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Smart Foundation (*Pangandoy sa Pag-Eskwela* Foundation, Inc.): Development and Evaluation of an Integrated Web-Based Information Management Platform for Scholarship, Attendance, and Financial Management of San Carlos City

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ABSTRACT

Scholarship administration requires the coordinated management of applicant information, scholar records, academic requirements, attendance, community-service participation, and financial transactions. This study presents Smart Foundation, an integrated web-based information management platform developed for Pangandoy sa Pag-Eskwela Foundation, Inc. in San Carlos City. The study employed a research-and-development design using Rapid Application Development (RAD), supported by requirements analysis, iterative prototyping, a three-tier architecture, relational database design, role-based access control, and preliminary source-based functional and security verification. The implemented platform defines 20 functional requirements and four principal user roles: administrator, staff, treasurer, and scholar. Its modules cover applicant and scholar management, digital requirements, scholarship status, RFID-assisted event attendance, community services, donor and expense records, allowance releases, bank transactions, reports, notifications, and activity logs. Source inspection identified 13 functional verification scenarios with the expected behavior implemented and seven security-oriented verification areas addressing protected access, password handling, role routing, privilege restriction, file uploads, auditability, and scholar-record ownership. The integrated architecture connects these functions through a shared scholar identity and centralized relational data model. The findings indicate that Smart Foundation provides a coherent information-management foundation for scholarship operations and internal attendance and financial recordkeeping. However, the supplied project materials did not include a verified final respondent dataset, measured performance benchmarks, or independent penetration-test results; therefore, no unsupported usability, performance, or overall quality scores are reported. The study recommends formal user acceptance testing, security hardening, privacy governance, backup and recovery validation, and strengthened financial approval controls before broad production deployment.

Keywords: *scholarship information management; nonprofit digital transformation; RFID attendance; financial information system; role-based access control; Rapid Application Development; ISO/IEC 25010*

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INTRODUCTION

Pangandoy sa Pag-Eskwela Foundation, Inc. manages a scholarship-oriented service in San Carlos City in which administrative work extends beyond selecting beneficiaries. The scholarship lifecycle requires the collection and maintenance of applicant profiles, family background, academic information, scholarship status, continuing requirements, attendance, community-service participation, allowances, donor information, expenses, and bank transactions. When these records are maintained through separate paper files, spreadsheets, messages, and manually prepared reports, personnel must repeatedly search, reconcile, update, and summarize information. The supplied project materials identify this fragmentation as the operational problem addressed by Smart Foundation.

Digital transformation in nonprofit organizations must be aligned with organizational mission, work practices, people, and resource conditions. Cipriano and Za (2025) found that nonprofit digital transformation contains people-centered and nonprofit-specific dimensions, while Jong and Ganzaroli (2024) showed how digital transformation can enable coordination and service innovation in social-good organizations. For a scholarship foundation, the implication is that an information system should reflect the scholarship lifecycle and accountability structure rather than simply digitize individual forms.

Smart Foundation was therefore conceived as a unified web-based platform that connects scholarship administration, attendance, community-service records, and internal financial management. The supplied implementation includes PHP-based server processing, HTML/CSS/JavaScript interfaces, a MySQL-compatible relational database, session-based access control, document uploads, activity logging, and RFID-assisted attendance. The resulting system is organized into role-specific portals for administrators, staff, treasurers, and scholars.

Research Gap

Research and applied systems commonly focus on individual technologies such as student information systems, RFID attendance, document management, or financial applications. However, the project materials point to a practical integration gap for nonprofit scholarship operations: scholarship lifecycle management, digital requirements, event attendance, community services, internal financial tracking, and role-specific access are rarely presented as a single platform centered on a shared scholar identity. Smart Foundation addresses this applied integration gap. Its contribution is therefore an integrated organizational information architecture for a scholarship foundation, not a claim that the platform represents a universal model for all nonprofit organizations.

Purpose and Objectives

The purpose of the study was to develop and preliminarily evaluate Smart Foundation as an integrated web-based information management platform for scholarship, attendance, and financial management in San Carlos City. Specifically, the study sought to:

- centralize applicant and scholar information, including personal, family, academic, scholarship, and status records;
- provide scholars with controlled self-service access and digital submission of academic requirements;
- provide staff with restricted operational functions and administrators with broader management and oversight functions;
- provide the treasurer with dedicated tools for donors, expenses, allowances, banks, bank transactions, and financial reports;
- implement RFID-assisted attendance for foundation events and link attendance records to scholar identities;
- apply role-based authorization, password protection, validation, activity logging, and privacy-oriented data controls; and
- develop the platform iteratively through Rapid Application Development and establish an evidence-based software evaluation framework.

