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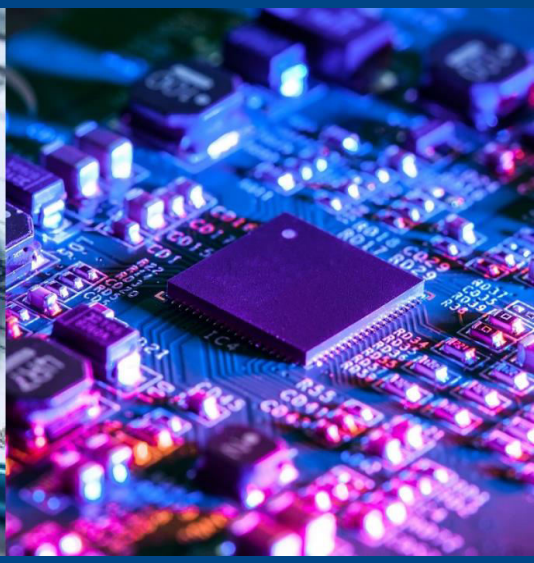

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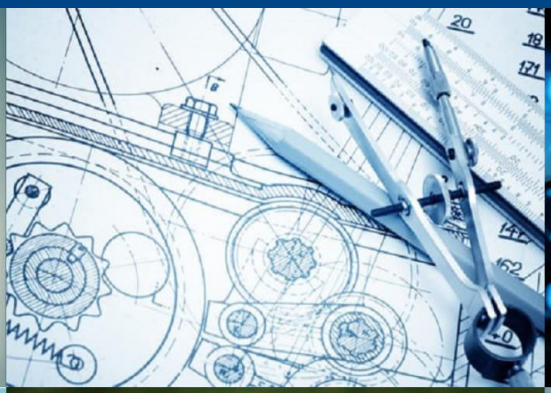

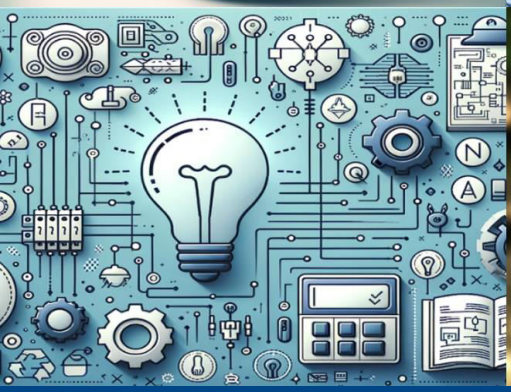

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A Web Based Platform for Optimizing Customer Satisfaction

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ABSTRACT. This study developed and evaluated a web-based platform to enhance customer satisfaction at the frontline offices of NEMSU Cantilan Campus by integrating sentiment analysis, recommender systems, and data analytics. The platform addressed delayed feedback, inconsistent communication, and limited real-time engagement. Using Agile SDLC and ISO/IEC 25010 standards, the system was assessed by 930 respondents. Results showed high effectiveness (general mean = 4.75), with portability and usability scoring highest. The platform reduced feedback processing from 2–3 days to under 15 minutes and improved stakeholder satisfaction from 3.8 to 4.6.

KEYWORDS: web-based platform, customer satisfaction, sentiment analysis, recommender system, data analytics

I. INTRODUCTION

The rapid growth of digital technology has transformed administrative services in higher education. This study focuses on improving frontline services at North Eastern Mindanao State University (NEMSU) – Cantilan Campus by integrating sentiment analysis, recommender systems, and data analytics. Frontline offices, responsible for enrollment, records, financial transactions, and advising, shape stakeholder perceptions and institutional effectiveness. While these technologies are widely applied in other industries, their use in university administration remains limited, particularly in regional institutions. Traditional processes often cause delays, inconsistent services, and limited feedback channels. This study proposes a web-based platform that leverages localized sentiment analysis, personalized recommendations, and real-time analytics to enhance service quality, efficiency, and stakeholder satisfaction under ARTA guidelines, providing a model for other Philippine universities.

II. LITERATURE SURVEY

Recent studies highlight the growing significance of sentiment analysis in evaluating textual feedback in educational and service-oriented institutions. Sentiment analysis enables institutions to classify opinions efficiently and identify areas for improvement, forming a foundation for AI-driven platforms like the one proposed in this study (Dalipi et al., 2021; Alzaid et al., 2023). Recommender systems have been shown to personalize user experiences by suggesting relevant services, increasing engagement and satisfaction (Urdaneta-Ponte et al., 2021; Da Silva et al., 2022). Additionally, service quality measurement frameworks, such as SERVQUAL, remain critical for assessing institutional performance and guiding administrative improvements (Wider et al., 2024).

