goal. A Management Information System is an integrated system involving people, machines, procedures, databases, and data models. This system collects data from both internal and external sources of the organization, processes it, and provides management information to support managers in making organizational decisions.

In the context of management information systems, the concept of information carries a different emphasis compared to the general definition of information. The information presented by a management information system is information that meets certain requirements or criteria in accordance with what is needed by management for organizational decision-making. According to [11] a management information system is a system comprised of a collection of people, procedures, machines, databases, and data models as its elements. This system functions to collect various data, both from within and outside the organization, process it, and present management information that assists managers in the decision-making process. The term "system" here underscores

that a management information system uses a holistic system approach, based on the concept of synergy, meaning that the management information system is viewed as an integrated system, not as a collection of separate parts. Andayani [11] mentions several important concepts or key components contained in the definition of a management information system, namely an integrated system, a computer-based human-machine system, a system that produces and presents information, a system that supports operational functions, a system that supports management and decision-making functions, a system that requires a database, and a system that utilizes various planning and decision models.

3. METHODS

This research adopts a Research and Development (R&D) approach, utilizing the IPPPE stages (Identification of Needs, Design, Testing, Implementation, and Evaluation). R&D is a systematic method aimed at developing, testing, and implementing new systems. In the context of education, this approach is often employed to develop more effective tools, curricula, or educational technologies [12]. These stages are used to develop an academic service application that will be integrated with an interactive web platform and are conducted to determine the needs of the management of Pondok AnNahdloh regarding the development product and to design the product based on the results of the needs analysis.

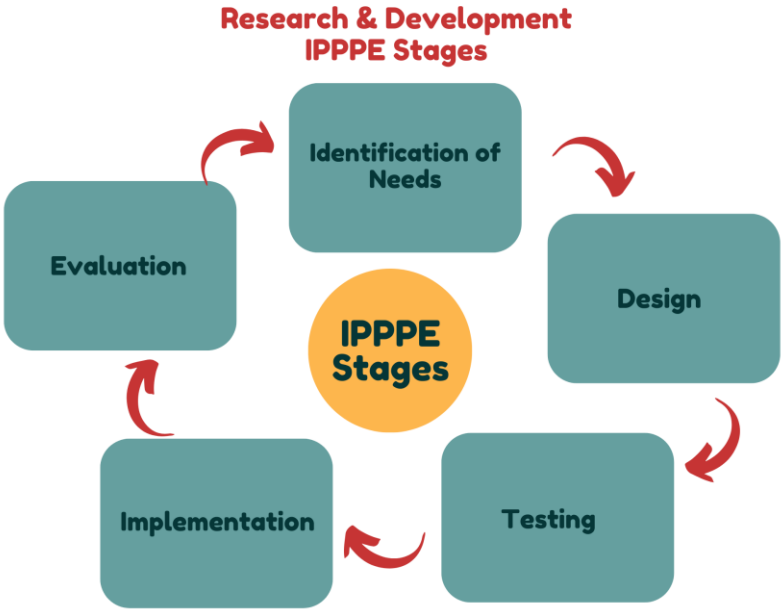

Figure 2. Stages in R&D Process

The elaboration of the research and development procedure is explained as follows:

3.1 Needs Identification

The first stage in the R&D process is to understand and identify the problems or needs present in the field, particularly at Pondok AnNahdloh. In the realm of education, this initial stage reveals several limitations in the ongoing academic service system. The steps in needs identification include conducting observations at Pondok AnNahdloh and collecting data through questionnaires or surveys to ascertain specific needs. The result of this stage is the identification of needs or problems that require resolution.

Designing

Once the needs are identified, the next step is to design or develop a solution. The solution in this activity takes the form of a new system that has been developed from the previously existing one, specifically a web-based application focused on financial management (AKUNA) within an integrated management information system. The design process includes determining the key features or components of the existing problems, creating a tested initial prototype, and drafting technical specifications or implementation designs.