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Research Questions

1. What information and workflow requirements are needed to manage scholarship applicants, scholars, requirements, attendance, community services, and financial transactions?
2. How can role-based web access organize scholarship records according to the responsibilities of administrators, staff, treasurers, and scholars?
3. How can digital requirement submission and RFID-assisted attendance strengthen the traceability of scholar-related activities?
4. How can an integrated financial module support internal recording and reporting of donors, expenses, allowances, and bank transactions?
5. What security and privacy controls are appropriate for a platform that processes personal, academic, family, photographic, credential, and financial information?
6. How can the developed platform be evaluated through functional verification and an ISO/IEC 25010:2023-oriented evaluation framework?

Related Literature and Theoretical Basis

Digital Transformation in Nonprofit Organizations

Nonprofit digital transformation differs from technology adoption in purely commercial settings because digital capabilities must support social purpose, organizational coordination, and resource-constrained operations. Cipriano and Za (2025) identify people-centered and nonprofit-specific themes in the literature, suggesting that digital transformation models should reflect the particularities of nonprofit organizations. Jong and Ganzaroli (2024) likewise illustrate how digital transformation can support social-good organizations through changes in coordination, service delivery, and organizational practices. Smart Foundation adopts this mission-aligned perspective by mapping system roles and workflows to the operational structure of a scholarship foundation.

Relational Information Management

Relational database systems provide structured mechanisms for representing entities, attributes, relationships, constraints, and transactions (Elmasri & Navathe, 2016). Smart Foundation uses a scholar-centered logical data model in which a scholar can be related to family background, academic information, scholarship details, requirements, attendance, community services, allowances, and historical records. The project materials identify 20 principal entities, including system users, scholars, applicants, requirements, events, attendance, donors, expenses, bank records, activity logs, and notifications. This structure supports integrated retrieval and reporting.

Scholarship and Digital Requirements Management

Scholarship administration is a lifecycle process involving application, assessment, admission, continuing compliance, completion, and historical retention. A digital platform can improve traceability when requirements are linked to a scholar, academic period, status, and uploaded document. Smart Foundation includes requirement templates, scholar-specific requirements, digital submission, status monitoring, and ownership checks that prevent a scholar from processing another scholar's requirement. These features turn requirements from isolated files into structured records within the scholarship lifecycle.

RFID-Assisted Attendance

RFID can reduce repetitive manual attendance entry by associating a unique card or tag with a record in a database. Nivetha et al. (2020), Cadungog et al. (2024), and Kurniawan et al. (2024) report RFID-based attendance approaches in educational settings. Smart Foundation applies the same general principle to foundation events. An RFID scan should nevertheless be interpreted as identification of the presented credential rather than biometric proof of the person's identity. Policies for lost cards, replacement, duplicate scans, card sharing, and attendance exceptions are therefore necessary.

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Role-Based Access Control and Application Security

Role-Based Access Control assigns permissions according to organizational roles and is appropriate when users have different responsibilities (Ferraiolo et al., 1999; Sandhu et al., 2000). Smart Foundation implements role-specific routing and server-side restrictions for administrator, staff, treasurer, and scholar functions. The supplied source also uses password hashing and verification, validation, selected prepared statements, transactions for selected multi-step operations, and activity logging. OWASP guidance reinforces the need for secure password storage, session management, and controlled file uploads. These controls are particularly important because the system aggregates sensitive personal and financial information.

Privacy and Software Quality

Republic Act No. 10173, the Philippine Data Privacy Act of 2012, establishes principles for the lawful and secure processing of personal information. The National Privacy Commission's implementing rules provide additional organizational, physical, and technical safeguards. Smart Foundation consequently requires purpose limitation, access control, controlled document handling, retention and disposal procedures, accountability, and incident response. For software quality, ISO/IEC 25010:2023 defines a product-quality model composed of nine characteristics that can be used to specify, measure, and evaluate software quality throughout the product lifecycle.

