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ONLINE SCHOLARSHIP MANAGEMENT SYSTEM FOR CAMARINES SUR POLYTECHNIC COLLEGES

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Abstract

The study specifically aimed to design and develop an Online Scholarship Management System for Camarines Sur Polytechnic Colleges, focusing on two primary modules: the Admin Management and User Management systems. The Admin Management module allows the administrator to perform critical functions such as importing comma-separated values (CSV) files into the database, importing scholarship data, processing applications, notifying applicants about the status of their applications, processing certification requests, notifying applicants about the release of certifications, printing and releasing certifications, and generating reports. The User Management module, on the other hand, enables users to log in, perform applications, edit their profiles, check the status of their applications, and request certifications. Furthermore, the system was evaluated based on ISO 25010 industry standards, covering eight quality characteristics: functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability.

After the development, testing, and evaluation phases, the study established several key findings. The Online Scholarship Management System effectively provided an Admin Management module, enabling administrators to efficiently handle essential tasks such as importing CSV files, managing scholarship data, processing applications, notifying applicants, handling certification requests, printing, releasing certifications, and generating comprehensive reports. Additionally, the system integrated a User Management module that allowed users to log in, perform applications, edit their profiles, check the status of their applications, and request certifications with ease. Evaluated against ISO 25010 industry standards, the system achieved a general rating of 3.93, demonstrating its reliability, efficiency, and user-friendliness. It met user expectations and industry benchmarks, excelling in functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability, effectively streamlining the scholarship management process.

This study highlights the success of the Online Scholarship Management System in meeting its objectives. The system effectively streamlined administrative tasks by providing an efficient Admin Management module that facilitated the management of scholarship data, applications, certifications, and reporting processes. Additionally, it included a robust User Management module, enabling users to seamlessly perform functions such as logging

in, managing applications, editing profiles, checking application statuses, and requesting certifications. Evaluated against ISO 25010 standards, the system achieved a high general rating of 3.93, demonstrating its reliability, efficiency, and user-friendliness. Overall, the system met user expectations and industry benchmarks, showcasing its capacity to manage scholarship processes effectively.

This study emphasized the practical implementation and future development of the Online Scholarship Management System. First, it is recommended to deploy and integrate the system into the institution's operations to streamline administrative workflows and improve scholarship management processes. To enhance user experience, continuous training and technical support should be provided to users, ensuring they maximize the potential of the User Management module and facilitate a smooth application process. Lastly, maintaining the system's adherence to ISO 25010 standards is crucial to ensure its reliability, adaptability, and continued alignment with user expectations and the evolving needs of the institution.

Keywords. *Aemilianum College Inc., Camarines Sur Polytechnic Colleges, Educational Funding, Financial Assistance Platform, Higher Education Support, Scholarship Administration, Scholarship Application Portal, Scholarship Tracking System, and Student Financial Aid.*

Introduction

Supporting education through scholarships to students of higher learning is an important aspect of governments' efforts worldwide to assist students at all levels and enable them to afford the costs of their studies. Many nations provide scholarships to develop a critical mass of professionals who can act as catalysts for scientific, technological, and economic development. However, the rising cost of education has made it increasingly difficult for low-income families to send their children to school, as they struggle to afford tuition and other educational expenses (Mohammed Abdullahi Jibrin et al.). Scholarships are crucial in providing financial support and making education more accessible by reducing financial burdens, such as tuition and living costs. Traditionally, many institutions have used manual processes for applications and tracking, but these are prone to delays, errors, and inefficiencies that affect both applicants and administrators.

In the Philippines, scholarships are important tool for ensuring equitable access to higher education, especially for students from disadvantaged backgrounds. The government, through agencies like the Commission on Higher Education (CHED), has implemented various scholarship programs to help low-income students pursue tertiary education and reduce dropout rates (CHED, 2023). These programs are part of the national agenda to promote social mobility and economic growth by building a skilled workforce. However, the rising costs of education - including tuition, books, and other necessities - continue to pose challenges for many families (Jibrin et al., 2020). Despite the importance of these scholarships, the manual processing methods still in use hinder the timely distribution of benefits and present obstacles for applicants, particularly those in remote areas. Shifting to digital platforms can address these issues by

improving efficiency, minimizing errors, and expanding access to scholarship opportunities.

