Available Online at www.ijcsmc.com

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320–088X
IMPACT FACTOR: 7.056

IJCSMC, Vol. 15, Issue. 4, April 2026, pg.227 – 233

SCHOOL-BASED WEB ACCESS SCHOLARSHIP PROGRAM INTEGRATED WITH DESCRIPTIVE ANALYTICS

Ivan Del Jolito[1]; Nikki R. Escarilla[2]; Jenny Rose F. Pabale[3]; Noel A. Revilla, MIT**[4]; Ariel M. Segumpan[5]; Mary Joy P. Parreñas[6]; Angele D. Suarez[7]**

Department of Computer Studies, Colegio de Sta. Ana de Victorias, Inc., Philippines

[1] bani96971@gmail.com, c20222951.jolito@csav.edu.ph
[2] escarilla.nikki@gmail.com, c20222413.escarilla@csav.edu.ph
[3] jennyrosepabale@gmail.com, c20222610.pabale@csav.edu.ph
[4] noelrevilla21@gmail.com, noel.revilla@csav.edu.ph
[5] arielsegumpan31@gmail.com, ariel.segumpan@csav.edu.ph
[6] mjoyparrenas@gmail.com, maryjoy.parrenas@csav.edu.ph
[7] angeesuarez198@gmail.com, angele.suarez@csav.edu.ph

DOI: https://doi.org/10.47760/ijcsmc.2026.v15i04.026

Abstract: This study addressed the inefficiencies, delays, and lack of transparency in conventional, manual scholarship management. The research aimed to implement a School-Based Web Access Scholarship Program integrated with Descriptive Analytics to automate the entire application, review, and reporting lifecycle, establishing a consolidated, safe, and transparent platform. Developed using the Agile Development Methodology, the system's design was formally defined, including a Data Flow Diagram, and features a secure online portal with dynamic GWA validation and a managed "push" workflow for reviewers. The designed system successfully replaced the labor-intensive manual filing process. It was rigorously assessed by IT specialists using the ISO/IEC 25010 Software Quality Model Criteria, receiving consistently high scores with a Grand Mean of 3.94 (Strongly Agree) for functional and efficiency performance. A major quantitative outcome was the substantial decrease in application processing time. The integration of Descriptive Analytics dashboards with dynamic 'Status by Course' charts fulfilled the study's primary analytical goal, providing administrators real-time data for demographic analysis, distribution tracking, and performance monitoring. In summary, the program offers a safe, effective, and data-driven alternative. Its excellent rating and confirmed analytical capability validate its feasibility for broad institutional deployment, facilitating a more equitable and data-driven approach to financial aid and grant monitoring.

Keywords: Scholarship Management System, Web Access, Descriptive Analytics, Automated Workflow, Agile Development Methodology, ISO/IEC 25010, Data-Driven Decision Making.

I. INTRODUCTION

Scholarship programs provide vital financial support, allowing students to prioritize their academic performance over financial burdens. However, traditional manual management frequently causes processing delays and inefficient tracking. To address these issues, researchers have increasingly looked toward technology integration. On an international scale, Rodrigues and Silva (2019) demonstrated that web-based platforms significantly reduce human error, while Dahlgren (2020) highlighted the role of data analytics in analyzing scholarship distribution. Within the Philippines, Chavez and Lim (2021) emphasized how combining web platforms with analytics can improve accessibility and even predict student retention rates.

Moving away from manual workflows toward automated systems offers a practical solution to these operational bottlenecks. This transition is highly significant as it equips administrators with organized data, provides reviewers with a focused evaluation interface, and ensures students receive real-time updates. Ultimately, automating these processes improves transparency and fosters a fairer, more sustainable approach to scholarship distribution.

Within the specific context of the institution where this study is conducted, the ongoing reliance on paper-based tracking and scattered spreadsheets makes it difficult to verify student eligibility or quickly generate reports across different academic departments. Despite the broader technological advancements discussed in the literature, a distinct operational gap remains. While existing studies have explored web platforms and data analytics independently, very few addresses how these technologies can be seamlessly merged into a localized system. For instance, while Anderson and Johnson (2019) explored data-driven scholarship allocation, they did not fully examine how to apply it in real-time within an integrated platform.

This study focuses on developing a customized School-Based Web Access Scholarship Program that integrates web-based technology directly with descriptive analytics. This system is designed to automate the application process, enable real-time tracking, and generate actionable insights to support institutional decision-making. By prioritizing efficiency and transparency, this study aims to deliver a fair and highly sustainable digital solution for scholarship management.