MATERIALS AND METHODS

Research Design

The study used a Research and Development (R&D) design because the primary output is a working information system developed to address an identified organizational need. Rapid Application Development (RAD) was selected as the development strategy because the platform contains multiple interconnected modules and role-specific workflows that benefit from iterative requirements clarification, prototyping, construction, testing, and refinement. The development sequence comprised requirements planning; user design and prototyping; construction of core, administrative, financial, and attendance modules; integration and security testing; and preparation for controlled deployment.

Study Setting and Intended Users

The study is situated in San Carlos City and focuses on the information-management processes of Pangandoy sa Pag-Eskwela Foundation, Inc. The intended users are administrators, foundation staff, treasurers, and scholars. Applicants are managed through the administrative workflow rather than through a separate authenticated applicant portal in the supplied implementation.

Role	Primary responsibility	Principal functions
Administrator	Overall administration and oversight	Users, applicants, scholars, requirements, attendance, community services, historical records, notifications, activity logs, reports
Staff	Operational processing	Applicants, scholar updates, requirements, reports, historical records, community services
Treasurer	Financial administration	Donors, expenses, allowances, banks, bank transactions, financial reports
Scholar	Self-service	Permitted profile/academic updates, scholarship information, requirement submission

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System Architecture and Technology

The system uses a three-tier architectural model. The presentation layer contains role-specific web interfaces; the application layer contains PHP authentication, validation, business rules, database operations, file processing, notifications, and activity logging; and the data layer contains MySQL-compatible relational records and uploaded files. The technology stack documented in the project comprises PHP, HTML/CSS/JavaScript, MySQL-compatible relational database technology, session-based role controls, file storage, and RFID hardware for attendance.

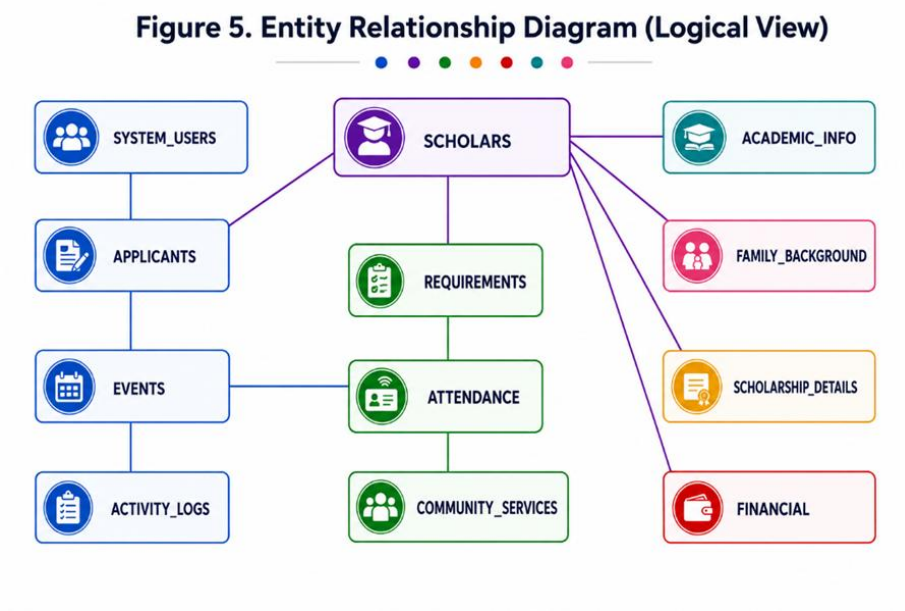

Figure 1. *Three-tier architecture of Smart Foundation.*

Functional Scope

Domain	Implemented capability
Identity and access	Authentication, role routing, role authorization, protected sessions
Scholarship lifecycle	Applicant management, scholar registration, scholar profile, academic information, scholarship status
Requirements	Requirement templates, digital upload, status monitoring, scholar-ownership checks
Attendance	Foundation events, RFID-assisted attendance, historical-record protection
Community services	Recording and management of scholar community-service participation
Financial management	Donors, expenses, allowance releases, banks, deposits, interest, withdrawals, financial reports
Accountability	Activity logs, notifications, historical scholar records, operational reports

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Data Model

The logical data model is centered on the scholar entity. The 20 principal entities documented in the project are system users, scholars, family background, academic info, scholarship details, applicants, requirements templates, scholar requirements, events, attendance, community services, alumni, terminated scholars, donors, expenses, allowance releases, banks, bank transactions, activity logs, and notifications. The design separates operational concerns while retaining the relationships necessary for integrated monitoring and reporting.