Testing

In the testing phase, the designed prototype is evaluated to ensure its effectiveness and utility. Testing is conducted in a staged manner on a small scale. Implementation includes functional testing, which assesses the product's alignment with the design, and field trials with end users (management representatives) to understand how the solution operates in practice. Feedback is collected from users for further improvements. The results of this testing will serve as a foundation for refining and enhancing the product or system.

Implementation

After undergoing testing and revisions, the application system (AKUNA) is ready for broader implementation. The implementation phase is the process in which the product begins to be used in real-world contexts. This process involves training for AnNahdloh's management on how to use the system, integrating the system into learning or administrative routines, and providing support to ensure that there are no obstacles.

Evaluation

The evaluation stage is conducted to assess the success of the implemented system. This evaluation not only measures whether the product functions well but also determines whether it truly meets the needs identified at the outset. Evaluation is carried out through observations and questionnaires for expert validators and users to collect primary data. Once the primary data is gathered, an analysis is conducted to design and develop the information system prototype. Subsequently, the system development uses the prototype model to produce a system that aligns with user and analyst needs. If the evaluation results indicate that there are still weaknesses, the system can be revised and adjusted according to the evaluation outcomes.

4. RESULTS AND DISCUSSION

4.1 Design of the AnNahdloh Financial Application System (AKUNA)

The AnNahdloh Financial Application System (AKUNA) is designed to meet the needs for accurate, efficient, and integrated financial administration that supports the smooth operation of the pondok. During the needs identification phase, it was found that financial transaction recording needs to be conducted in real-time. Additionally, the financial reporting feature requires automation by displaying financial records on a monthly and annual basis. Furthermore, it is necessary to integrate student payments digitally, enabling secure and structured data storage [13]. In the following Figure 3, the AKUNA application has been integrated with the SIMADU application (Integrated Information System of AnNahdloh).

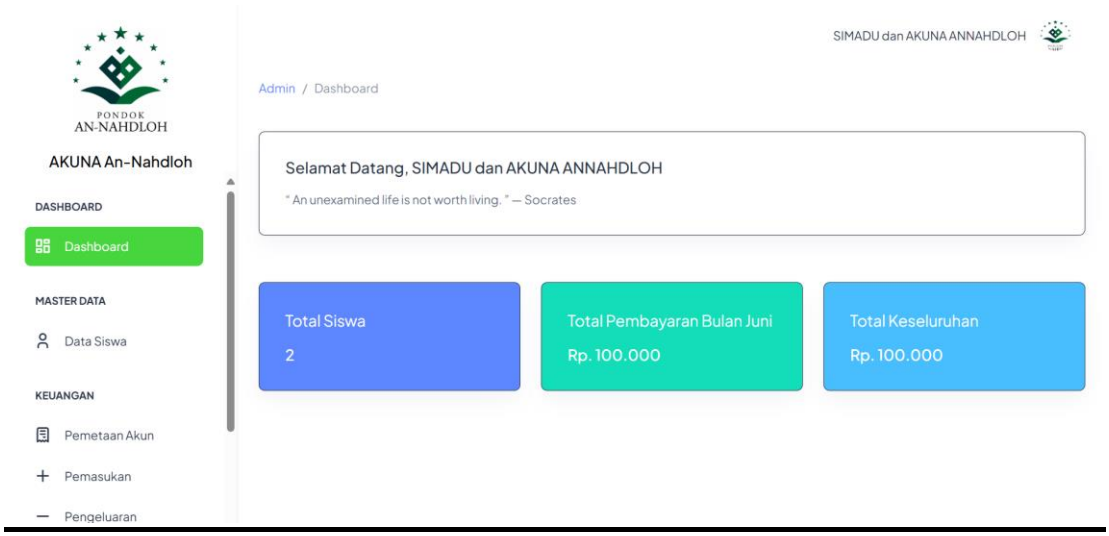

Figure 3. Dashboard Display of AKUNA AnNahdloh

Based on the requirements, the AKUNA system is designed with the main features: (1) income and expenses for the Islamic boarding school and junior high school, (2) upload payment receipts, (3) income from junior high school (tuition fees), (4) income from the boarding school, which includes three components: accommodation fees, meal costs, and donations, (5) expenses for the boarding school, which cover fixed management costs, kitchen supplies, administrative expenses, and accommodations.