Objectives of the Study

This capstone project aimed to develop a School-Based Web Access Scholarship Program integrated with descriptive analytics to improve speed, fairness, and ease of access in scholarship management.

Specifically, the study aimed to:

1. Develop a system that will:
   a. Automate the application processes and list of requirements.
   b. Provide a centralized online platform for students, administrators, and scholarship committees.
   c. Incorporate descriptive analytics to generate insights on scholarship distribution, student performance, and demographic trends.
   d. Enable administrators to analyze historical scholarship data and assess program trends through descriptive analytics.
2. Evaluate the overall quality of the developed application based on the ISO/IEC 25010 Software Quality Model and Quality in Use Criteria, specifically assessing:
   a. Product Quality through IT experts' evaluation in terms of functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability; and
   b. Quality in Use through end-user's assessment in terms of effectiveness, efficiency, satisfaction, freedom from risk, and context coverage.

II. MATERIALS AND METHODS

The descriptive developmental technique, which is the methodical study of designing, creating, and carefully evaluating programs, procedures, and products that must meet standards or criteria, was employed by the researcher.

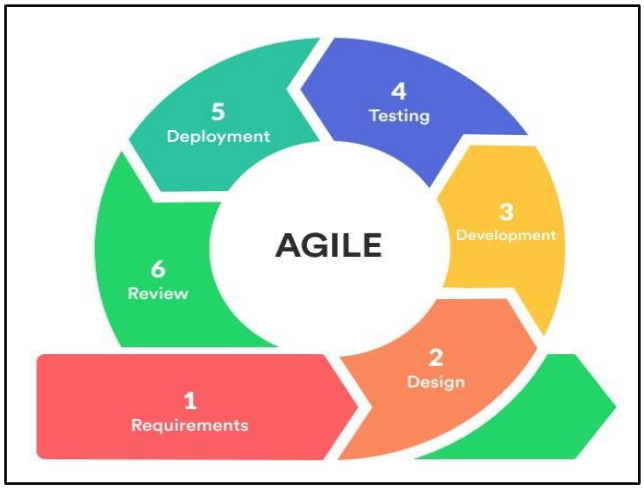

Figure 1. Software Development Life Cycle

Figure 1 shows the methodology used in the development of the proposed system. The researcher used process models of the System Development Life Cycle known as the Agile Approach Model. The approach model anticipates changes and allows for much more flexibility than traditional methods. The process involves breaking down each project into prioritized requirements and delivering each individual within an iterative cycle.

Requirements. In this phase, the researchers conducted interviews to understand the needs of all stakeholders involved in the scholarship program. The requirements were categorized into functional requirements, such as application submission, user account management, and real-time tracking; and non-functional requirements, including system security, usability, and performance.

Design. In this phase, the system architecture is designed, and detailed specifications are developed. For the School-Based Web Access Scholarship Program with Descriptive Analytics, this involved Role-Based Access Control (RBAC) was defined to manage user permissions, user interface wireframes, and database structure using Entity-Relationship Diagrams (ERD) and Data Flow Diagrams (DFD) were developed to visualize data movement.

Development. In this phase, the system was developed in modules, including login, application form, evaluation panel, and reporting. Security features like authentication and encryption were implemented. Development followed iterative sprints with ongoing testing and refinement.

Testing. In this phase, the system will be tested to make sure it worked properly. For School-Based Web Access Scholarship Program with Descriptive Analytics, this involves evaluating the specific features and functionalities to ensure they operate properly.

Deployment. In this phase, after successful testing, the system was deployed on a secure web server. Database migration was completed with test data. Training sessions and manuals were provided to users. The system was then launched in a real environment for use.

Review. After deployment, the researchers collected feedback from users to identify areas for improvement. The system underwent routine checks and updates to ensure continued performance and security. Maintenance activities were scheduled to fix bugs and enhance system features based on user needs.

Data Gathering Procedures. The researchers specifically utilized thematic analysis and semi-structured interviews to gather and analyze data. The researchers allowed the students, administrators, and scholarship committees to use the system. Evaluation forms were supplied by the researchers to the evaluators so they could provide input. The standard questionnaires were used, such as the USE Questionnaire: Usefulness, Satisfaction,

and ease of use questionnaires and the ISO/IEC 25010 software characteristics. All three IT expert groups collectively utilized the ISO/IEC 25010 Software Quality Model questionnaires. In contrast, the selected users were the students, administrators, and scholarship committees who will complete the USE Questionnaire: Usefulness, Satisfaction and Ease of use.