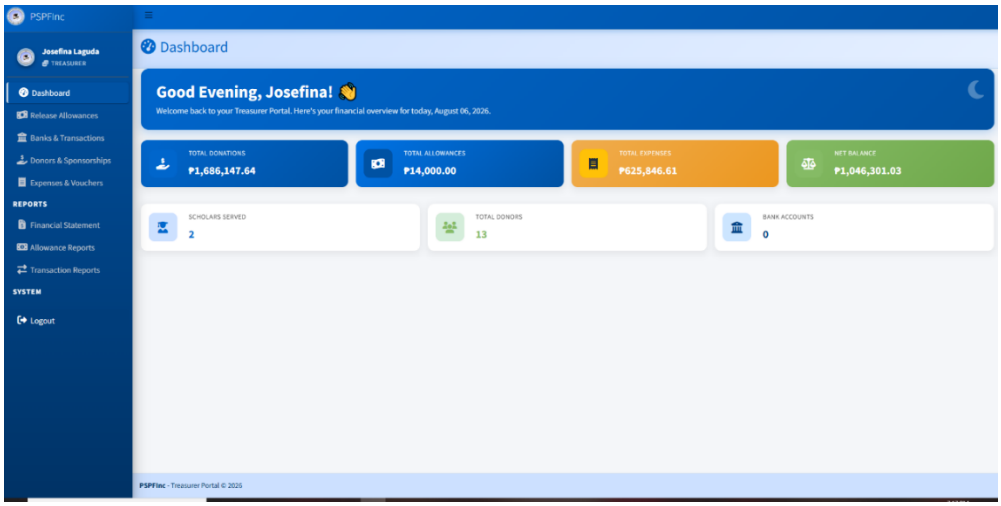

Figure 2. *Logical entity-relationship structure centered on scholar records.*

Conceptual Framework

The study adopts an Input–Process–Output–Feedback (IPOF) framework. Inputs consist of foundation requirements, organizational processes, user roles, applicant and scholar data, academic requirements, attendance rules, community-service information, and financial information. Processes include requirements analysis, database and interface design, role configuration, document processing, RFID attendance, financial transaction processing, activity logging, testing, and iterative refinement. Outputs are organized records, monitored requirements, attendance records, financial records, reports, and audit trails. Feedback consists of user observations, testing results, defects, workflow adjustments, and security findings.

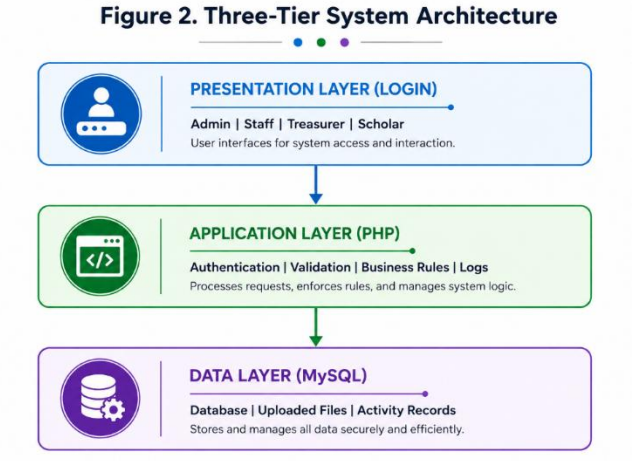

Figure 3. *Input–Process–Output–Feedback conceptual framework.*

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Evaluation Strategy

Evaluation was structured as two complementary evidence streams. The first was source-based functional and security verification of the supplied PHP implementation. The second was a defined user-acceptance and software-quality evaluation procedure using a four-point Likert questionnaire aligned with ISO/IEC 25010:2023. The project materials did not contain a verified final respondent dataset; therefore, the present paper reports implementation evidence and evaluation readiness rather than fabricated respondent statistics.

