



Long Paper

Optimizing Enrollment and Administrative Decision-making through Data Analysis for Local Universities and Colleges

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Date received: May 14, 2025,

Date received in revised form: October 21, 2025; December 1, 2025

Date accepted: December 10, 2025

Recommended citation:

Diaz, R. V., & Jain, A. M. (2025). Optimizing enrollment and administrative decision-making through data analysis for local universities and colleges. *International Journal of Computing Sciences Research*, 9, 4074-4098.
<https://doi.org/10.25147/ijcsr.2017.001.1.260>

Abstract

Purpose – Local universities and colleges (LUCs) often face recurring challenges in managing enrollment and generating data-driven administrative decisions due to limited analytical tools. These inefficiencies affect institutional performance and student satisfaction. This study aimed to develop a data-driven enrollment and administrative decision-making system for Balian Community College, intended to serve as a model for other LUCs.

Method – The study employed a system development approach using the Agile methodology. Institutional data were processed using predictive and prescriptive analytics and integrated into a customized decision support system. System quality was assessed following ISO/IEC 25010 standards, while user acceptance was evaluated through the Technology Acceptance Model (TAM).

Results – System evaluation generated high ratings in software quality, with mean scores of 4.68 for functionality, 4.55 for usability, and 4.60 for efficiency. TAM results showed strong user acceptance, with perceived usefulness rated at 4.70 and perceived ease of use at 4.66.



The system streamlined enrollment workflows, reduced administrative workload by around 35%, and provided actionable insights that improved decision-making and resource allocation.

Conclusion –The developed system effectively addressed key administrative challenges by integrating data analytics into institutional operations. However, its implementation was limited to a single LUC, suggesting a need for broader validation.

Recommendations – Future research should refine the system’s predictive models, integrate advanced analytics features, and test scalability across multiple LUCs to enhance robustness and interoperability.

Research Implications – Findings demonstrate the potential of analytics-driven systems to strengthen institutional planning, resource management, and evidence-based decision-making in higher education.

Practical Implications – Implementing data-driven platforms can substantially improve enrollment efficiency, reduce manual workload, and enhance transparency in administrative processes, thereby supporting better service delivery in LUCs.

Social Implications – Improved institutional efficiency may lead to better student experiences and more equitable access to quality education within local communities.

Keywords – Data analysis, enrollment optimization, administrative decision-making, local universities and colleges, system development, Agile methodology, ISO/IEC 25010, Technology Acceptance Model

INTRODUCTION

In today’s digital world, higher education institutions-including local universities and colleges (LUCs)-are under pressure to improve how they manage student enrollment and make administrative decisions. Many still rely on outdated systems, leading to delays, errors, and difficulty accessing reliable data. As demands for transparency and efficiency grow, schools must adopt digital solutions and data analytics to modernize their processes (Fernandes, 2023; Watermark Insights, 2024; Marshall University Institutional Research and Planning, 2023). Using data-driven decision-making helps school administrators develop more effective strategies, improve transparency, and build trust with students, faculty, and other stakeholders (Watermark Insights, 2024). However, many LUCs still struggle with inefficient enrollment systems, slow manual processes, and limited tools to support long-term planning. These challenges often result in student dissatisfaction, heavy administrative workloads, and poor resource management (Santos, Lumibao, & Magday, 2024; Full Fabric, 2023).

Predictive analytics allows institutions to forecast enrollment trends and better prepare for future student numbers. It also helps identify factors that affect student success, making it possible to create targeted support systems (Ekowo & Palmer, 2016; Cerratto Pargman & McGrath, 2021). Ensuring quality education requires institutions to monitor their operations and make well-informed decisions daily, which calls for reliable data and proper systems (Şenyapar & Bayındır, 2024; Prasetyo, 2022; Jin, Peng, Wang, Wang, & Zhang, 2024). Improving enrollment and administrative processes using data analytics is key to making operations more efficient and improving student experiences. As schools move toward digital transformation, tools such as student information systems, mobile enrollment apps, and analytics platforms help streamline registration, improve planning, and ensure data accuracy (Cooley, 2024; Lesjak, Natek, & Kohun, 2021). These tools not only save time and resources but also allow for better decision-making and overall institutional success (Gaftandzhieva, Hussain, Hilčenko, Doneva, & Boykova, 2023; Daniel, 2015).

Local universities and colleges often face unique challenges because they operate under local government units and have limited budgets, staff, and technology. Many still use manual or semi-digital systems, leading to errors, slow responses, and poor data tracking. They are also expected to remain transparent and accountable, despite having few tools to help with reporting and decision-making (Nguyen, Gardner, & Sheridan, 2020; González Canché, 2024). Balian Community College (BCC), established in 1972 in Barangay Balian, Pangil, Laguna, reflects many of these issues. It offers various academic and TESDA-accredited programs and plays a key role in providing accessible education (TESDA, n.d.; UniFAST, n.d.). However, it struggles with limited resources, classroom space, and teaching staff, which affects service delivery and quality (Asian Development Bank, 2012). Its current manual enrollment process causes long lines, delays, and data errors, which burden administrative staff and students (Hirezon, 2024). These challenges increase as the student population grows.

To solve these problems, this study proposes developing a centralized digital system for enrollment and administrative tasks at Balian Community College (BCC). This system will automate registration, track student data in real time, and improve report generation. It will also use predictive and prescriptive analytics to help with planning, budgeting, and resource allocation (González Canché & Zhang, 2024). Security features like encryption and anomaly detection will be included to protect sensitive student information (Liu & Wang, 2024). By transitioning to this automated system, BCC can improve efficiency, transparency, and scalability, making it better prepared to meet the needs of its students and staff (Bond, 2024).

LITERATURE REVIEW

Local Universities and Colleges (LUCs)

Local universities and colleges (LUCs) in the Philippines play a vital role in providing accessible higher education, especially in community-based areas. To improve administrative

efficiency, LUCs can use predictive analytics and real-time data visualization (SAS Institute, 2021). Predictive analytics helps institutions enhance student retention and streamline enrollment (Orong, Ramos, & Castillo, 2020). For instance, a Philippine university developed a machine learning–based decision support system to predict freshman enrollment (Esquivel & Esquivel, 2021). Real-time dashboards also allow administrators to monitor enrollment trends, budgets, and resources (SAS Institute, 2021). Predictive analytics has also supported faculty selection and promotion processes (Bilog & Abamo, 2024). Internationally, Georgia State University in the U.S. applied predictive models to identify at-risk students, improving retention (Georgia State University, 2023). By integrating predictive and prescriptive analytics, LUCs can strengthen transparency, decision-making, and resource allocation.