Local literature emphasizes that frontline services in Philippine universities directly affect stakeholder satisfaction. Text-based feedback collection and analysis help identify repeated complaints and areas for improvement, ensuring responsive and client-centered service delivery. Studies in the Philippines demonstrate that feedback analysis can inform administrative decisions, improve service efficiency, and accommodate multilingual and code-switched stakeholder inputs (Gorospe et al., 2021; Ubat, 2024; Santiago et al., 2023; Baradillo, 2023; Patacsil, 2021; Perez, 2020).

Despite the effectiveness of these tools individually, few studies integrate sentiment analysis, recommender systems, and data analytics into a single web-based platform tailored for frontline offices. Existing works often focus on general educational services or international contexts, limiting applicability in Philippine higher education. Moreover, many sentiment analysis models are trained on Western datasets, reducing accuracy in local languages and dialects. This study

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addresses these gaps by proposing an integrated, localized platform that analyzes stakeholder feedback, provides actionable service recommendations, and supports data-driven administrative decisions in NEMSU Cantilan's frontline offices.

III. METHODOLOGY / APPROACH

Research design

This study employed a **descriptive-developmental research design** to develop and evaluate a web-based platform for optimizing customer experience at NEMSU Cantilan Campus. The developmental component focused on the design, implementation, and testing of the system, while the descriptive component assessed system acceptability and software quality based on stakeholder feedback. The **Agile Software Development Life Cycle (SDLC)** guided iterative development, enabling refinement of features through multiple sprints and integration of real-time feedback from students, staff, and administrators.

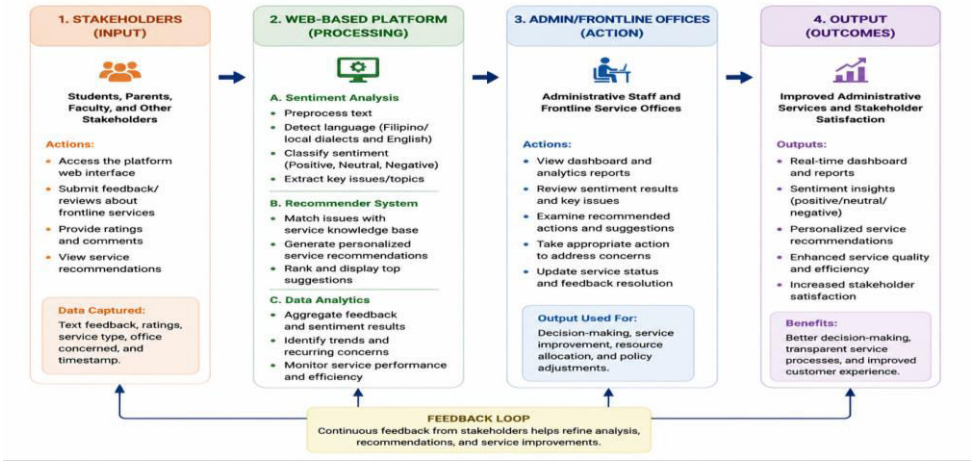

Figure 1. Functional workflow of the Web-Based Platform

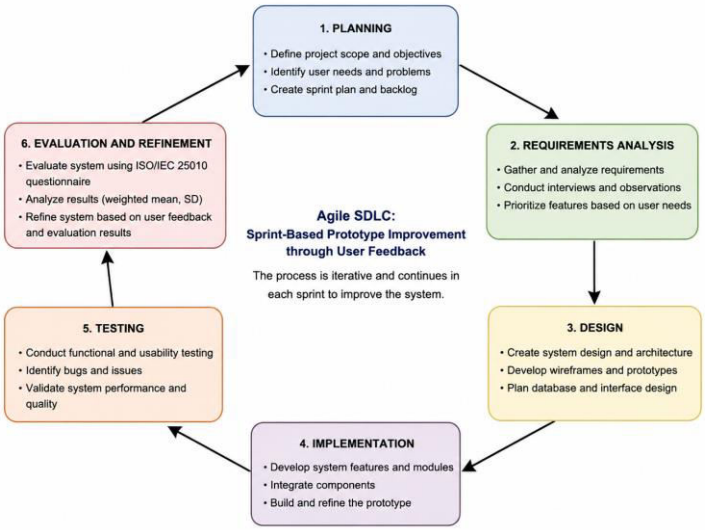

Figure 2. Agile Development Workflow for the NEMSU Cantilan Customer Satisfaction Platform