Evaluation stream	Evidence	Current status
Functional verification	Source inspection of authentication, registration, authorization, scholar portal, attendance, finance, and audit functions	Implemented behaviors documented
Security-oriented verification	Protected access, password handling, role routing, privilege restriction, file upload, audit logging, ownership controls	Baseline controls documented; hardening remains
User acceptance	Task scenarios for administrator, staff, treasurer, and scholar	Requires actual representative users
Software quality	ISO/IEC 25010:2023-oriented questionnaire and technical tests	Requires empirical measurement

Data Analysis Plan

The proposed user-evaluation instrument uses a four-point Likert scale: 4 = Strongly Agree, 3 = Agree, 2 = Disagree, and 1 = Strongly Disagree. Weighted mean may be computed as $WM = \Sigma(f \times w) / N$, where f is response frequency, w is the assigned weight, and N is the number of responses. The specified interpretation is 3.26–4.00 = Strongly Agree; 2.51–3.25 = Agree; 1.76–2.50 = Disagree; and 1.00–1.75 = Strongly Disagree. Functional verification is analyzed through pass/fail outcomes and documented defects. Performance evaluation should use measured response time and load conditions, while security evaluation should use explicit authorization, authentication, file-handling, session, and vulnerability test cases.

RESULTS AND DISCUSSION

Integrated System Design

The implemented platform integrates four principal roles around a common information environment. Administrators receive broad management privileges; staff perform restricted operational tasks; the treasurer works within a dedicated financial environment; and scholars use a self-service portal. The role separation is reflected in the use-case structure and interface design. This is an operational expression of RBAC because access is aligned with organizational responsibility rather than exposing a common unrestricted interface.

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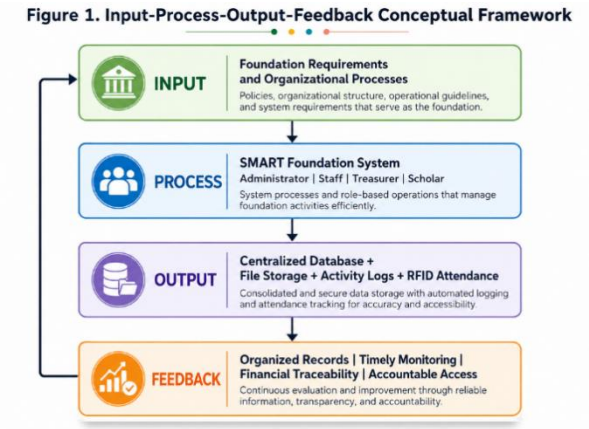

Figure 4. *Role-based use-case structure and major Smart Foundation functions.*

Functional Verification

The project defines 20 functional requirements spanning authentication, authorization, applicant management, scholar registration and profile management, academic information, requirements, scholarship status, attendance, community services, historical records, donors, expenses, allowances, banks, bank transactions, financial reports, activity logging, and notifications. Source inspection documented 13 representative functional scenarios with the expected behavior present in the supplied implementation.

Table 1. *Source-based functional verification of representative system behaviors.*

Module	Scenario	Expected result	Result
Authentication	Valid login	Correct role portal displayed	Pass
Authentication	Invalid password	Access denied	Pass
Authorization	Staff attempts prohibited scholar add/delete	Action denied	Pass
Registration	Missing required field	Registration rejected	Pass
Registration	Duplicate email	Registration rejected	Pass
Registration	New scholar	Scholar, family, and academic records created together	Pass
Scholar portal	Profile update	Permitted fields updated	Pass
Scholar portal	Requirement upload	Only own requirement processed	Pass
Attendance	Create event	Event stored	Pass
Attendance	Delete event with attendance	Deletion blocked	Pass
Finance	Deposit	Balance increases	Pass
Finance	Withdrawal within balance	Balance decreases	Pass

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Module	Scenario	Expected result	Result
Finance	Withdrawal above balance	Transaction rejected	Pass

These results are implementation evidence derived from the supplied source files. They should not be interpreted as independent execution results, formal software certification, load-test results, or user acceptance results. This distinction is essential because the available project materials do not contain an external test log or verified final respondent dataset.

Security and Privacy Findings

Seven security-oriented areas were identified in the project: unauthorized portal access, password handling, role routing, staff privilege restriction, file-upload workflow, audit logging, and scholar-record ownership. The implementation demonstrates password hashing and verification, session-based role checks, validation, selected prepared statements, database transactions for selected multi-step operations, and activity logging. These controls provide a meaningful baseline for a web application that handles personal and financial information.

However, the project also identifies several production hardening requirements: CSRF protection, secure cookie attributes, session regeneration, login throttling, HTTPS enforcement, strict file-content validation, safe file storage, controlled download routes, output encoding, database least privilege, backups, monitoring, and periodic security testing. These requirements are consistent with secure web-development practice and with the Data Privacy Act's emphasis on protecting personal information.