Administrative Decision-Making

Administrative decision-making in higher education has shifted from intuition-based to evidence-based approaches powered by analytics and artificial intelligence (Ellucian, 2020). Previously, decisions relied on experience, often causing inefficiencies. Today, data-driven tools analyze trends, predict student behaviors, and allocate resources effectively (World Bank, 2023). CHED’s Smart Campus Project improved institutional capacity for data collection and analysis (CHED, 2023). Evidence-based systems also promote fairness and accountability (Semenets, Drahomirov, & Ivankov, 2021). Algorithmic decision-making enhances efficiency but raises ethical issues (McConvey & Guha, 2024). Larger institutions tend to have centralized decision-making, while smaller ones promote participatory approaches (Fordham University, 2022). Strong leadership, communication, and faculty participation further improve institutional outcomes (Carroll, Smith, & Torres, 2023).

Data Analytics

Data analytics is essential for improving enrollment systems. In the Philippines, predictive models help analyze student characteristics and manage resources (Esquivel & Esquivel, 2020). Esquivel and Esquivel (2021) applied binary classification to predict student enrollment. Nationally, Markov chain models improved enrollment forecasting accuracy (Zhao & Otteson, 2024). Internationally, Drexel University and providers such as PowerSchool developed analytics tools for enrollment management (PowerSchool, 2024). These approaches increase efficiency, transparency, and engagement in higher education.

Predictive Analytics

Predictive analytics uses data and algorithms to forecast student enrollment and retention (Zitter, 2021). It identifies likely enrollees and predicts student behaviors (DeLancey & Baumer, 2020). Esquivel and Esquivel’s (2021) system forecasted enrollment in the Philippines. Priulla, DiLuca, and Romano (2024) applied predictive modeling in Italy to study STEM enrollment trends. Beyond forecasting, predictive analytics also supports recruitment

strategies, providing insights from historical student data that help institutions make better-informed admissions decisions (Alyahyan & Düşteğör, 2020).

Prescriptive Analytics

Prescriptive analytics complements predictive analytics by recommending actions for optimal outcomes (Sharma & Patel, 2022). Predictive models may forecast rising enrollments, while prescriptive systems suggest staffing or course adjustments (Zhang, Lee, & Hernandez, 2021). This integration improves planning, reduces costs, and increases student satisfaction (Jones, Carter, & Liu, 2023).

Decision Support Systems (DSS)

AI-driven decision support systems (DSS) enhance administrative functions such as enrollment management, budgeting, and strategic planning in universities by processing large volumes of institutional data to generate actionable, real-time insights (Zhang & Goyal, 2024; Mohammed-Shittu, 2025; Mahamad, Chin, Zulmuksah, Haque, Shaheen, & Nisar, 2025). DSS automates scheduling, optimizes resources, and monitors institutional policies (Stern & Brown, 2022). This integration shifts administration from reactive to proactive, improving transparency and institutional outcomes.

METHODOLOGY

Research Design

This study used both descriptive and developmental research designs to address problems in enrollment and administrative processes at Balian Community College. The descriptive design helped identify current issues, such as slow registration and inconsistent data, by collecting information through surveys, interviews, and feedback from students, administrators, and the enrollment team (Stojanov & Daniel, 2023; Ebneyamini & Moghadam, 2018). This phase focused on understanding the real situation without manipulating any variables.

Based on these findings, the study applied a developmental design, which involved designing, building, and testing a data-driven system tailored to the college's needs (Davenport & Harris, 2020; Stojanov & Daniel, 2023). The system included predictive analytics to anticipate enrollment trends and prescriptive analytics to support resource planning. Advanced tools, such as machine learning and data visualization, were used to ensure data accuracy and clarity (Sajja, Sermet, Cikmaz, Cwiertny, & Demir, 2024).

The system was developed using the Agile methodology, allowing for iterative feedback and continuous improvements from stakeholders (Beck et al., 2021). To ensure quality, the system was evaluated using the ISO/IEC 25010 standards for software quality and

the Technology Acceptance Model (TAM) to assess user acceptance based on perceived usefulness, ease of use, and behavioral intention (Aguirre, Villareal, Gil, & Collazos, 2017). This approach enabled the study to first understand real problems and then create an effective technological solution to support better decision-making, transparency, and efficiency in the college’s operations.

System Framework

The System framework illustrates how predictive and prescriptive analytics can be integrated to optimize enrollment and administrative decision-making in local universities and colleges. The system operates through three main phases: input, data processing, and decision-making. In the input phase, students, applicants, and administrative staff (including the Enrollment Committee and administrators) engage in various activities such as application submission, admission verification, financial transactions, and registration. These activities generate both structured and unstructured data, which serve as the foundation for further analysis. During the data processing phase, raw data is transformed into actionable insights. Historical and real-time enrollment data are collected and analyzed using predictive models to identify trends in student behavior, resource allocation, and budgeting.