At the local level, particularly in the Bicol Region, the challenges associated with manual scholarship management systems are increasingly evident. Remote and underdeveloped areas face logistical issues that limit students' access to scholarship programs, often resulting in missed opportunities. Traditional methods relying on paper records are not only time-consuming but also susceptible to human errors such as typos and missing information, potentially disqualifying deserving applicants. In addition, paper-based storage creates data security risks, compromising the privacy of applicants. Manual processes further disadvantage students with mobility issues or those living far from institutions, making timely submission of applications difficult. Bicol University, for instance, has recognized the importance of addressing these limitations by partnering with organizations like the Tzu Chi Foundation to enhance access to scholarships through digital means. These efforts reflect a growing need for online scholarship management systems to improve efficiency, security, and accessibility for both administrators and students in the region (Bicol University, 2023; Commission on Higher Education, 2022).

There is a pressing need to conduct this study to address the inefficiencies of manual scholarship management processes and explore the advantages of a digital system. As the number of applicants increases and scholarship programs grow more complex, organizations need reliable and streamlined solutions to improve processing times, minimize errors, and ensure fairness. An online scholarship management system offers several advantages, such as real-time updates, enhanced transparency, improved data security, and reduced operational costs. Moreover, it promotes inclusivity by allowing students from remote or marginalized areas to access and apply for scholarships easily. This study aims to contribute to the development of a sustainable and user-friendly digital system that can serve as a model for educational institutions and government agencies, helping them optimize their scholarship programs and provide better support to students in need.

Specific Objectives

Specifically, the study aimed to:

1. Design an Online Scholarship Management System for Camarines Sur Polytechnic Colleges with Admin Management module that allows the administrator to:
   - 1.1 Import comma-separated values (csv) file in the database
   - 1.2 Import Scholarship Data
   - 1.3 Process Application
   - 1.4 Notify Applicant on The Status of Application
   - 1.5 Process Request of Certification
   - 1.6 Notify Applicant on The Release of Certification
   - 1.7 Print and Release Certification
   - 1.8 Report Generation
2. Develop User Management system that allows the user to:
   - 2.1 Log-in
   - 2.2 Perform Application
   - 2.3 Edit Profile
   - 2.4 Check Status of Application
   - 2.5 Request Certification
3. Evaluate the system using ISO 25010 industry standards in terms of:
   - 3.1.Functional Suitability
   - 3.2. Performance Efficiency

3.3. Compatibility
3.4. Usability
3.5. Reliability
3.6. Security
3.7. Maintainability
3.8.Portability

Scope and Delimitations

The scope of this study focused on the design, development, and evaluation of an Online Scholarship Management System (OSMS) for Camarines Sur Polytechnic Colleges (CSPC), aimed at enhancing both administrative processes and user accessibility. The system's Admin Management Module enabled administrators to import scholarship data through CSV files, process applications, notify applicants of their status, manage certifications, and generate reports, replacing labor-intensive manual tasks with automated workflows. Meanwhile, the User Management Module allowed students to log in, apply for scholarships, update profiles, check application statuses, and request certifications, ensuring smoother interactions and quicker feedback. To assess the system's effectiveness, it was evaluated using ISO 25010 standards, focusing on functional suitability, performance efficiency, usability, security, and other key quality attributes. The evaluation involved ten (10) IT experts and five (5) office staff members from the CSPC Scholarships Office, whose feedback guided refinements to ensure that the OSMS met institutional needs and improved access to scholarship programs for students.

The study is delimited to the development of the online scholarship management system for Camarines Sur Polytechnic Colleges and does not extend to other colleges or scholarship programs outside the institution. Additionally, while the system includes modules for managing student information, it does not cover financial aspects of scholarships, such as fund allocation or disbursement. The evaluation of the system will be confined to the feedback of selected IT professionals and end-users within the institution, which may not reflect the opinions or needs of a broader audience.

Gap Bridged by the Study

The previous study bridged gaps identified in existing scholarship management systems, such as those developed by CSM and other educational platforms. These systems often provided essential functionalities, like managing applications and tracking funding sources, but frequently lacked comprehensive features to address the unique challenges faced by underprivileged students. For instance, while many systems streamlined application processes, they did not effectively reduce financial barriers or facilitate equitable access to scholarships for low-income families.