Table 2. *Security-oriented source verification and control status.*

Test area	Scenario	Expected	Finding
Unauthorized portal access	Protected portal requested without correct session/role	Redirect/deny	Implemented
Password handling	Inspect password storage	No plaintext password storage	password_hash()/password_verify() used
Role routing	Login with different roles	Role-specific redirect	Implemented
Staff privilege	Attempt prohibited scholar action	Server-side denial	Implemented
File upload	Upload photograph/document	Upload workflow processes file	Implemented; hardening recommended
Audit trail	Perform selected administrative/financial action	Activity log entry	Implemented in multiple modules
Privacy boundary	Access another scholar's requirement	Access denied	Ownership check present

Scholarship and Requirements Management

The scholarship component supports a lifecycle beginning with applicant information and continuing through scholar registration, academic information, scholarship status, requirements, historical records, and self-service functions. The registration process validates required fields, checks duplicate information, generates a scholar identifier, handles photographs, hashes passwords, and creates related family and academic records through a transaction. The scholar portal allows permitted profile and academic updates and digital requirement

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submission. The ownership check on requirements is particularly relevant to privacy because it limits a scholar's operation to records associated with the authenticated scholar.

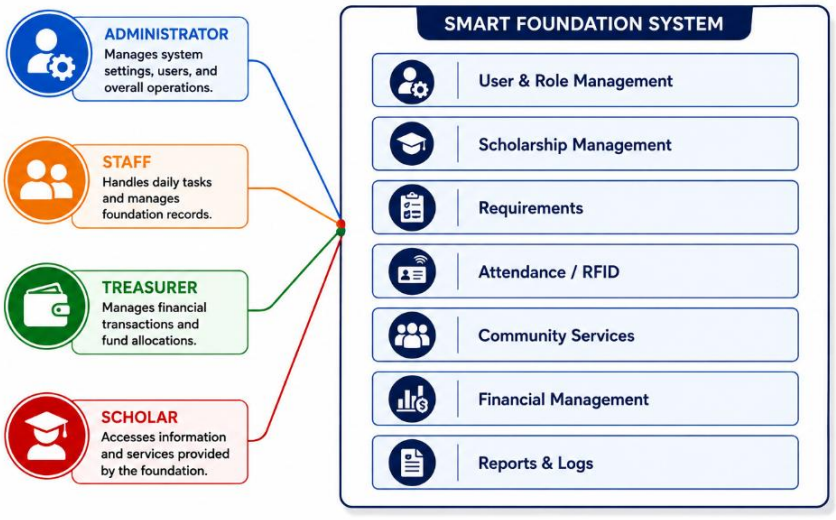
Attendance Management

The attendance module creates and manages foundation events, activates events for attendance, records RFID-assisted attendance, and protects historical integrity by blocking deletion when attendance records exist. These controls provide a structured event-attendance trail. Nevertheless, RFID is not biometric authentication. The operational policy should address card assignment, lost-card replacement, duplicate scans, late attendance, and card sharing to reduce the risk of inaccurate attendance records.

Financial Management

The treasurer module provides a dedicated workspace for donors, expenses, scholar allowances, banks, bank transactions, and financial reports. The implementation records deposits, interest, and withdrawals and applies an insufficient-balance rule that rejects withdrawals exceeding the recorded balance. This creates internal transaction traceability and supports reporting. The system should be described as an internal financial-management and reporting tool rather than a replacement for formal accounting standards, professional review, bank reconciliation, or external banking integration. The supplied materials do not verify direct bank API synchronization or an online payment gateway.

Figure 4. Use Case Diagram



User Interface and Role-Specific Interaction

The supplied interface designs use dashboard-oriented navigation and role-specific menus. The administrator interface emphasizes broad management and oversight; the staff interface emphasizes operational processing; the treasurer interface emphasizes balances and financial transactions; and the scholar interface emphasizes requirements, scholarship information, profile functions, and events. This separation can reduce cognitive overload by presenting users with functions relevant to their responsibilities. Formal usability claims, however, require task completion data and user feedback rather than visual inspection alone.

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Software-Quality Evaluation Status

ISO/IEC 25010:2023 defines nine product-quality characteristics and is designed to support requirements specification, testing objectives, quality criteria, and evaluation. The Smart Foundation evaluation framework maps the system to functional suitability, performance efficiency, compatibility, interaction capability, reliability, security, maintainability, flexibility, and safety. The current evidence supports source-based assessment of functional suitability and selected security controls, but empirical measurements are still required for the remaining characteristics.

