Global Scientific JOURNALS
GSJ: Volume 13, Issue 2, February 2025, Online: ISSN 2320-9186
www.globalscientificjournal.com

WEB PORTAL WITH GENERATIVE ARTIFICIAL INTELLIGENCE-POWERED CHATBOT FOR AEMILIANUM COLLEGE INC.

[1]Genevieve C. Oca
[2]Josefina R. Sarmiento, PhD

Aemilianum College Inc. Piot, Sorsogon City, Sorsogon, Philippines

Abstract

The study, titled Web Portal with Generative Artificial Intelligence-Powered Chatbot for Aemilianum College Inc., aimed to improve user interaction and accessibility of information at Aemilianum College Inc. (ACI). Using Agile Development Methodology, the system integrated various modules, including the Admin, Staff/Teacher, Student, and Guest Modules. A key feature was the Generative AI-Powered Chatbot, designed to manage inquiries about admissions, academic departments, and institutional information. System performance was evaluated based on ISO 25010 standards, with usability and security receiving high ratings. User testing included IT professionals and end-users to assess functionality and efficiency.

The project successfully developed a front-facing web portal featuring a dynamic homepage, content carousel, and chatbot for handling inquiries. It also included an Administrative Management Module for efficient user and content management. The Staff/Teacher and Student Management Modules ensured secure profile handling and content contribution. The chatbot incorporated multi-language support and advanced contextual response capabilities, enhancing user experience. The Notification Module facilitated effective communication among users. System evaluation showed exceptional performance, with an overall rating of 4.18, highlighting high usability, portability, and security.

The study concluded that the system effectively met ACI's needs by streamlining operations, enhancing accessibility, and improving communication among stakeholders. The AI-powered chatbot significantly contributed to user engagement by providing contextual and accurate responses. The system's robust features improved administrative efficiency and ensured seamless interactions across different user groups. The integration of AI-driven functionalities created a more user-friendly and responsive institutional platform.

Recommendations focused on continuous content updates, chatbot knowledge base improvements, and advanced reporting features to enhance decision-making. Collaboration tools were suggested to support faculty and staff workflows, while personalized features for students could optimize their engagement. Regular chatbot updates were advised to maintain accuracy and contextual relevance. Enhancing the notification system with greater user customization was recommended to improve engagement. Routine system audits and user feedback surveys were encouraged to ensure ongoing improvements and satisfaction. Lastly, a comprehensive user training program was suggested to maximize the platform's potential and ensure its long-term success.

Keywords. *Aemilianum College Inc., Generative Artificial Intelligence, Inquiry Chatbot, Web Portal*

Introduction

In the swiftly evolving digital age, the transformation of education is increasingly driven by the integration of web portals and cutting-edge Artificial Intelligence (AI) technologies. Web portals serve as comprehensive digital hubs, centralizing access to various resources and services, thus streamlining administrative processes and boosting operational efficiency. Coupled with advancements in AI, particularly generative AI, these portals have become even more powerful. Generative AI refers to systems capable of producing new, contextually appropriate content and responses, enhancing the functionality of AI-driven chatbots. These chatbots, which simulate human-like interactions, leverage generative AI to provide immediate, personalized support and engage users in meaningful ways. This fusion of web portals with AI-driven chatbots creates a dynamic and interactive academic environment, fostering a more connected and responsive system. The advancements in technology emphasize accessibility, interactivity, and customization, with AI chatbots providing real-time, tailored assistance that transforms interactions between stakeholders. This synergy between web portals and AI technology not only boosts communication efficiency but also promotes a dynamic and responsive digital learning environment, positioning educational institutions to significantly improve educational outcomes and achieve greater institutional excellence in the face of ongoing technological evolution.

The growing integration of Generative AI-powered chatbots within educational web portals is significantly transforming how higher education institutions manage inquiries and provide personalized support to their stakeholders. Recent research emphasizes the potential of these AI-driven systems to enhance user engagement and operational efficiency in academic settings. For instance, a 2023 study by Oliveira and Matos demonstrated that the incorporation of chatbots into a university web portal significantly improved student interaction by delivering timely and accurate responses to inquiries, thereby creating a more supportive and efficient academic experience. This study reflects a broader trend of leveraging AI technologies to develop more responsive and adaptive educational ecosystems, enabling institutions to better address the evolving needs of students and faculty in an increasingly digital landscape.

