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Development of Financial Management Information System at Education Foundation Using RAD Method

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Keywords

Financial Management
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Education

Abstract. Efficient financial management in education foundations is crucial in maintaining the quality of education provided. Lack of transparency in fund management, lack of efficiency in resource allocation, and problems in complying with financial regulations can negatively affect the sustainability of education foundation operations. This research uses the Rapid Application Development Method (RAD) to develop a Financial Management Information System. The research stages included Requirement Definition, Planning, Analysis, Prototyping, Development, Testing, User Evaluation, and Implementation. A total of 30 users, including financial officers from educational foundations, have tested the financial information system. Testing includes testing data accuracy, functionality, integration, performance, security, and user testing. The results of this research include developing a financial information system that successfully meets the foundation's needs. Test users reported a high level of satisfaction with the system, where 87% of users were satisfied, 8% were moderately satisfied, and 5% had some issues that needed to be fixed. This research makes a significant contribution to improving financial management in educational foundations. The developed Financial Management Information System can improve transparency, efficiency, financial monitoring, regulatory compliance, and the quality of education provided by the foundation.

1. INTRODUCTION

Financial management is central to various organizations, including educational institutions such as schools, universities, and educational foundations. Efficient and transparent financial management is crucial in ensuring the operational sustainability of such organizations. Particularly in the context of education foundations, sound financial management directly impacts the quality of education that the institution can provide[1]–[3].

Good financial management is the foundation for education foundations to provide quality education. With well-managed financial resources, foundations can optimize the use of funds to improve the quality of education, meet student needs, and support the development of quality human resources. Therefore, improving financial management in education foundations has a significant positive impact on improving the quality of education organized by the institution[4]–[7].

Financial management in educational foundations can involve several issues that require attention and resolution. Some common issues in the financial management of educational foundations include a lack of efficient budget planning, which can result in inappropriate allocation of funds. This can result in underfunding educational programs, facility maintenance, or human resource development. Education foundations must comply with applicable financial regulations, such as tax reporting and proper accounting. Not complying with financial regulations may result in adverse penalties or sanctions[8], [9].

Depreciation and maintenance of assets such as physical facilities, technological devices, and libraries require additional funds. Not properly accounting for these assets can result in the degradation of facilities and a reduction in the quality of education. Proper debt management can result in a manageable long-term financial burden if the foundation is forced to take on debt. This can compromise financial flexibility and sustainable payments. Changes in government policies that impact education funding or changes in tax rules can affect the financial management of education foundations[10], [11].

The absence of a good and transparent financial reporting system can make it difficult for foundations to monitor financial performance, make necessary reports, and provide accountability to stakeholders. Solving problems in the financial management of educational foundations requires

planning, monitoring, sound policies, and sometimes innovation in finding additional financial resources. Good collaboration with donors, stakeholders, and finance professionals is essential in addressing these issues[12]–[14].

A Financial Management Information System is crucial in ensuring the sustainability of the foundation's operations. Financial Management Information System increases transparency in fund management, helps control expenditure, enables financial performance monitoring, and ensures compliance with financial regulations. With this system, education foundations can allocate financial resources efficiently, build donor trust, and improve the quality of education they provide. In this research financial information system, the objectives of developing a Financial Management Information System at an educational foundation are to increase transparency in fund management, allocate resources efficiently, monitor financial performance, ensure compliance with regulations, support better quality education, control expenses, report donations accurately, formulate sustainable financial policies, and meet the needs of students and staff. Through achieving these objectives, the Financial Management Information System plays a role in improving the efficiency and quality of financial management of educational foundations, building donor trust, and supporting operational sustainability[3], [15]–[17].

The development of management information systems is inseparable from software development methods; some standard methods for developing financial information systems in educational foundations are waterfall, spiral, prototype, agile, hybrid, and Rapid Application Development (RAD) methods[18]–[24]. The Waterfall method involves sequential phases, starting from planning, analysis, design, development, testing, implementation, and maintenance. It is suitable if the foundation's needs are relatively stable and stay mostly the same during development. The spiral method involves repeated iterations throughout the development cycle[25]. Each iteration results in more complete software. This is suitable if the foundation has changing needs that may arise during development. The Prototype method involves creating software prototypes that are used to get feedback from users and stakeholders. Prototypes are evaluated, improved, and expanded until they meet the needs of stakeholders. The agile method involves iterative development focusing on teamwork, user collaboration, and rapid change response. Agile is suitable if the foundation requires frequent changes and wants more flexible development. Hybrid methods combine elements from various methods above, according to their particular situation and needs. The RAD method focuses on the rapid development of prototypes that can be used for user evaluation. RAD is suitable if the foundation wants development that is fast, flexible, and responsive to change[26]–[28].