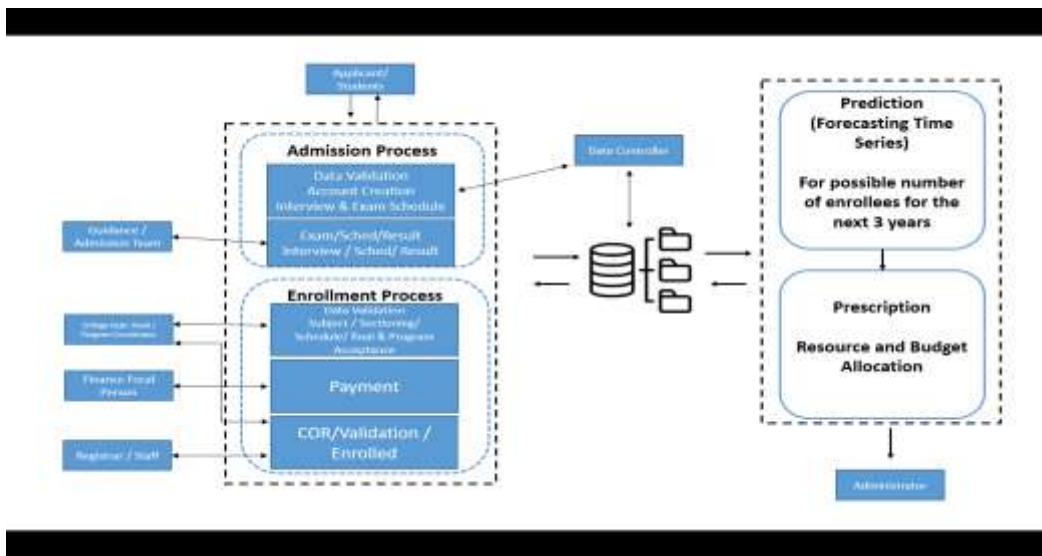


Figure 1. System Framework for Optimizing Enrollment and Administrative Decision-making through Data Analysis

Prescriptive analytics further enhances this by refining models and recommending the most effective decision-making strategies. Finally, in the decision-making phase, the insights gained are used to optimize resource and budget allocation for different programs and projects, ensuring more efficient resource management. The overall aim of the framework is to increase enrollment rates, improve budget and resource accuracy, and enhance strategic management approaches. By applying data-driven methods, local universities and colleges

can achieve greater transparency, efficiency, and sustainability in their enrollment and administrative operations.

Population of the Study

The study focuses on improving enrollment and administrative processes at Balian Community College (BCC), with 1,143: 1,111 students, 10 IT experts, 1 institutional administrator, and 21 enrollment committee members. The student population for the second semester of Academic Year 2024-2025 is distributed across four programs: Bachelor of Science in Entrepreneurship (382), Bachelor of Science in Public Administration (380), Bachelor of Science in Midwifery (209), and Bachelor of Science in Accounting Information Systems (140).

Sampling Design

The study used stratified random sampling to ensure a representative selection of respondents from Balian Community College (BCC). The population was divided into different groups (strata) based on their roles: students, administrative staff, faculty, part-time instructors, and non-teaching staff. This approach helped capture diverse perspectives and ensured key groups were adequately represented, reducing bias (Smith, Torres, & Lee, 2022). Stratified sampling is effective in heterogeneous populations, such as a college community, and improves the reliability of the results, especially for addressing issues like enrollment and decision-making processes (Hadijah, 2024). The sample size for students was calculated using an online tool, yielding 286 respondents out of 1,111 students, with a confidence level of 95% and a margin of error of $\pm 5\%$. Respondents were distributed across academic programs as shown in Table 1. Additionally, all faculty and administrative staff involved in enrollment and decision-making were included to ensure their roles in the system were represented (Creswell & Creswell, 2018).

Table 1. Academic Program Distribution Using Stratified Sampling

Program	Number of Respondents	Percentage (%)
BSE	99	34.62%
BSPA	98	34.27%
BSM	37	12.94%
BSAIS	36	12.59%
Total	286	100%

Data Collection Instrument

This study utilizes a combination of survey questionnaires and structured interviews as the primary data collection instruments to gather comprehensive and relevant information from the stakeholders of Balian Community College (BCC). These tools are designed to align with the study's objectives of analyzing and optimizing enrollment and administrative decision-making systems to enhance transparency and the enrollment process.

Survey Questionnaires

The survey questionnaire was structured to collect quantitative data and is divided into sections based on the roles and experiences of the respondents. It comprises close-ended questions using Likert-scale items to ensure consistency and ease of analysis. The evaluation tools are anchored on two established models: the ISO/IEC 25010:2011 software quality model and the Technology Acceptance Model (TAM).

Software Quality (ISO 25010:2011)

For IT experts, the questionnaire was based on ISO/IEC 25010, which provides a comprehensive framework to assess the system's product quality, including attributes such as functionality, usability, reliability, security, and maintainability (Aguirre, Villareal, Gil, & Collazos, 2017). The survey for IT experts is structured according to ISO/IEC 25010, which defines software quality characteristics critical for evaluating system performance in real-world operational settings (Fagerholm, Guinea, Mäenpää, & Münch, 2021). The system's effectiveness is evaluated based on several key criteria, as shown in Table 2, to ensure it meets institutional needs. Functionality assesses whether the system accurately and completely performs its core tasks, such as managing student records and institutional data. Reliability measures its ability to operate consistently under expected conditions without failures over time. Efficiency examines performance metrics like response time, resource usage, and processing capacity to ensure smooth operation.

Maintainability determines how easily the system can be updated, fixed, or enhanced as requirements evolve. Portability evaluates its adaptability to different hardware or software environments, ensuring flexibility for future changes. Finally, security scrutinizes the protective measures in place to safeguard data and prevent unauthorized access or breaches. Together, these factors ensure the system remains robust, user-friendly, and sustainable for long-term use. These factors are rated by IT professionals who have relevant expertise in software evaluation and academic information systems, ensuring that the system aligns with recognized quality standards.

Table 2. Likert scale for ISO 25010

SCALE	NUMERICAL RATING	DESCRIPTIVE RATING
5	4.20 - 5.00	Functional/Reliable/Efficient/ Maintainable/ Portable/Secured
4	3.40 - 4.19	Slightly Functional/Reliable/Efficient/ Maintainable/ Portable/Secured
3	2.60 - 3.39	Undecided
2	1.80 - 2.59	Slightly Not Functional/Reliable/Efficient/ Maintainable/ Portable/Secured
1	1.0-1.79	Not Functional/Reliable/Efficient/ Maintainable/ Portable/Secured

User Acceptability

For end users-students, faculty, and staff-the questionnaire follows the Technology Acceptance Model (TAM) as presented in Table 3, which evaluates perceived usefulness, ease of use, attitude toward use, and behavioral intention. TAM is widely recognized for assessing user acceptance of new technologies in educational environments (Smith, Torres, & Lee, 2022).