III. RESULTS AND DISCUSSION

After thorough evaluation of the experts and respondents, the following are discovered:

Table 1. *Level of User Acceptability in terms of School-Based Web Access Scholarship Program with Descriptive Analytics.*

In Terms of School-Based Web Access Scholarship Program with Descriptive Analytics	MEAN	Verbal Interpretation
Provide a secure online registration and application module for students to submit requirements.	4.0	Strongly Agree
Automatically validate student qualifications based on specific program rules.	3.6	Strongly Agree
Allow administrators to triage and assign applications to specific reviewers for evaluation.	3.6	Strongly Agree
Automate status updates and email notifications.	4.0	Strongly Agree
Generate real-time visual reports on applicant demographics, courses, and approval rates for decision support.	3.6	Strongly Agree
Maintain a secure log of all reviewer decisions and status changes for accountability.	3.6	Strongly Agree
Grand Mean	**3.73**	**Strongly Agree**

Table 1 shows the evaluation results of the School-based Web Access Scholarship Program with Descriptive Analytics, revealing an overall assessment of Strongly Agree with a Grand Mean of 3.73, which indicates strong technical validation and confidence in the system's functional capabilities. The highest-rated components, the secure online registration module (4.0) and automated status updates with email notifications (4.0), highlight the experts' strong validation of the system's core security and communication effectiveness. The automatic validation of student qualifications (3.6) and the real-time visual reports on demographics (3.6) also received a positive response, showing that the system effectively enforces program rules and provides actionable decision support. Additionally, the administrator's ability to assign applications (3.6) and the maintenance of a secure log for accountability (3.6) were rated as Strongly Agree, reflecting the system's capacity to streamline the workflow and ensure process integrity. Overall, the positive ratings across all features indicate that the proposed web-based program meets specific functional expectations and supports a secure, data-driven, and modernized scholarship application experience.

Table 2. *Level of User Acceptability in terms of determining the quality of the developed system based on ISO/IEC 25010:2011 Systems and Software Quality Requirements and Evaluation (SQuaRE) Quality Model*

Criteria	Mean	Interpretation
Functional suitability	3.8	Very Satisfied
Performance efficiency	3.9	Very Satisfied
Compatibility	3.7	Very Satisfied
Usability	3.7	Very Satisfied
Reliability	3.8	Very Satisfied
Security	3.9	Very Satisfied

Maintainability	3.7	Very Satisfied
Portability	3.7	Very Satisfied
Grand Mean	**3.8**	**Very Satisfied**

Table 2 shows the result of the IT Experts' feedback in determining the quality of the School-based Web Access Scholarship Program with Descriptive Analytics based on the characteristics set in the ISO/IEC 25010:2011 Systems and Software Quality Requirements and Evaluation (SQuaRE) Quality Model. In terms of functional suitability, it was rated with a mean value of 3.8, which is interpreted as very satisfied. Concerning performance efficiency, it was rated with a mean value of 3.9, which is interpreted as very satisfied. As to compatibility, it was rated with a mean value of 3.7, which is interpreted as very satisfied. In regard to usability, it was rated with a mean value of 3.7, which is interpreted as very satisfied. In terms of reliability, it was rated with a mean value of 3.8, which is interpreted as very satisfied. As to security, it was rated with a mean value of 3.9, which is interpreted as very satisfied. About maintenance, it was rated with a mean value of 3.7, which is interpreted as very satisfied. And lastly, in terms of portability, it was rated with a mean value of 3.7, which is interpreted as very satisfied. Generally, in terms of determining the quality of the developed system based on ISO/IEC 25010:2011 Systems and Software Quality Requirements and Evaluation (SQuaRE) Quality Model, the system has a grand mean of 3.8 which has an interpretation of Very Satisfied, indicating a positive assessment of the system's quality across various aspects.