This research uses the RAD method. The RAD method offers several advantages in developing financial information systems in educational foundations. Firstly, RAD allows for rapid and responsive development, which is invaluable when foundations need information systems that can be implemented quickly to meet immediate needs. In addition, this approach allows for greater flexibility and responsiveness to changes in policy or regulatory rules that may occur, as well as maximizing intensive collaboration between developers, users, and stakeholders. The advantages of RAD also include the ability to prototype systems quickly, ensure high quality and accuracy, and increase user satisfaction through their active participation in development. With RAD, foundations can implement responsive, efficient systems that fit their needs more quickly and accurately.

The development of financial information systems in education foundations has crucial benefits, including increased transparency in fund management, efficiency in resource allocation, accurate monitoring of financial performance, compliance with financial regulations, support for improving the quality of education, control over expenditure, timely reporting, and the ability to formulate sustainable financial policies. Using this system, the foundation can ensure better financial management, build donor trust, and support operational sustainability to provide quality education.

2. METHOD

The research phase, figure 1, consists of eight main stages: requirement definition, planning, analysis, prototyping, development, testing, user evaluation, and implementation. These stages can take place iteratively to ensure that the financial information system developed meets the education

foundation's needs and can adapt to changes that may occur in financial management.

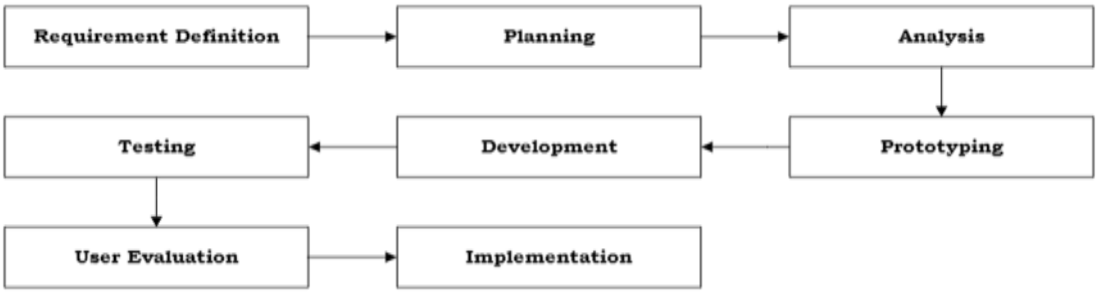

Figure 1. Research Method

Requirement Definition

This stage identifies specific needs related to the financial management of the education foundation, including donor fund reporting, budget monitoring, and tax reporting. Interviews with finance officers and foundation leaders to gather requirements. Documentation of system requirements involving an in-depth understanding of financial processes and related regulations.

Planning

Determine the financial system development project plan, including resource allocation, schedule, and required budget. Identify a development team of software developers, business analysts, and financial experts. Determine the scope of the system, including the features to be integrated into the system.

Analysis

Conduct an in-depth analysis of the foundation's financial processes, including the recording and reporting financial transactions. Analyze relevant tax regulations and requirements to ensure compliance. Identify user needs in managing donor funds and budget allocation.

Prototyping

Build a prototype financial information system that includes transaction recording, financial reporting, and budget management modules—bringing users into the prototype evaluation process to gather feedback and necessary improvements. Documentation of proposed changes based on user responses.

Development

Build financial information system software with critical modules such as transaction recording, budget management, and financial reporting. They have developed an interface that allows users to enter transaction data and view financial reports in real-time—ensuring the integrity and security of financial data.

Testing

Conduct financial information system testing to ensure accuracy and adequate performance. Verify the system meets requirements and functions correctly, including integration testing with other systems if required. Conduct security testing to protect financial data.