Uniquely, the Online Scholarship Management System aimed to integrate features that not only simplified application and management processes but also prioritized the specific needs of disadvantaged students. This system emphasized accessibility, offering user-friendly interfaces and robust support mechanisms to ensure that financial aid reached those who needed it most. By

focusing on both operational efficiency and social equity, this study contributed to a more inclusive educational landscape, aiming to empower students who traditionally faced obstacles in accessing higher education opportunities.

and user-friendliness. To guide the development process, the researcher created a clear project scope and timeline, outlining the system's objectives, deliverables, and constraints.

Planning

In the first phase of the methodology, the planning process was a crucial step in ensuring the successful development of the Online Scholarship Management System for Camarines Sur Polytechnic Colleges. This phase began with the gathering of essential data, which involved consulting various stakeholders, such as scholarship administrators, student beneficiaries, and institutional staff. Through interviews, surveys, and observations, the researcher identified key functional and non-functional requirements for the system.

Careful consideration was given to understanding the specific needs and challenges faced by the users. This included identifying repetitive manual processes that could be automated, ensuring data accuracy, and addressing issues related to accessibility

Risk assessment and resource allocation were conducted during this phase. Potential challenges, such as compatibility with existing infrastructure and user resistance to change, were analyzed, and strategies were developed to mitigate these risks. Tools and technologies suitable for the system's development were also identified, ensuring the system would be efficient and scalable.

By establishing a comprehensive and well-structured plan, the researcher ensured that the development process would be smooth and that the final system would meet the expectations of its intended users. This planning phase set a strong foundation for the subsequent phases of design, development, and implementation.

Requirements

The second phase of the methodology focused on gathering and analyzing the requirements for the development of the Online Scholarship Management System for Camarines Sur Polytechnic Colleges. This phase was crucial in defining the specific features and functionalities that the system needed to address user needs and operational challenges. The researcher conducted in-depth consultations with key stakeholders, such as scholarship coordinators, system administrators, and student beneficiaries, to ensure the system's requirements aligned with existing workflows. The requirements were divided into functional and non-functional categories. Functional requirements included application management, eligibility checking, scholarship monitoring, notification systems, and reporting and analytics features. Non-functional requirements emphasized usability, security, scalability, and accessibility to ensure the system’s efficiency and reliability. Detailed documentation, including use case diagrams and user stories, was created to visualize interactions and

prioritize critical functionalities. This comprehensive requirement phase served as the foundation for the system's design and development, ensuring that all necessary features were accounted for and aligned with user expectations.

Design

The third phase of the study focused on the design of the Online Scholarship Management System for Camarines Sur Polytechnic Colleges. This phase aimed to translate the requirements identified in the previous phase into a structured and comprehensive system architecture that serves as a blueprint for development. The design process emphasized creating an intuitive, efficient, and scalable system that addressed the functional and non-functional requirements of the stakeholders.

The system design was centered on two main modules: the Admin Management Module and the User Management Module. The Admin Management Module was designed to enable administrators to perform critical tasks such as importing comma-separated values (CSV) files for database population, importing scholarship data, processing scholarship applications, and notifying applicants of their application status. Additionally, it facilitated processing requests for certification, notifying applicants about certification releases, and enabling administrators to print and release certifications. The module also included a report generation feature, providing administrators with the capability to produce summaries and analytics on scholarship data.

The User Management Module, on the other hand, was designed to empower student users to interact with the system effectively. It included features such as logging into the system, performing scholarship applications, editing their profile information, checking the status of their applications, and submitting requests for certifications. These features ensured a seamless and user-friendly experience for the beneficiaries of the system.

The design process incorporated the use of Unified Modeling Language (UML) diagrams, such as use case diagrams, activity diagrams, and entity-relationship diagrams (ERDs), to visualize the system's workflows and database structure. These diagrams provided clarity on how different system components would interact and ensured that data relationships were properly mapped.

The system design also adhered to ISO 25010 standards to ensure high-quality output. Particular attention was given to designing the system for functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. For example, security measures such as encryption protocols and authentication mechanisms were integrated into the design to protect sensitive user and scholarship data. Usability principles guided the layout of the user interface, ensuring it was simple and intuitive for both administrators and applicants.

By carefully crafting the system's architecture, the design phase ensured that all requirements were addressed while creating a strong foundation for the subsequent development and implementation phases. The resulting design promised to deliver a robust, secure, and user-friendly scholarship

management system tailored to the needs of Camarines Sur Polytechnic Colleges.