Table 3. *Level of user acceptability in terms of the usability of the developed system in terms of usefulness, satisfaction, ease of use, and learning.*

In Terms of usefulness, satisfaction, ease of use, and learning.	**Mean**	**Interpretation**
Effectiveness	4.0	Very Satisfied
Efficiency	3.7	Very Satisfied
Satisfaction		
Usefulness	4.0	Very Satisfied
Trust	3.7	Very Satisfied
Pleasure	4.0	Very Satisfied
Comfort	4.0	Very Satisfied
Freedom from risk		
Economic risk mitigation	3.7	Very Satisfied
Context coverage		
Context completeness	3.7	Very Satisfied
Flexibility	3.7	Very Satisfied
Grand Mean	**3.8**	**Very Satisfied**

Table 3 shows the result of the user's feedback on the School-based Web Access Scholarship Program with Descriptive Analytics. In terms of effectiveness, it was rated with a mean value of 4.0, which is interpreted as very satisfied. As to efficiency, it was rated with a mean value of 3.7, which is interpreted as very satisfied. About satisfaction, it was rated with a mean value of 3.9, which is interpreted as very satisfied. In regard to freedom from risk, it was rated with a mean value of 3.7, which is interpreted as Very Satisfied. Lastly, in terms of context coverage, it was rated with a mean value of 3.7, which is interpreted as very satisfied. Generally, in terms of determining the usability of the developed system in terms of usefulness, satisfaction, ease of use, and learning, the system has a grand mean of 3.8, with an interpretation of Very Satisfied which, indicates a positive user experience in terms of usability.

IV. SUMMARY OF FINDINGS

Based on the detailed presentation, discussion, interpretation, and analysis of research findings, the following summary is hereby presented:

1. The perfect rating of **4.0** for the secure online registration module and automated status updates indicates that experts strongly validate the system's core security and communicating effectiveness. This suggests that the solution successfully eliminates manual processing vulnerabilities and provides transparency.
2. The **3.9** score demonstrates strong satisfaction with performance efficiency and security. Experts perceive the system as fast, optimized, and secure against unauthorized access, validating the use of middleware authorization.
3. The **3.8** rating in functional suitability and reliability indicates that the software is robust and meets industry standards, though slight refinements may still improve its adaptability across different environments.
4. The **3.6** mean rating for generating real-time visual reports reflects excellent approval of the system's analytical capabilities. Experts find the dashboard valuable for decision support, showing that the feature effectively visualizes applicant demographics and trends.
5. With another **3.6** score, the managed workflow or the assigning applications received strong validation. This suggests that the transition to a designated push system is viewed as highly efficient and logical for administrators.
6. The **3.6** rating signifies strong performance for dynamic validation and audit trails, showing that the system effectively enforces program rules, GWA checks, and maintains accountability. Minor improvements may further enhance the flexibility of these rules.
7. Three IT specialists used the ISO/IEC 9126-1:25021 Software Quality Instrument to test the recommended features for end users of the system. It was concluded that the system was necessary to enhance process performance after the findings showed that the produced system's quality satisfied the requirements.

V. CONCLUSIONS

The result of the alpha and beta testing activities and evaluation was positively proven. Therefore, the researchers concluded that:

1. The consistently high ratings, including multiple perfect **4.0** scores, indicate that the system delivers excellent functionality and meets user expectations across its core features.
2. The Secure Registration Module and Automated Status Updates all received **4.0 (Strongly Agree)**, showing that the system successfully resolves the inefficiencies of the manual process and provides actionable intelligence.
3. The Dynamic Validation (Mean: **3.6**), Audit Trail (Mean: **3.6**), and Descriptive Analytics Dashboard (Mean: **3.6**) demonstrate strong performance but highlight opportunities for minor enhancements in rule customization and reporting depth.
4. With all features rated "Strongly Agree" and quality attributes rated "Very Satisfied," the results confirm that the web-based program is effective, secure, and data-driven, supporting a modernized scholarship application experience for the institution.

VI. RECOMMENDATIONS

1. Implement the Renewal Management Module to allow approved scholars to renew their grants in subsequent semesters without re-encoding static data, further streamlining the process.
2. Integrate an SMS Notification Gateway to ensure students with limited internet connectivity to receive critical status updates instantly, enhancing the system's reach and user satisfaction.
3. Deploy the system to a secure Cloud Server to facilitate remote access for reviewers working off-campus, improving flexibility and accessibility.
4. Regularly conduct user feedback sessions with scholarship coordinators to identify evolving needs, ensuring continuous improvement and maintaining the system's high security and usability standards.
5. Enhance the public landing page to include a dynamic catalog of available scholarship programs and their specific qualification requirements, allowing students to self-assess their eligibility before logging in.
6. Implement an auto-population feature for the application module. Future versions should link the student profile directly to the application form, automatically filling in redundant data to streamline the user experience.
7. Expand the descriptive analytics module to include drill-down capabilities, allowing administrators to view applicant course distribution filtered by specific scholarship programs.
8. The future researcher is recommended to use this study as a reference to help improve the processes of similar academic management systems.