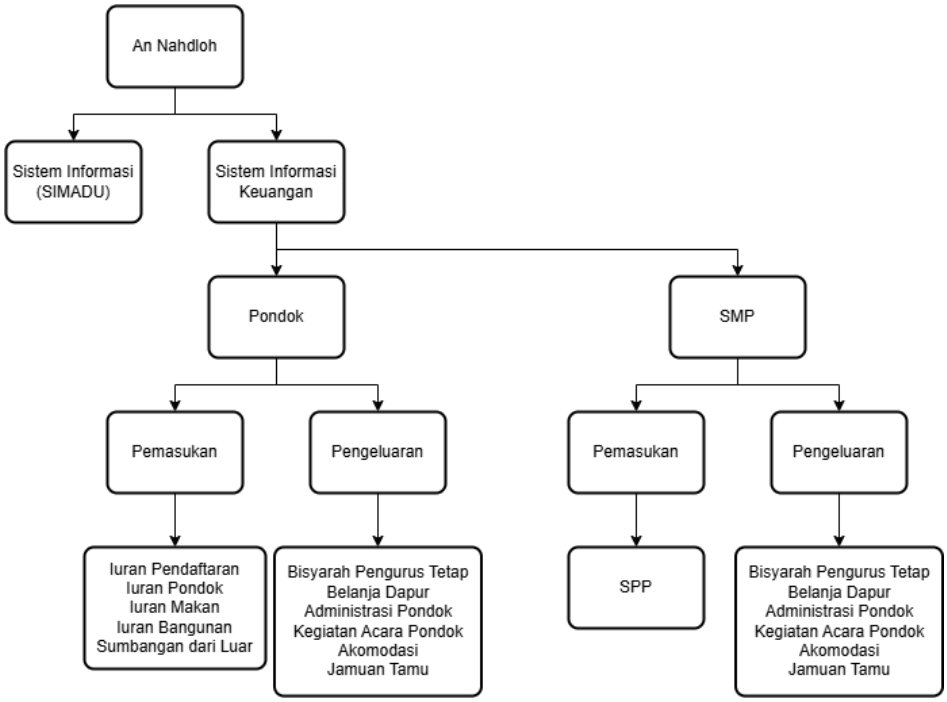

Figure 4. Application System Design Planning Flow
Source: Author's own work

At the prototype testing stage, AKUNA was trialed in the environment of Pondok AnNahdloh with selected users from the financial administration team. The testing involved simulations of daily transactions, digital payment integration tests (via bank transfer), and financial reporting and data validation tests. The previously existing application systems include the

AnNahdloh system, which operates on the domain https://an-nahdloh.simadu.org/, and the financial system at https://an-nahdloh.siku.site/. The features available before testing included income (from tuition fee payments) and savings (from tuition fee payments) uploaded by students and then approved by the administrator.