User Evaluation

Involve users, including foundation financial officers, in evaluating the developed system. Users conduct system trials to ensure the system can be used effectively and meet financial management needs—correct and address issues identified by users.

Implementation

Implement the financial information system in the foundation's production environment. Conduct training for financial officers and staff who will use the system. Ensure necessary technical support and maintenance after implementation. Monitor system performance periodically and make improvements if needed.

3. RESULTS AND DISCUSSION

Requirement Definition

The system developer must clearly understand the specific needs of the educational foundation. The results of this stage, table 1, reveal that foundations need a system capable of tracking and reporting donor funds, managing budgets efficiently, and ensuring tax compliance. This reflects the foundation's need to maintain transparency and accountability in managing the funds they receive.

Table 1. Needs Identification

Needs Identification	Desc.
Donor fund reporting	Foundations need the ability to record, track, and report on funds received from various donors and external funding sources.
Budget Monitoring	Foundations need a module that allows them to manage their budget efficiently. This includes the allocation of funds to various educational programs and projects.
Tax Reporting	Tax compliance and accurate tax reporting are essential. The system must generate tax reports accurately and by applicable tax regulations.

Interviews with finance officers and foundation leaders were vital in determining the exact requirements. These discussions enabled gathering more detailed requirements and ensured that the system developed would accurately reflect the foundation's internal processes and policies. In addition, additional requirements such as individual donor tracking and integration with the national taxation system underscored the complexity of the foundation's finances. All identified requirements have been documented in detail, including functional and non-functional requirements. This documentation includes proper workflows, desired reporting formats, and security constraints to protect the foundation's financial data.

Analysis

As a result of the Analysis stage, in Table 2, an in-depth analysis of the education foundation's financial processes was conducted. The results of this analysis include a better understanding of how the foundation records and reports financial transactions, both those from donors and those related to budget allocations to various educational programs. This analysis has considered relevant tax regulations and requirements. With a comprehensive understanding of these regulations, the developed system will be able to ensure that the foundation complies with applicable tax provisions. The analysis also includes the identification of user needs in managing donor funds and budget allocations. This includes understanding how users will use the system, including recording donors, allocating funds to specific programs, and monitoring the budget.

Table 2. Analysis Recap

Item Analysis	Desc.
Financial Process	Donation recording process The analysis revealed that the foundation uses a physical donation form to record donations received. Transaction reporting The foundation uses an Excel spreadsheet to record transactions and create financial reports.
Tax Regulation	Income Tax The foundation is exposed to income tax on funds received as income. Grant Tax Grant funds from donor institutions are subject to different taxes by applicable tax regulations.
User Needs	Users want an easy-to-use system to record individual donors, the ability to allocate funds to various programs, and integrated budget monitoring.

Prototyping

A prototype financial information system with several vital modules has been built in the prototyping stage. These include a transaction recording module, which allows users to record all financial transactions, a financial reporting module to generate the required financial reports, and a budget management module that facilitates the allocation of funds to various educational programs.
Users, including financial officers and foundation staff, have been involved in evaluating this prototype. They have participated in testing and using the prototype to evaluate how it meets their needs. The results of the user evaluation generated precious feedback. Users have provided input on the strengths and weaknesses of the prototype, as well as the improvements needed to ensure the system meets their. Results of User Feedback at the Prototyping stage:

a. Users highlighted that the transaction recording module was easy to use and intuitive..
b. Users suggested improvements to the financial reporting module, including adding filter options and graphical displays.
c. There was a request for more in-depth budget management enhancements, including alerts on running out of budget.
d. Users provided feedback regarding changes to the interface to improve usability.

Development

The development stage of an education foundation's financial information system is the critical stage where the software is built. The Development stage includes the development of key modules, including transaction recording, budget management, and financial reporting. An easy-to-use user interface is critical in ensuring users can effectively enter transaction data and access financial reports.