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System features and framework

Feature	Main Function	Expected Benefit
Access the Platform	Open web browser and go to access URL for platform login	Provides initial access to the platform for stakeholders
Enter Access Code	Enter or scan department access code to proceed	Ensures secure access for authorized users
Dashboard Overview	Redirected to dashboard to view key platform insights	Offers insights into overall platform performance and usage
ARTA CSQ (View Responses)	View customer feedback responses; filter and manage data	Facilitates tracking and management of submitted feedback
Access Codes & QR	Generate one-time codes or QR codes for respondents	Enables controlled and secure access for survey participants
Analytics Dashboard	View performance analytics including satisfaction trends	Supports data-driven monitoring of service performance
Sentiment Analysis	View overall sentiment breakdown and trends from comments	Identifies stakeholder sentiment for targeted improvements
AI-Powered Recommendations	View AI-generated recommendations for service improvement	Provides actionable service recommendations for administrators
User Management	Manage admin accounts, roles, and system access	Ensures proper system administration and role management

Table 2. Features of the NEMSU Cantilan Customer Satisfaction Platform

Respondents, instrument, and data collection

The study involved **930 respondents**, comprising students, parents, faculty, and administrative staff who directly interacted with the frontline offices of NEMSU Cantilan Campus. Stratified random sampling ensured proportional representation across stakeholder groups. Data were collected using a **researcher-designed ISO/IEC 25010-based software quality evaluation questionnaire**, employing a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). The evaluation covered **functionality, efficiency, portability, reliability, usability, security, and maintainability**. Qualitative data from **interviews, observations, and consultations** supplemented the quantitative responses, providing insights into user experiences, system suggestions, and operational challenges.

Data analysis

Quantitative data were analyzed using weighted mean and standard deviation to assess each software quality attribute. Feedback was categorized as positive, neutral, or negative, and qualitative observations were summarized to identify recurring issues and improvement recommendations.

IV. RESULTS AND DISCUSSION

Implementation of system features

The web-based platform implemented all key functionalities to enhance stakeholder interactions at NEMSU Cantilan. The **Transaction Coding Feature** assigns unique codes to each transaction for efficient tracking and analysis. The **Feedback Submission Form** provides a convenient digital interface for structured stakeholder feedback, while the **Dashboard** centralizes metrics and analytics, enabling real-time monitoring and data-driven administrative decisions.

ISO/IEC 25010 performance evaluation

Quality Characteristic	Mean	Verbal Interpretation
Functionality	4.83	Very Great Extent
Reliability	4.82	Very Great Extent
Usability	4.87	Very Great Extent
Efficiency	4.80	Very Great Extent

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Maintainability	4.70	Very Great Extent
Security	4.58	Very Great Extent
Overall Mean	4.77	Very Great Extent

Table 3. Performance evaluation of the Web-based Platform using ISO/IEC 25010.

Usability achieved the highest mean (4.87), indicating the system is user-friendly and accessible. Functionality (4.83) confirmed that booking, tracking, and administrative management features operate effectively. Reliability (4.82) and Efficiency (4.80) reflect consistent performance and responsive system behavior, while Maintainability (4.70) and Security (4.58) suggest the system is adaptable and secure for day-to-day operations.

Discussion of contribution and practical implication

The platform enhances administrative efficiency, communication consistency, and stakeholder satisfaction. By centralizing feedback, enabling real-time monitoring, and providing AI-powered recommendations, the system replaces manual processes, improves transparency, and supports operational reliability. ISO/IEC 25010 evaluation confirms that the platform is technically robust and meets user-centered quality standards. The findings highlight the platform's potential as a scalable model for improving administrative services in higher education..

V. CONCLUSION

This study developed and evaluated a web-based platform to optimize customer experience at the frontline offices of North Eastern Mindanao State University (NEMSU) Cantilan. By integrating sentiment analysis, a recommender system, and data analytics, the platform enhanced the collection, interpretation, and application of stakeholder feedback. It addressed operational challenges such as delayed feedback processing, inconsistent communication, and underutilized service data. Evaluation using ISO/IEC 25010 demonstrated Very Great Extent ratings across functionality, efficiency, portability, reliability, usability, security, and maintainability. These results indicate that the platform is user-friendly, efficient, reliable, and capable of supporting daily administrative operations. Future enhancements may focus on expanding the platform to additional offices, strengthening security, improving real-time performance, and incorporating advanced analytics for decision support and service optimization.

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