Develop

The next phase of the study focuses on the Development of the Online Scholarship Management System for Camarines Sur Polytechnic Colleges. This phase involves translating the design specifications into an operational system by writing the necessary code and configuring the system's components. The development team utilizes programming languages, frameworks, and tools chosen in the design phase to implement the core functionalities, including user management, application processing, certification management, and report generation. During this phase, developers ensure that the system adheres to the requirements specified earlier, implementing security features, user interfaces, and data handling mechanisms. Testing is an essential part of this phase, ensuring that the system functions as intended, performs efficiently, and is free of critical errors. Regular feedback from stakeholders, particularly administrators and students, is incorporated to refine the system, address any issues, and ensure it meets the needs of the target users. Once the system is developed, it proceeds to the next phase of testing and deployment.

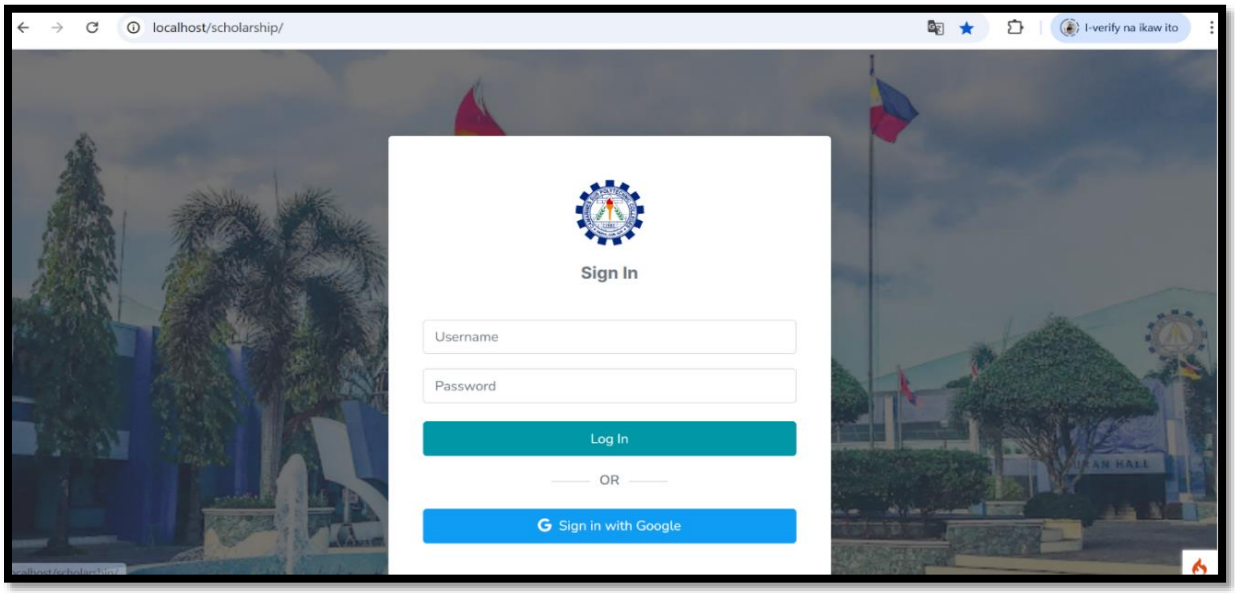

Figure 4.4 System Admin Login

Figure 4.4 illustrates the System Admin Login interface of the Online Scholarship Management System for Camarines Sur Polytechnic Colleges (CSPC). This section serves as the entry point for administrators to securely access and manage

the system's core functionalities. The login interface is designed with a user-friendly layout, requiring an authorized administrator to input their credentials, such as a unique username and password. Security measures, including input validation and encryption protocols, are integrated to ensure data protection and prevent unauthorized access. Once authenticated, the system grants the administrator access to manage student records, oversee scholarship applications, and generate reports efficiently. This feature enhances operational control and ensures the integrity of sensitive data within the system.

Testing

The Testing phase of the study involves systematically evaluating the Online Scholarship Management System to ensure it meets the specified requirements and functions as expected. During this phase, various testing techniques, such as unit testing, integration testing, system testing, and user acceptance testing (UAT), are employed to identify and fix any bugs or issues in the system. Unit testing focuses on individual components, verifying their correctness in isolation, while integration testing ensures that different modules work seamlessly together. System testing checks the overall performance and functionality, including security, usability, and compatibility. UAT is conducted with actual users, such as administrators and students, to assess the system's usability and ensure it meets their expectations. The testing phase also involves performance and stress testing to ensure the system can handle a large number of concurrent users and perform efficiently under various conditions. Feedback from testers is used to refine the system, correct defects, and make necessary improvements before the system is deployed for full use.