Table 3. *ISO/IEC 25010:2023-oriented evaluation matrix and current evidence status.*

Quality characteristic	Evaluation focus	Suggested measure	Current evidence
Functional suitability	Completeness and correctness of functions	Functional pass rate; defect count	Source-based verification available
Performance efficiency	Response time and resource use	Measured response time; load test	Not yet verified
Compatibility	Supported browsers/environments	Cross-browser and deployment testing	Not yet verified
Interaction capability	Ease and clarity of interaction	Task completion; user questionnaire	Not yet verified
Reliability	Consistency and recovery	Repeated execution; recovery tests	Not yet verified
Security	Authentication, authorization, integrity, accountability	Security and authorization tests	Partially source-verified
Maintainability	Code organization and documentation	Code review; documentation review	Not independently verified
Flexibility	Adaptation to changing requirements	Change-request prototype	Not yet verified
Safety	Privacy, data-loss and transaction integrity	Privacy, recovery, transaction tests	Not yet verified

Discussion of the Research Contribution

The principal contribution of Smart Foundation is the integration of multiple scholarship-fund management processes into a shared information architecture. Instead of treating scholarship records, attendance, community service, and financial transactions as independent files or applications, the platform connects them through a common scholar identity and centralized relational data. This design is consistent with the literature's emphasis on context-sensitive digital transformation in nonprofit organizations.

A second contribution is governance-oriented access separation. Scholarship information and financial records have different sensitivity and operational ownership. By separating administrator, staff, treasurer, and scholar permissions, the platform establishes a practical least-privilege structure. Activity logging further supports accountability for selected administrative and financial actions.

A third contribution is the explicit recognition that integration increases security responsibility. Centralizing sensitive records can improve coordination while simultaneously increasing the impact of unauthorized access. Consequently, the next stage of system maturity should prioritize secure file handling,

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session protection, CSRF defenses, privileged account controls, database least privilege, backup recovery, privacy governance, and periodic security assessment.

CONCLUSIONS

Smart Foundation provides an integrated web-based information architecture for scholarship administration, attendance, community-service monitoring, and internal financial information management in San Carlos City.

The role-based structure appropriately separates administrator, staff, treasurer, and scholar responsibilities and establishes a practical basis for least-privilege access.

The relational data model is appropriate for connecting scholar, academic, family, scholarship, requirements, attendance, community-service, allowance, financial, and historical information.

RFID-assisted attendance provides a structured mechanism for event recording and traceability, but it should not be represented as biometric identity verification.

The financial module supports internal recording and reporting of donors, expenses, allowances, bank transactions, and balances, but it should remain subject to formal accounting controls, approval procedures, bank reconciliation, and professional review.

The implementation contains meaningful baseline security controls, but production deployment requires additional security hardening and privacy governance.

The current evidence supports preliminary evaluation of implemented functionality; claims about user satisfaction, performance, reliability, scalability, and overall software quality require actual empirical and technical evaluation data.

Recommendations

Conduct formal user acceptance testing with representative administrators, staff, treasurer personnel, and scholars, and report the sampling procedure, respondent profile, instrument validation, reliability, and statistical results.

Measure response time, database performance, upload processing time, and RFID attendance processing under realistic concurrent-user conditions.

Implement CSRF protection, secure session cookies, session regeneration, login throttling, HTTPS enforcement, and stronger privileged-account controls.

Strengthen file-upload security using extension allow-lists, content-signature validation, size limits, generated filenames, controlled storage, and malware scanning where feasible.

Establish a formal privacy governance framework covering data purpose, lawful processing, access rights, retention, disposal, disclosure, confidentiality, and incident response.

Implement scheduled backups and restoration drills and document recovery objectives.

Add maker-checker or approval controls for sensitive financial transactions where organizational policy requires separation of duties.

Strengthen RFID controls through duplicate-scan prevention, lost-card replacement, card reassignment, and clear attendance exception policies.

Conduct periodic vulnerability assessment and security review before production releases and after major system changes.

Limitations and Future Research

The most important limitation is the absence of a verified final respondent dataset and independent technical benchmark results in the supplied materials. The paper therefore does not report fabricated user counts, weighted means, performance percentages, or statistical significance. Source-based verification documents implemented behavior, but it cannot establish real-world usability, scalability, or security assurance by itself.