This model examines several important factors that influence user acceptance, including how users perceive the system's quality in terms of functionality, reliability, and security. It also looks at whether people find the system easy to use and whether they believe it helps them work better. The survey explores users' general feelings about the system and whether they're likely to continue using it, while also considering how their past experiences with similar technologies might affect their views. Designed to provide a complete picture of user satisfaction, the survey measures both practical benefits and ease of use, and includes open-ended questions to capture personal feedback and suggestions for improvement. This approach ensures the findings reflect real user experiences while identifying opportunities to enhance the system.

Table 3. Likert scale for the User Acceptability

SCALE	NUMERICAL RATING	DESCRIPTIVE RATING
5	4.20 - 5.00	Highly Acceptable
4	3.40 - 4.19	Acceptable
3	2.60 - 3.39	Moderately Acceptable
2	1.80 - 2.59	Unacceptable
1	1.0-1.79	Highly Unacceptable

Statistical Treatment

The data collected in this study are analyzed using various statistical methods to ensure that the findings are valid, reliable, and aligned with the research objectives of optimizing enrollment and administrative decision-making at Balian Community College (BCC). The statistical treatments applied to the data are shown in Table 4.

Project Design

For this study, titled *Optimizing Enrollment and Administrative Decision-Making through Data Analysis for Local Universities and Colleges*, a structured project design was developed to align with the research goals and ensure all elements are clearly integrated. The design is based on a conceptual framework that uses predictive and prescriptive analytics to identify current inefficiencies in enrollment and administrative processes. It aims to analyze data-

driven solutions and recommend strategies that improve transparency, efficiency, and decision-making in local higher education institutions (Chigbu & Makapela, 2025).

Table 4. Table outlining the statistical treatment.

Objectives	Statistical Tool	Formula
Evaluate the developed system's quality using the ISO/IEC 25010	AWM Ranking	$AWM = (\sum fx) / N$ Where: f = frequency x = scale value N = total number of respondents
Conduct an assessment of the system's effectiveness by measuring user acceptability and satisfaction.	AWM Ranking	$AWM = (\sum fx) / N$ Where: f = frequency x = scale value N = total number of respondents
Determine if there is a significant difference in the result of the user satisfaction between the students, enrollment committee, and administrators.		$U = n_1n_2 + \frac{n_1(n_1 + 1)}{2} - R_1$ Where: n_1n_1 = sample size of group 1 n_2n_2 = sample size of group 2 R_1R_1 = sum of ranks for group 1 R_2R_2 = sum of ranks for group 2

Software Development Model

The development of the system for optimizing enrollment and administrative decision-making through data analysis was guided by the Agile Software Development Model, specifically using the Scrum framework. This methodology enabled iterative progress, adaptive planning, and consistent collaboration with stakeholders, making it well-suited to the evolving needs of higher education institutions (Hadijah, 2024; Artyukhov, Volk, & Vasylieva, 2020).

The Agile Software Development Model shown in Figure 2 ensures flexibility, user engagement, transparency, and continuous improvement in developing systems for optimizing enrollment and administrative decision-making. Its iterative approach minimizes development risks, delivers functional components at regular intervals, and ensures that the final system effectively enhances data analysis, transparency, and security within local universities and colleges.

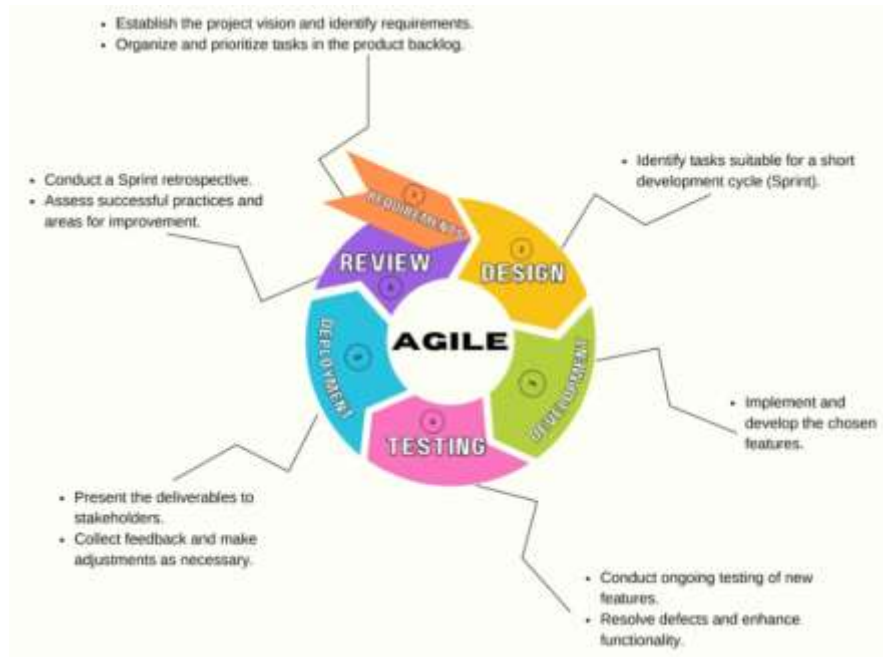


Figure 2. Agile Software Development Model

Requirements Phase

The requirements gathering involved structured interviews with administrators, enrollment staff, and students, supplemented by on-site observations during the enrollment period. Students shared their experiences with enrollment steps and communication channels. The observations documented manual processes, including form collection, office visits, and queue management. This process identified potential system requirements such as record centralization, workflow automation, real-time notification capabilities, and analytical tools.

Design Phase

Stakeholder consultations-involving administrators, enrollment committee members, and students-were conducted throughout the design phase. The system architecture incorporated a centralized student records database, automated enrollment workflows, a real-time administrative dashboard, and a notification system for students. The relational database stored student information, including personal details, enrollment status, and academic progress. The user interface (UI) was tailored for administrators, enrollment staff, and students. Administrators and committee members received a dashboard displaying enrollment figures, course availability, and student progress. Students were provided with an interface for online enrollment, document submission, and progress tracking, along with step-by-step guidance and notifications. The system automated the previously paper-based enrollment process, enabling online form submission, automated validation, and subject

assignment. A notification system alerted students about missing documents or approval status. Security measures included user authentication, role-based access controls, and validation checks at each data entry stage. Prototypes of key components, such as the student interface and administrative dashboard, were reviewed for feedback, leading to refinements in usability and accessibility.