Table 4. 10
Overall Testing and Evaluation Result Summary

Sub-Characteristic	IT Experts (10)	Beneficiaries (2)	Weighted Mean	Interpretation
Functional Suitability	3.04	3.35	3.2	Presence of the expectation
Performance Efficiency	2.87	3	3	Presence of the expectation
Compatibility	3.4	3.8	3.6	Presence of the expectation
Usability	3.6	3.9	3.8	Presence of the expectation
Reliability	2.9	3	3	Presence of the expectation
Security	2.12	3.56	3.34	Presence of the expectation
Maintainability	3.9	4	3.34	Presence of the expectation
Portability	3.98	3.76	3.87	Presence of the expectation
Average Weighted Mean	**3.44**	**3.5**	**3.93**	**Presence of the expectation**

Table 4.10 presents the Testing and Evaluation Result Summary for the Online Scholarship Management System, showing the weighted mean ratings for eight key sub-characteristics as evaluated by IT experts and beneficiaries. Functional Suitability scored a mean of 3.2, confirming that the system effectively meets its intended purpose. Performance Efficiency, Reliability, and Security each scored around 3, indicating the system meets expectations in terms of operational efficiency, stability, and data protection. Compatibility (3.6), Usability (3.8), Maintainability (3.34), and Portability (3.87) achieved higher scores, highlighting the system's flexibility, user-friendliness, and adaptability to various environments. The overall average weighted mean of 3.93 confirms that the system consistently met user expectations across all criteria, demonstrating its readiness for implementation and reliable functionality.

Deployment

The Deployment Phase is the final stage in the methodology of developing the Online Scholarship Management System for Camarines Sur Polytechnic Colleges. In this phase, the system is prepared for installation and operational use by the intended users. All necessary configurations, documentation, and training materials have been completed to ensure a seamless transition from development to deployment. The system has undergone rigorous testing to confirm its reliability, functionality, and compatibility, ensuring it is free from critical issues. It is now ready for deployment, allowing the beneficiary to install and use it whenever they decide. This phase also includes providing technical support to address any initial challenges and ensure smooth adoption by the users, guaranteeing the system's effectiveness in managing scholarship processes.

Findings

During the development and after testing and evaluation of the developed system the following findings have been established:

1. The Online Scholarship Management System effectively provided an Admin Management module that enables administrators to efficiently manage tasks such as importing CSV files, handling scholarship data, processing applications, notifying applicants, managing certification requests, printing and releasing certifications, and generating reports.
2. The system successfully incorporated a User Management module, allowing users to log in, perform applications, edit their profiles, check the status of their applications, and request certifications efficiently.
3. Using ISO 25010 industry standards, focusing on functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. With a general rating of 3.93, the system demonstrated its ability to meet user expectations and industry benchmarks, highlighting its reliability, efficiency, and user-friendliness in managing scholarship processes effectively.

Conclusions

Based on the findings of this study the following conclusions were formulated:

1. The Online Scholarship Management System successfully streamlined administrative tasks, enabling efficient management of scholarship data, applications, certifications, and reporting processes.
2. The Online Scholarship Management System effectively provided a User Management module, enabling users to efficiently perform essential functions such as logging in, managing applications, editing profiles, checking application statuses, and requesting certifications.
3. The Online Scholarship Management System met user expectations and industry benchmarks, achieving a general rating of 3.93 based on ISO 25010 standards, and demonstrated reliability, efficiency, and user-friendliness in managing scholarship processes

Recommendations

Based on the conclusions drawn from this study, the following recommendations were formulated:

1. It is recommended to deploy and integrate the Online Scholarship Management System into the institution's operations to optimize administrative workflows and enhance the management of scholarship processes.
2. Further improve user experience, it is suggested to provide continuous training and support for users, ensuring they fully utilize the features of the User Management module for a seamless application process.
3. Maintain its compliance with ISO 25010 standards and ensure that it continues to meet user expectations and adapt to evolving institutional needs.
4. Regularly conduct system performance evaluations and user feedback sessions to identify areas for enhancement, ensuring the system remains efficient, secure, and user-friendly over time.

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