Future empirical work should administer the evaluation instrument to representative users, conduct task-based usability testing, measure response times and database performance, perform security testing, and document defects and retesting. Subsequent system research may examine mobile optimization, automated report scheduling, analytics, and other enhancements after core security and governance requirements are stable.

Data Availability, Ethics, Funding, and Conflict of Interest

Data Availability

The study is based on the supplied project manuscript, system design artifacts, and implementation evidence. Personal scholar records, financial records, photographs, credentials, and other sensitive operational data are not included as a public research dataset.

Ethics and Privacy

Any future empirical user evaluation should obtain the appropriate institutional authorization and participant information/consent procedures and should comply with applicable Philippine data-protection requirements. The Data Privacy Act of 2012 and National Privacy Commission rules should govern the collection, access, retention, disclosure, and disposal of personal information.

Funding and Conflict of Interest

Funding and conflict-of-interest information were not specified in the supplied project materials. The final submission should replace this statement with the authors' verified declaration according to the target journal's requirements.

References

Cadungog, R. R., Nambong, R. L., Hontiveros, N. L., Tenebroso, M. B. C., & Serrano, M. R. (2024). Cite-Stema sa Atendansiya: Modernizing CITE students attendance system with RFID technology. International Journal of Computer Science and Engineering Survey, 15(2/3/4). https://doi.org/10.5121/ijcses.2024.15401

Cipriano, M., & Za, S. (2025). Exploring the discourse on digital transformation in nonprofit organizations. Information & Management, 62(6), 104165. https://doi.org/10.1016/j.im.2025.104165

Elmasri, R., & Navathe, S. B. (2016). Fundamentals of database systems (7th ed.). Pearson.

Ferraiolo, D. F., Barkley, J., & Kuhn, D. R. (1999). A role-based access control model and reference implementation within a corporate intranet. ACM Transactions on Information and System Security, 2(1), 34–64. https://doi.org/10.1145/300830.300834

International Organization for Standardization. (2023). ISO/IEC 25010:2023: Systems and software engineering—Systems and software Quality Requirements and Evaluation (SQuaRE)—Product quality model. ISO. https://www.iso.org/standard/78176.html

Jong, C. L. K., & Ganzaroli, A. (2024). Managing digital transformation for social good in non-profit organizations: The case of The Felix Project Zeroing Hunger in London. VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations, 35, 417–427. https://doi.org/10.1007/s11266-023-00597-5

Kendall, K. E., & Kendall, J. E. (2019). Systems analysis and design (10th ed.). Pearson.

Kurniawan, B., Fitriadi, L. H., Albaroky, M. F., & Astiani, R. (2024). Radio Frequency Identification and Telegram for student attendance. International Journal of Research and Applied Technology, 4(1), 139–144. https://doi.org/10.34010/injuratech.v4i1.14124

National Privacy Commission. (2012). Republic Act No. 10173: Data Privacy Act of 2012. https://privacy.gov.ph/data-privacy-act/

National Privacy Commission. (2016). Implementing rules and regulations of Republic Act No. 10173, also known as the Data Privacy Act of 2012. https://privacy.gov.ph/implementing-rules-regulations-data-privacy-act-2012/

Nivetha, R., Kavipriya, M., Pavithra, R., Jeyanthi, C., & Lakshmi, V. S. (2020). Student attendance system using RFID. International Journal of Research in Engineering, Science and Management, 3(10), 16–19.

OWASP Foundation. (n.d.). File upload cheat sheet. https://cheatsheetseries.owasp.org/cheatsheets/File_Upload_Cheat_Sheet.html

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 8 (August 2026)

OWASP Foundation. (n.d.). Password storage cheat sheet. https://cheatsheetseries.owasp.org/cheatsheets/Password_Storage_Cheat_Sheet.html

OWASP Foundation. (n.d.). Session management cheat sheet. https://cheatsheetseries.owasp.org/cheatsheets/Session_Management_Cheat_Sheet.html

Sandhu, R., Ferraiolo, D., & Kuhn, D. R. (2000). The NIST model for role-based access control: Towards a unified standard. Proceedings of the Fifth ACM Workshop on Role-Based Access Control, 47–63. https://doi.org/10.1145/344287.344301

Sommerville, I. (2016). Software engineering (10th ed.). Pearson.