CONFLICTS OF INTEREST

The author declares that for this article she has no actual, potential or perceived conflict of interests. Financial disclosure: The research work is funded by the researcher.

ACKNOWLEDGEMENT

The author thanks Colegio de Sta. Ana de Victorias, Inc. for providing necessary infrastructure facility to carry out the work.

REFERENCES

[1]. Altbach, P. G. (2015). Global perspectives on higher education. Johns Hopkins University Press.

[2]. Baum, S., & Schwartz, S. (2016). Student aid, student behavior, and educational attainment. College Board. https://cipe.umd.edu/conferences/DecliningMiddleClassesSpain/Papers/Baum.pdf

[3]. Berido, M. L., & Reonal, I. (2023). Development of scholarship automation system for student qualification program applied to college universities using regression analysis. World Journal of Advanced Research and Reviews, 20(3), 73–89. https://doi.org/10.30574/wjarr.2023.20.3.2421

[4]. Darling-Hammond, L. (2010). The flat world and education: How America's commitment to equity will determine our future. Teachers College Press.

[5]. Dawson, S. (2015). Learning analytics: Theories, practices, and trends. Springer.

[6]. Espiritu, F. V., Natividad, R. A., & Velasco, J. (2024). Data-driven decision making in scholarship programs: Leveraging decision trees and clustering algorithms. International Journal in Information Technology in Governance, Education and Business, 6(1), 1–13. https://ijitgeb.org/ijitgeb/article/view/134

[7]. Hossler, D., & Gallagher, K. S. (1987). Studying student college choice: A three-phase model and the implications for policymakers. College and University, 62(3), 207–221.

[8]. Jadhav, S., & Pise, N. (2023). CryptoScholarChain: Revolutionizing scholarship management framework with blockchain technology. International Journal of Advanced Computer Science and Applications, 14(8), 652–659. https://doi.org/10.14569/IJACSA.2023.0140872

[9]. Jibrin, M. A., Musa, M. N., & Tahir, S. (2016). Development of e-scholarship system. International Journal of Computer Science and Information Technologies, 7(2), 560–564.

[10]. Khelifi, A., & Adel, K. (2023). Smart scholarship system. In A. Hamdan et al. (Eds.), From Industry 4.0 to Industry 5.0: Mapping the transitions (pp. 953–965). Springer. https://doi.org/10.1007/978-3-031-28314-7_70

[11]. Laudon, K. C., & Laudon, J. P. (2018). Management information systems: Managing the digital firm (15th ed.). Pearson.

[12]. Marave, A. M. (2019). Online scholarship application and record management system for AYZ City. International Journal of Recent Innovations in Academic Research, 3(3), 32–56.

[13]. Pressman, R. S. (2020). Software engineering: A practitioner's approach (9th ed.). McGraw-Hill Education.

[14]. Provost, F., & Fawcett, T. (2013). Data science for business: What you need to know about data mining and data-analytic thinking. O'Reilly Media.

[15]. Ronal, R., Lagarteja, J., & Reonal, I. (2020). Online student's scholarship application with decision support system using decision tree algorithm. ResearchGate. https://www.researchgate.net/publication/349760308

[16]. Tasrif, E., Saputra, H. K., Kurniadi, D., Hidayat, H., & Mubai, A. (2021). Designing website-based scholarship management application for teaching of analytical hierarchy process (AHP) in decision support systems (DSS) subjects. International Journal of Interactive Mobile Technologies (iJIM), 15(9), 179–191. https://doi.org/10.3991/ijim.v15i09.23513

[17]. Triwibowo, Y. (2021). Decision support system to determine scholarship recipients using analytical hierarchy process method. Journal of Intelligent Decision Support System (IDSS), 4(2), 31–40. https://doi.org/10.35335/idss.v4i2.67

[18]. Turban, E., Pollard, C., & Wood, G. (2018). Information technology for management: On-demand strategies for performance, growth, and sustainability (11th ed.). Wiley.

[19]. Yan, K. (2024). Online students' scholarship evaluation system. The Light Explorer, 9(2), Article 75. https://www.thelight-explorer.com/wp-content/uploads/2024/10/75.-Yan-Kemeng-June-2024.pdf