Development Phase

The development phase implemented the designed enrollment and administrative system using Visual Studio Code as the primary IDE, with XAMPP providing the local server environment (Apache, PHP, and MySQL). Frontend development utilized HTML for structure, CSS for styling, JavaScript for interactivity, and Bootstrap for responsive design. The backend employed PHP for server-side processing and MySQL for database operations, managing student profiles, enrollment records, and course information. Two primary interfaces were built: a student portal for online enrollment submissions, document uploads, and status tracking; and an administrator dashboard for data review, document management, and report generation. The system incorporated automated document validation and record organization features. Security measures included encrypted authentication, role-based access controls, and multi-layer form validation.

Testing Phase

The enrollment system's functionality, usability, and reliability were evaluated during this phase. Initial tests used Google Chrome's developer tools to monitor system behavior and identify rendering or performance issues. Functional testing verified user registration, form submission, file uploads, role-based access, and dashboard operations. Usability testing involved students, staff, and administrators performing tasks while observers noted interaction challenges. Security testing validated session management, input validation, and access controls through deliberate error injections. Cross-browser compatibility was checked against Firefox and Edge. Identified issues were categorized by severity, with critical problems resolved before implementation.

RESULTS

The Developed Enrollment System

The developed automated enrollment system successfully integrated online admission, digital document uploading, automated subject evaluation, online payment processing, and real-time dashboards. These features directly addressed the issues found in the manual enrollment workflow, such as long queues, delays, and duplicated tasks. The interface and system features shown in Figures 3, 4, and 5 demonstrate the complete transition from manual to automated processing, highlighting modules for student records, evaluation, and administrative access.

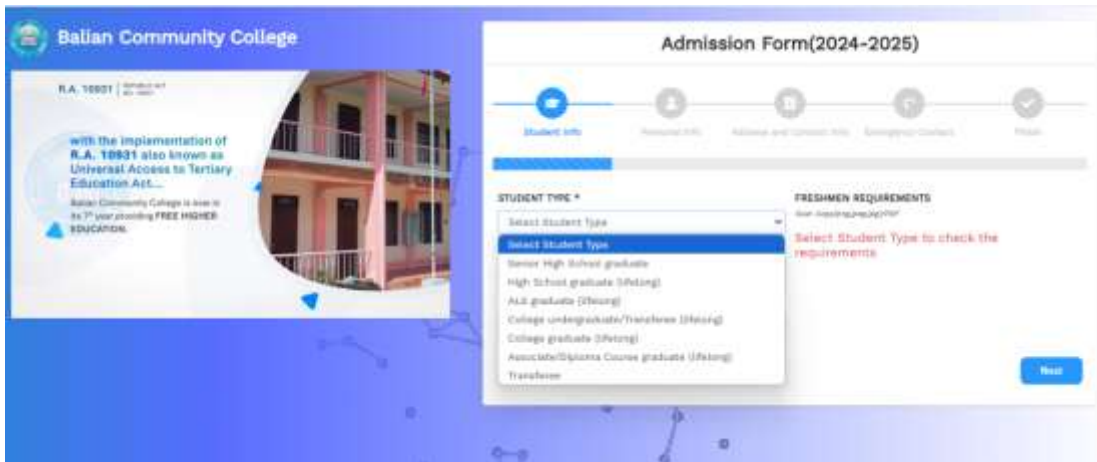


Figure 3. Students' Registration and Admission

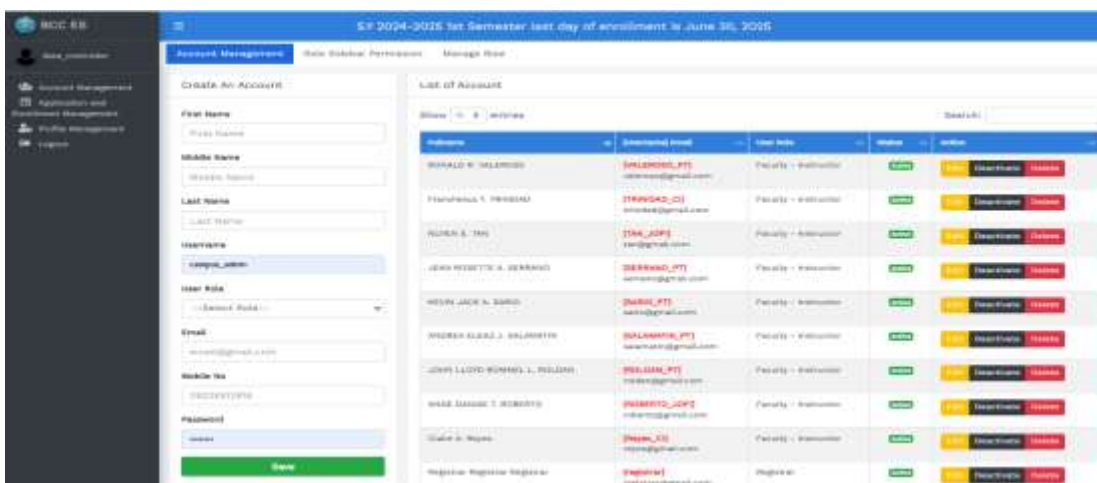


Figure 4. Record Management

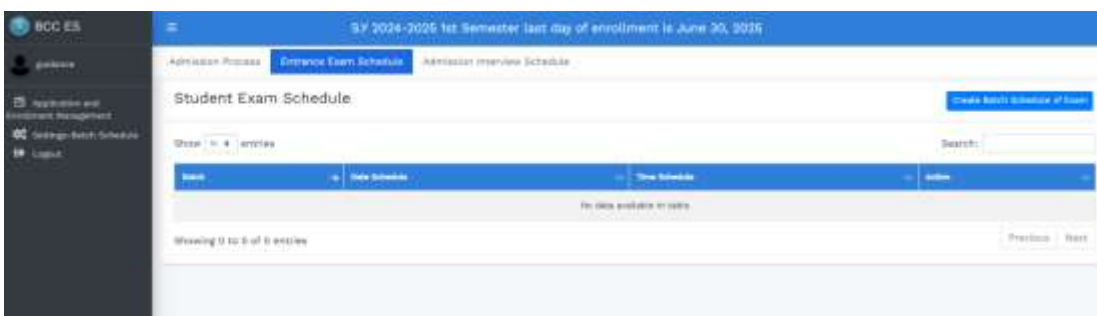


Figure 5. Reporting Interface for the examinee schedule

Performance Improvement

A time analysis comparing manual and automated processes revealed significant improvements. As presented in Table 6, the manual enrollment procedure required 390 minutes per student, while the optimized automated system required only 65 minutes. This resulted in a time reduction of 325 minutes or approximately 83 percent. The largest improvements occurred in validation, subject evaluation, cashiering, and registrar processes, which were greatly reduced through digital handling. These results confirm the system's ability to remove redundant steps and reduce student congestion during enrollment.