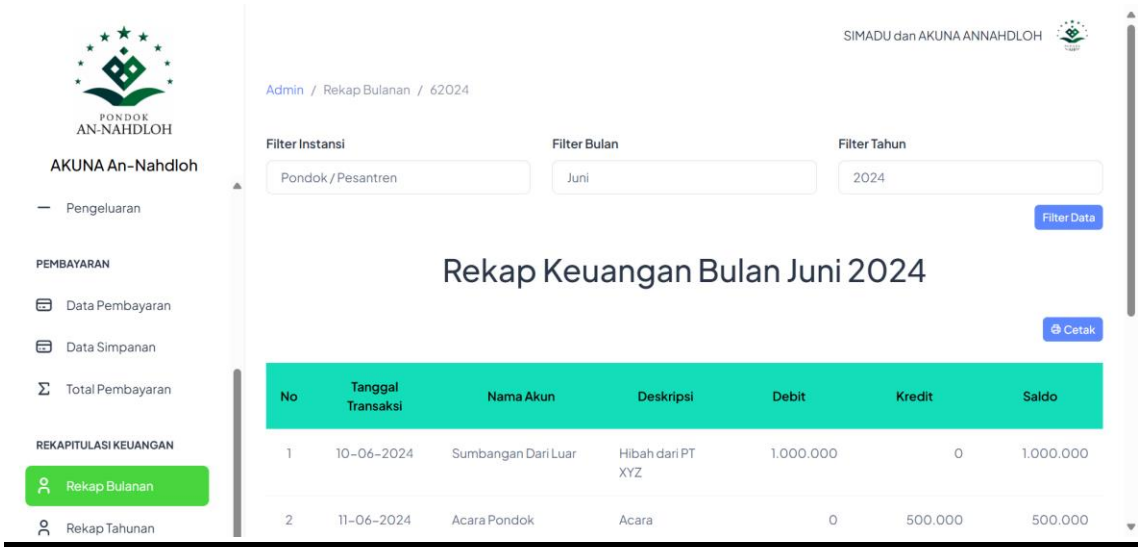

Figure 5. AnNahdloh Financial Application System (AKUNA)

After testing was conducted, revisions involving the addition of features were made. Several added features are detailed in the following Table 1.

Table 1. Revision Results from Testing

Added Feature	Description
Upload Payment Evidence from Administrator	Currently, students must upload their payment documents themselves by logging in with their accounts on the An-Nahdloh system. With this new feature, students can directly pay the administrator, and the data will be added to the system.
Account Mapping	This feature allows the addition of accounts (accounting-based) while also determining whether an account is classified as a debit (income) or credit (expense).
Pemasukan (bukan dari pembayaran SPP)	A new feature accessible only to administrators for entering income data that is not related to SPP payments.
Expenses	A new feature accessible only to administrators for entering expense data.
Adjustment of Recapitulation and Document Printing	Adjustments have been made to the document printing section, which currently only addresses income from SPP payments. A new column has been added for debit and credit related to income and expenses.

Source: Author's Own Work

In the implementation phase, the management of the pondok is provided with training support for system usage and integration of the system into the learning or administrative routines. The application of the AKUNA system at Pondok AnNahdloh is carried out in stages, complemented by intensive training and careful data migration to ensure a smooth transition from a manual to a digital system [14]. This approach allows users to adapt while maintaining the accuracy and security of the pondok's financial data. The implementation stages are conducted as follows: (1) a piloting phase (testing in a specific area only, namely student payments), followed by a trial for the pondok management and system launch; (2) training on financial system usage, financial data management,

and basic troubleshooting knowledge for potential errors that may arise later; (3) the data migration process from the manual system to AKUNA. The fourth stage, which also serves as the evaluation phase, involves (4) monitoring and adjustments during the implementation.

4.2 Effectiveness of the AnNahdloh Financial Application (AKUNA)

The strengthening of education administration based on information technology systems at Pondok AnNahdloh Selangor can be observed from several key aspects that contribute to improved accuracy, efficiency, and transparency of management services. Based on the results of questionnaires from expert validators with expertise in educational technology, the AnNahdloh Financial Application System (AKUNA) is highly effective in supporting the strengthening of education administration based on information technology systems at Pondok AnNahdloh Selangor. With accurate record-keeping, operational efficiency, improved transparency, as well as enhanced security and service convenience [15], AKUNA assists the pondok in providing more optimal financial management services. The results from the validators are presented in Table 2 below.

Table 2. Results of Expert Validator Questionnaire

No.	Aspect	Compliant	Non-Compliant
1.	Functions and Features		
	• Ability to explain financial reporting	√	
2.	Design Suitability		
	• User-friendly	√	
	• Efficient	√	
	• Solution-oriented	√	
3.	System Performance		
	• System speed	√	
	• Accessibility	√	
	• *User interface* comfort	√	

Source: Author's Own Work

Based on its functions and features, AKUNA is deemed capable of explaining a financial report, and the transaction recording system has been designed to be automatic. From the design suitability aspect, AKUNA meets the needs by being user-friendly, efficient, and providing solutions to the problems present in the previous system. The system's performance, in terms of speed, accessibility, and user interface comfort, is assessed by expert validators as being easy to understand and use by the administrative team, particularly for managers who may be less accustomed to digital technology [16].