Table 3. Application Modules

Module	Desc.
Transaction Recording	This module allows foundations to record all financial transactions, including donations from donors, income from various sources, and expenses for educational programs. It includes details such as donor name, transaction date, amount, and transaction category.
Budget Management	This module helps in the management of the foundation's budget. It allows the foundation to allocate funds to various educational programs and projects. The module can also provide alerts if the budget is nearing exhaustion or exceeding certain limits.
Financial Reporting	The financial reporting module allows foundations to generate financial reports automatically. These include income statements, balance sheets, cash flow statements, and other reports required for financial monitoring and tax reporting.
Donor and Relationship Management	The module allows foundations to track donor information, including name, address, donation history, and preferences. This helps in maintaining good relationships with donors and potentially increasing financial support.
Donor Reporting	This module allows foundations to generate customized reports on donors, such as individual donor reports, donation amounts in a certain period, and donation analysis.
Tax and Compliance	This module assists foundations in complying with applicable tax regulations. It includes appropriate tax calculations, monitoring of tax reporting deadlines, and integration with the national tax system if required.
Audit and Security	This module focuses on the security of the foundation's financial data. It includes audit logs, data change tracking, and access control to the system to protect sensitive data.

Module	Desc.
Financial Planning	This module assists foundations in future budget planning. It allows the development of budget projections based on historical data and certain assumptions.
Project Management	If the foundation has specific educational projects that need to be managed, this module can assist in organizing and tracking project progress, budget allocation, and evaluation of results.
Performance Analysis	This module enables foundations to analyze educational programs' financial performance and effectiveness. It includes metrics and reports that aid decision-making.

Testing

The Testing stage in developing a financial information system is critical to ensuring that the system functions correctly and as needed. The results of this stage are shown in Table 4.

Table 4. Results of the Testing Stage

Testing	Results
Data Accuracy	Donor transactions inputted into the system include data such as the donor's name, "Mr.X," and a donation of Rp. 1,000,000,000, - on November 1, 20XX. Testing financial statements with previously known data, such as total income of Rp. 100,000,000,-
Functionality	Testing includes testing the transaction recording module, where data is used to record transactions in simulation. They are testing the functionality of the financial reporting module by generating reports. As a result of this stage, the test was successful.
Integration	Integration testing was conducted with the national taxation system, where tax data was synchronized with the taxation system.
Performance	Performance testing involves testing the system with more extensive data to measure report processing time in high workload scenarios.
Security	Security testing includes penetration testing by attempting to access financial data unauthorized. The data is used to identify potential vulnerabilities
User	User testing involves test users using data to enter transactions and generate reports in a test environment.

The Testing stage is a critical step that helps ensure the financial information system functions appropriately, accurately, and securely. The test results and data used in this stage reflect efforts to validate and ensure the system's success before it is fully deployed.

User Evaluation

A total of 30 users, including financial officers from educational foundations, have conducted a pilot test of the financial information system. During the evaluation, users provided feedback on the system's ease of use, efficiency, and suitability to their needs. The evaluation results showed that 87% of users were satisfied with the system, 8% were moderately satisfied, and 5% had issues that needed fixing. The user evaluation results and satisfaction percentage were used to identify problems and improvements needed in the system. Changes were implemented in response to user feedback.

Implementation

The financial information system has been implemented in the foundation's production environment. All components and modules of the system have been activated and are ready to be used by financial officers and staff involved in the foundation's financial management. Financial officers and staff who will use the system have received appropriate training. They have the necessary knowledge and skills to operate the system effectively. Technical support has been prepared to address issues that may arise after implementation. The technical support team is ready to assist with technical problems or issues. Regular maintenance and upkeep of the system have been scheduled and

implemented to ensure optimal system performance. This includes hardware and software monitoring and maintenance. The system is regularly monitored to ensure that its performance meets expectations. Performance measurement and monitoring are used to identify whether improvements or upgrades are needed.

4. CONCLUSION

This research emphasizes the importance of efficient financial management in educational foundations and its positive impact on the quality of education. By developing a Financial Management Information System using the RAD Method, the research succeeded in creating a tool that helps foundations overcome problems in financial management. User evaluation results show that the system is effective and well-received. Of the 30 users involved, 87% were satisfied with the system, reflecting significant added value in fund management and financial transparency. Thus, this study provides a strong foundation for education foundations to improve their financial management, build donor trust, and support operational sustainability to provide quality education. In future research, the study of the long-term impact of using the Financial Management Information System on the quality of education and the sustainability of the foundation can be the focus of future research to measure the long-term effectiveness of this solution.

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