Table 6. Manual vs Optimized Enrollment Process (Per Student Transaction)

PROCESS STAGE	MANUAL PROCESS DESCRIPTION	MANUAL TIME (MIN)	OPTIMIZED PROCESS DESCRIPTION	OPTIMIZED TIME (MIN)
1. Admission Application	Google Form submission + manual review via Messenger	30	Online portal admission with auto-confirmation	5
2. Validation & Acceptance	Manual validation and acceptance via Messenger	60	Automated validation and issuance of student accounts	10
3. Exam & Interview Notification	Manual scheduling and results via Messenger	45	System-generated notification and result update	5
4. Enrollment Step 1: Credential Check	In-person credential check + issuance of enrollment guide	40	Upload of digital credentials + auto-generation of enrollment guide	10
5. Step 2: Prospectus Issuance & Verification	Printed prospectus issued and verified manually	30	Prospectus viewable in the system with automated subject tracking	5
6. Step 3: Subject Evaluation	Manual evaluation with the faculty or registrar	60	Online system-assisted subject evaluation	10
7. Step 4: Data Record & Enrollment Form	Manual encoding and printed form release	30	Automatic data logging and a form available for download	5
8. Step 5: Bills Payment	In-person payment with a queue	40	Online payment through portal/e-wallet integration	5
9. Step 6: Registrar Validation	Manual review and approval by the registrar	30	Registrar validates digitally through the dashboard	5
10. Step 7: Dept. Head COR Signing	COR printed and walked to the College Department Head for signature	25	COR digitally signed and stored via the system	5
Total Time per Student Transaction		390 minutes		65 minutes

Predictive Analytics Capabilities

The system's predictive analytics capabilities generated enrollment forecasts and visual trend analyses shown in Figures 6, 7, and 8. These charts helped project future student population levels, enabling administrators to prepare classrooms, assign faculty loads, and allocate budgets more accurately. The prescriptive analytics results, illustrated in Figures 8, 9, and 10, provided administrators with resource allocation recommendations based on forecasted student numbers. These outputs allowed the institution to plan for staffing, space requirements, and budget adjustments in a more data-driven manner.

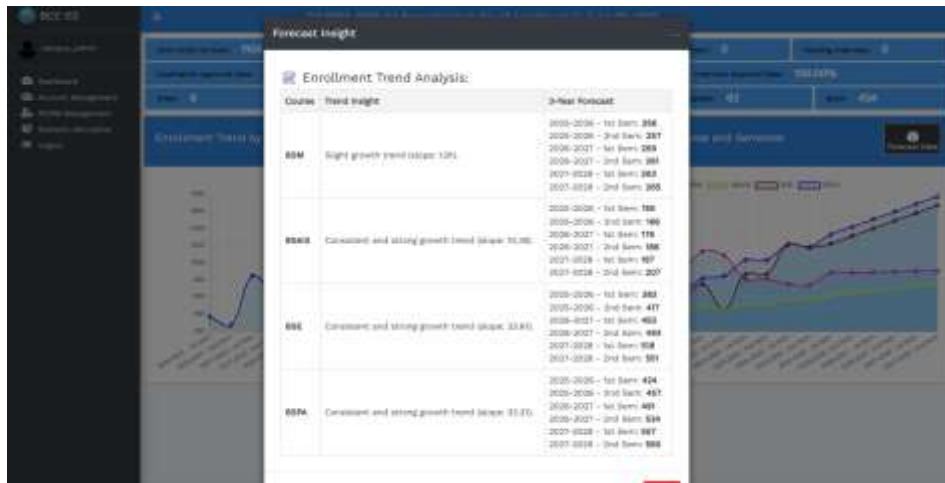


Figure 6. Forecast future student population trends.

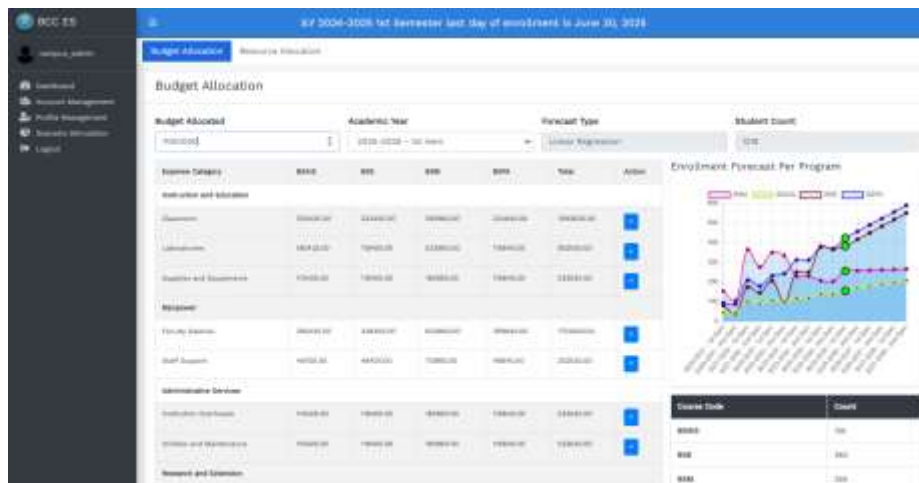


Figure 7. Planning and resource allocation.