For users, which include the financial administration team and other stakeholders utilizing AKUNA in daily activities—such as the head of Pondok An-Nahdloh, teachers involved in the administrative process, and financial staff—evaluated aspects include usability, productivity enhancement, and satisfaction with the system's features. The following table presents the user validator data shown in Table 3 below.

Table 3. User Questionnaire Results

No.	Aspect	Compliant	Non-Compliant
1.	User-Friendliness		
	• Experience in inputting financial data	√	
	• Ease of accessing financial reports	√	
	• Speed in accessing information and recording transactions	√	
2.	Productivity Improvement		
	• Time required to complete financial administrative tasks	√	
	• System's ability to help minimize errors	√	

3.	Satisfaction with System Features	
	• Relevant, useful, and facilitates operations	√

Source: Author's Own Work

4.3 Constraints and Challenges in the Implementation Process of the AnNahdloh Financial Application (AKUNA)

Although the AnNahdloh Financial Application (AKUNA) offers numerous benefits in strengthening technology-based administration, its implementation is not without several constraints and challenges. Technical issues, limited human resources, and difficulties in adapting to technology are some of the main challenges faced. Solutions to address these challenges include ensuring ongoing technical support [17], providing intensive training for staff [18], and enhancing technological infrastructure [19]. The following table presents detailed data on the constraints and challenges.

No.	Constraints and Challenges
Technical Constraints and Challenges	
1.	Internet connectivity and accessibility
2.	Errors within the system
3.	Integration of digital payment systems
User Adaptation Constraints and Challenges	
1.	Limited technological literacy
2.	Resistance to change
3.	Human Error
4.	Changes in work processes from manual to automation
5.	Limited human resources
6.	Maintenance and development of a system integrated with learning

Source: Author's Own Work

CONCLUSION

Based on the research results, which encompass three main aspects—system design, system effectiveness, and the constraints and challenges of implementation—it can be concluded that, overall, the AnNahdloh Financial Application (AKUNA) has been developed and implemented with the primary goal of strengthening the financial and educational administration system through the application of information technology. This, in turn, is expected to become an integrated part of enhancing the quality culture of education at Pondok AnNahdloh Selangor. Despite several challenges encountered during the implementation process, this application has proven effective in improving efficiency, accuracy, and transparency in financial management, as well as supporting efforts to cultivate a quality culture. The application makes a significant contribution to the overall optimization of management services at the pondok. With ongoing support to address technical constraints and human resource challenges, AKUNA has the potential to become a long-term solution that can provide a more modern and accurate financial management system for the pondok.

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BIOGRAPHIES OF AUTHORS

Desti Nur Aini earned her doctoral programme in 2021 at Universitas Negeri Surabaya, Indonesia, specializing in the field of language and literature education. One of her prominent academic works is titled "Fostering Edupreneurship Among Students as a Social and Cultural Practice: A Case Study in the German Department at Universitas Negeri Malang." This study delves into the role of entrepreneurship within the educational framework and its social and cultural dimensions. Desti Nur Aini can be contacted via email at desti.nur.fs@um.ac.id

Agung Winarno holds a doctoral degree in Economic Education from the State University of Malang, which he completed in 2008. His expertise lies in entrepreneurship and business education, focusing on both formal education and non-formal education within the community. His most recent research publication explores "The Effect of Religious Sentiment-Based Entrepreneurial Education on Home-Based Business Management: A Case Study of the Halaqah Online Business Community in East Java". His community service activities primarily involve promoting education and entrepreneurship in rural areas.
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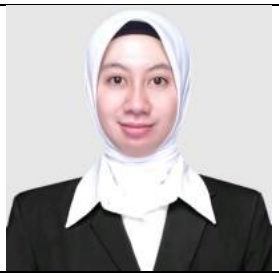

Amalia Arifah Rahman earned her Master's degree in Management in 2023 from Universitas Negeri Malang. She played a key role in data collection and data processing for this research. Currently, Amalia serves as an accounting representative at the Institute for Research and Community Service, contributing to the institution's financial management and research initiatives. Amalia Arifah Rahman can be contacted at amaliarahman058@gmail.com