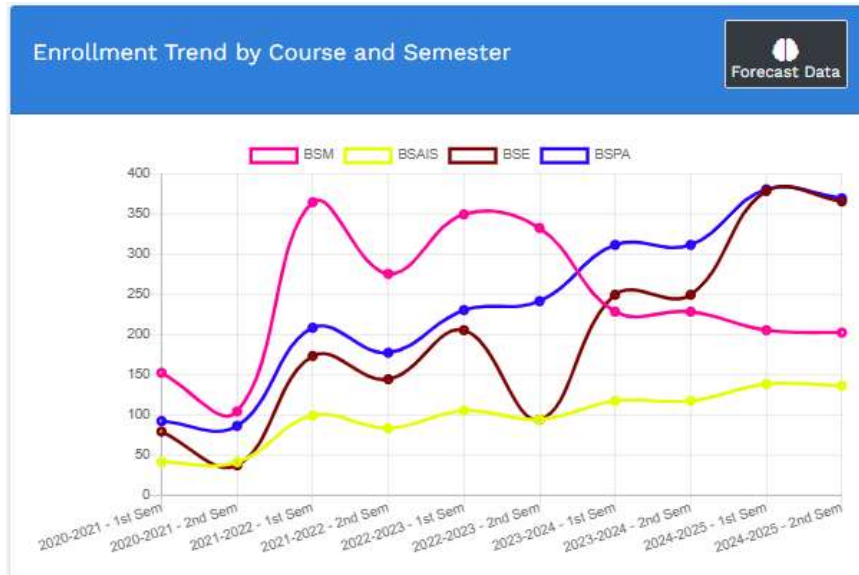


Figure 8. Color-coded graphs and trend lines highlight potential growth patterns

System Evaluation Result

Software Quality Evaluation using ISO/IEC 25010

The system underwent quality evaluation using the ISO/IEC 25010 model, as summarized in Table 7. Experts rated the system highly in functionality (4.520), reliability (4.340), and efficiency (4.243), indicating that it met expected performance standards and operated consistently under testing. However, the security rating (3.813) was the lowest, showing that enhancements in data protection and vulnerability prevention are necessary. Despite this, the overall quality results reflect a stable and functional system ready for institutional deployment.

Table 7. System Quality Evaluation Based on the ISO/IEC 25010 Framework of an IT Expert

CRITERIA	RATING	DESCRIPTIVE RATING
Functionality	4.520	Strongly Agree
Reliability	4.340	Strongly Agree
Efficiency	4.243	Strongly Agree
Maintainability Weighted Mean	4.025	Agree
Portability Weighted Mean	4.104	Agree
Security Weighted Mean	3.813	Agree

User Acceptability Result

User acceptability using the Technology Acceptance Model (TAM) also produced positive findings. The Enrollment Committee gave a very high acceptability rating, with a grand mean of 4.653, as shown in Table 8, indicating that they found the system useful, easy to operate, and beneficial for improving institutional workflows. Students also provided a generally positive evaluation, reflected in Table 9, with a grand mean of 4.306. While they

appreciated the interface design, they expressed concerns regarding system security and occasional inconsistencies. A comparison of satisfaction levels using the Mann-Whitney U Test, shown in Table 10, revealed significant differences in appropriateness, learnability, efficiency, accessibility, and functionality, where the Enrollment Committee rated the system higher. However, both groups showed no significant difference in suitability, effectiveness, and freedom from risk, indicating shared agreement that the system achieves its intended purpose.

Table 8. Enrollment Committee Response

CRITERIA	RATING	DESCRIPTIVE RATINGS
Quality factors	4.783	Highly Acceptable
Perceived ease of use	4.567	Highly Acceptable
Perceived usefulness	4.550	Highly acceptable
Attitude towards the adoption of the system	4.600	Highly acceptable
Behavioral intention to use	4.883	Highly acceptable
Experience	4.550	Highly acceptable
Grand Mean	4.655	Highly acceptable

Table 9. Students' Response

CRITERIA	RATING	DESCRIPTIVE RATINGS
Quality factors	4.337	Highly acceptable
Perceived ease of use	4.360	Highly acceptable
Perceived usefulness	4.257	Highly acceptable
Attitude towards the adoption of the system	4.428	Highly acceptable
Behavioral intention to use	4.274	Highly acceptable
Experience	4.181	Acceptable
Grand Mean	4.306	Highly acceptable

Table 10. Comparison of User Satisfaction Ratings between the Enrollment Committee and Students Using the Mann-Whitney U Test

SYSTEM QUALITY CRITERIA	MEAN RANK (COMMITTEE)	MEAN RANK (STUDENTS)	U-VALUE	P-VALUE	INTERPRETATION
APPROPRIATENESS	58.10	48.35	980.5	0.042	Significant
SUITABILITY	56.85	49.10	1022.0	0.060	Not significant
LEARNABILITY	60.25	47.00	945.0	0.030	Significant
EFFICIENCY	59.00	48.00	965.0	0.038	Significant
ACCESSIBILITY	57.90	48.20	990.5	0.045	Significant
FUNCTIONALITY	58.60	47.60	955.5	0.035	Significant
FREEDOM FROM RISK	56.75	49.30	1035.0	0.065	Not significant
EFFECTIVENESS	57.20	48.70	1010.0	0.052	Not significant

DISCUSSION

The findings of this study demonstrate that the developed automated enrollment system significantly improves institutional efficiency, as supported by the time reduction results in Table 6. The dramatic 83% decrease in processing time confirms that automation successfully resolves long-standing operational challenges such as slow validation, manual data encoding, and administrative bottlenecks. This supports past research emphasizing that

academic institutions benefit greatly from automation in areas requiring repetitive and high-volume processing. The system interfaces in Figures 3 to 5 visually show how automation replaced manual encoding with streamlined digital workflows.

The integration of predictive and prescriptive analytics further strengthens administrative planning and decision-making. The enrollment forecasts in Figures 6 to 8 allow administrators to anticipate student population trends and prepare resources ahead of time, improving classroom management, faculty assignments, and budget allocation. The prescriptive analytics outputs in Figures 8 to 10 go beyond forecasting by suggesting specific strategies for resource allocation, making decision-making more data-driven and effective. This aligns with studies showing that analytics improves accuracy, reduces uncertainty, and enhances institutional responsiveness.

The ISO/IEC 25010 quality evaluation in Table 7 highlights the system's strong performance in functionality, reliability, and efficiency. These results confirm that the system is capable of supporting academic processes consistently and accurately. However, the lower security rating suggests the need for enhanced authentication, better data protection mechanisms, and improved defense against common digital threats. This is particularly important because students, based on the acceptability results in Table 10-expressed concerns about system safety and data risk. Strengthening the security features of the system will likely increase user trust and satisfaction.

The user acceptability results further reveal that the Enrollment Committee rated the system more favorably than students, as shown in Tables 8 and 9. The significant differences found in the Mann-Whitney U Test (Table 11) suggest that administrators have a deeper understanding of the system's benefits and a higher level of familiarity with institutional workflows. Students, however, may require clearer guidance, user-friendly improvements, and more visible security features to enhance their comfort and confidence when using the system. Despite these differences, both groups agree that the system effectively fulfills its intended purpose and improves the overall enrollment experience.

Collectively, the results show that the system is functional, efficient, and well accepted, with strong potential for full implementation in Local Universities and Colleges (LUCs). The combination of automation, predictive analytics, and prescriptive recommendations positions the system as a powerful tool for modernizing enrollment operations and supporting data-informed decision-making in academic institutions.

CONCLUSIONS AND RECOMMENDATIONS

The study successfully developed and evaluated an optimized enrollment and administrative decision-support system for Balian Community College using data analysis techniques and modern software development approaches. Through a combination of descriptive and developmental research, the project identified key issues in the college's manual enrollment process, including delays, redundant tasks, and a lack of data-driven tools.

These insights guided the design and development of a digital system aimed at streamlining operations and improving administrative decision-making. Using Agile methodology, the system was built in Visual Studio Code and deployed via a local XAMPP server. Technologies such as HTML, CSS, JavaScript, and Bootstrap were used to create a responsive and user-friendly interface. Predictive and prescriptive analytics were integrated to provide useful insights for planning, budgeting, and resource management. The system automated many routine tasks and improved data handling, allowing administrators to make more informed decisions based on real-time data. The system underwent rigorous evaluation using the ISO/IEC 25010 software quality model and the Technology Acceptance Model (TAM). Results showed high levels of functionality, reliability, and user satisfaction. Minor technical and interface issues were noted during testing, but were quickly addressed. Overall, the system achieved its goal of optimizing enrollment and supporting evidence-based administrative processes, making it a practical and scalable solution for similar educational institutions.

To maximize the system's long-term impact, several recommendations are proposed. The system should be fully implemented across all departments, with structured user training provided. Security improvements, especially the resolution of a reported XSS vulnerability, must be prioritized. Enhancing the user interface, particularly for mobile access, and adding built-in tutorials will improve the user experience. The system should also be aligned with CHED reporting standards and designed to scale with growing enrollment. Finally, continuous evaluation through user feedback and recognized quality frameworks is essential to ensure ongoing relevance and effectiveness.

IMPLICATIONS

The findings of this study have significant implications for higher education institutions, particularly for local universities and colleges seeking to improve enrollment and administrative processes through technology and data analytics. The high satisfaction ratings and positive evaluations from both users and experts indicate that adopting an automated, analytics-based system can enhance institutional efficiency, transparency, and data-driven decision-making.

The developed system demonstrates that digital transformation in enrollment management can reduce administrative workload, minimize errors, and improve service delivery. By automating repetitive tasks, personnel can focus on strategic and student-centered activities, resulting in greater productivity and operational effectiveness.

The integration of predictive and prescriptive analytics also has important implications for academic planning and governance. These tools enable administrators to forecast enrollment trends, allocate resources efficiently, and implement evidence-based policies, fostering a culture of informed decision-making within the institution.

Furthermore, the system's strong ratings in functionality, reliability, and security emphasize the importance of following international software quality standards such as

ISO/IEC 25010. Ensuring data security and system reliability is essential for maintaining institutional trust and supporting long-term sustainability.

The system's success serves as a practical model for other Local Universities and Colleges (LUCs) aiming to implement digital and data-driven solutions. Its scalability and adaptability make it suitable for broader applications across educational institutions, supporting the nationwide movement toward digital transformation in higher education.

In essence, this study highlights that integrating technology and analytics into administrative operations not only addresses current institutional challenges but also lays the groundwork for more efficient, secure, and evidence-based management practices.

ACKNOWLEDGEMENT

The researcher extends sincere gratitude to Almighty God for the guidance, strength, and wisdom that made this study possible. Deep appreciation is given to the researcher's wife, Analyn, daughter, Kaye Anne, and the entire family for their unwavering love, understanding, and support. The researcher also expresses heartfelt thanks to the Research Adviser, Sir Achieval M. Jain, Sir Mark Reden Pacaon, for his invaluable guidance, as well as to Sir Jommel De Jesus and Sir Leander Lizo for their encouragement to pursue and continue this research endeavor. Appreciation is likewise extended to friends and colleagues, especially Mr. Kevin Jack A. Sario, and to both Laguna State Polytechnic University and Balian Community College for providing essential support and resources. With heartfelt thanks, the researcher acknowledges all who contributed to the successful completion of this academic journey.

FUNDING

The study did not receive funding from any institution.

DECLARATIONS

Conflict of Interest

The author declares no conflict of interest related to the conduct and completion of this study. All procedures, analyses, and interpretations were carried out objectively and independently, without any personal, financial, or professional relationships that could have influenced the research outcomes. The study was conducted solely for academic purposes in fulfillment of the requirements of Balian Community College.

Informed Consent

All participants involved in this study were informed of the research objectives, procedures, potential risks, and benefits before their participation. They were assured that

their participation was voluntary and that they could withdraw from the study at any time without any penalty. Written informed consent was obtained from all participants before data collection. Confidentiality and anonymity were strictly maintained throughout the research process.

Ethics Approval

This study received ethics approval from the Research Ethics Committee of Balian Community College before data collection. The research protocol was reviewed to ensure compliance with ethical standards concerning human participation, data privacy, and research integrity. All procedures were conducted in accordance with institutional and national ethical guidelines for research involving human participants.

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