The trend of synergy of school portal with AI-powered chatbots is not limited to global institutions but is also gaining traction within the Philippines. This is evident in the Philippine context, where the application of AI in educational settings is being explored. The University of the Philippines Open University (UPOU) has recognized the growing importance of AI in education, particularly in enhancing information support services. In response to the increasing demand for efficient communication tools, UPOU developed a chatbot system named “Iska and IskOU”. This chatbot is designed to provide immediate, intelligent, and human-like interactions regarding university-related inquiries. The chatbot’s effectiveness

is largely attributed to its intelligence database or knowledge base, which is meticulously compiled from a wide array of university resources. As noted by Serrano, Belegal, Cañas-Llamas, Petrasanta, and Almodiel (2021), "the chatbot's capability to provide accurate and prompt responses has significantly improved user engagement and satisfaction, reducing the need for human intervention in repetitive inquiries" (p. 65). This highlights the tool's capability to streamline support services, making it a valuable resource for both students and staff. Moreover, the study emphasizes the importance of periodically evaluating the chatbot's performance to ensure it continues to meet user expectations and maintain its relevance over time. As the authors suggest, the ability of the chatbot to provide timely and relevant information plays a crucial role in user satisfaction, reflecting the broader potential of AI in educational settings.

At Aemilianum College Inc. (ACI), the integration of a web portal with a Generative AI-powered chatbot holds substantial significance for addressing common and repetitive inquiries related to administrative and school processes. This innovative system is designed to streamline responses to frequently asked questions and routine administrative tasks, thereby enhancing operational efficiency and user satisfaction. By automating the handling of these repetitive inquiries and consolidating information access, the proposed system aims to reduce the administrative burden on staff and provide students, faculty, and other stakeholders with immediate, accurate responses. This strategic approach not only aligns with global trends in digital transformation but also directly targets the specific needs of ACI, paving the way for a more efficient and user-friendly academic environment.

The need for this system at ACI is highlighted by the increasing complexity and volume of inquiries that traditional methods struggle to manage effectively. As the academic environment becomes more dynamic, addressing a wide range of inquiries swiftly and accurately is crucial. The introduction of a comprehensive web portal, which will serve as a hub for accessing detailed information about the school, combined with a Generative AI-powered chatbot, will be instrumental in meeting this demand. The chatbot will provide advanced, real-time assistance for school-related inquiries. Together, these components will alleviate administrative workload, enhance user experience, and improve communication efficiency. By offering a reliable, scalable, and responsive support system, this integrated approach is expected to reduce response times and foster better stakeholder engagement. In an era where digital solutions are pivotal for institutional success, this advanced system represents a significant step toward achieving operational excellence and delivering exceptional support in a complex educational landscape.

Specific Objectives

Specifically, the study aimed to:

1. Implement Front-Facing Web Portal Module
   1.1 Homepage Interface
      a. Implement dynamic carousel system for featured content display
      b. Develop quick access navigation menu for key sections
      c. Create officials' corner section for institutional messages
      d. Provide news, events and announcements showcase area
      e. Implement contact information section with map integration
   1.2 Content Access

a. Enable public access to institutional news, events and announcements
b. Provide academic department and admission information
c. Display downloadable public resources
d. Present career opportunities and FAQs
e. Integrate chatbot for public inquiries and assistance
f. Implement contact form to send communication to school

2. Implement Administrative Management Module
2.1 User Management
a. Manage user accounts and authentication system
a. 1. Handle user registration and status workflow
a. 2. Configure role-specific profile settings
a. 3. Implement password management system
b. Configure role-based access control
b. 1. Manage user roles (Admin/Staff/Teacher/Student)
b. 2. Handle role assignments and modifications
2.2 Content Management
a. Manage institutional information
a. 1. ACI Information
a. 2. Admissions
a. 3. Departments
a. 4. Carousel Items
b. Manage dynamic content and review submitted content for publishing
b. 1. News
b. 2 Announcements
b. 3. Events
b. 4. Resources
c. Manage support content
c. 1. Careers
c. 2. FAQs
2.3 System Administration
a. Configure portal settings
a. 1. Manage site appearance and branding
a. 2. Configure system-wide settings
a. 3. Handle contact information
a. 4. Maintain officials' corner content
b. Manage chatbot system
b. 1. Configure chatbot settings
b. 2. Maintain knowledge base
b. 1. Monitor chat history
2.4 Notifications - Receive content review notifications

3. Implement Staff/Teacher Management Module
3.1 Profile Management
a. Configure profile settings
a. 1. Set up personal information
a. 2. Manage department affiliations
a. 3. Handle contact details
b. Manage authentication
b. 1. Access login system
b. 2. Handle password management
3.2 Content Contribution/Management
a. Manage and submit content: Announcements, Events, News and Resources
a. 1. Draft/Update a content
a. 2. Submit content for approval to published as per set visibility setting
a. 3. Track approval status (Draft → Pending Approval → Published/Rejected)
3.3 Web Portal Access
a. Access role-specific features/content
b. View assigned affiliated department content
c. Receive notifications
c. 1. Content review status updates
c. 2. System announcements
c. 3. Department updates

4. Implement Student Management Module
4.1 Profile Management
a. Configure profile settings
a. 1. Set up student information
a. 2. Manage department affiliations
b. Manage authentication
b. 1. Access login system
b. 2. Handle password management
4.2 Web Portal Access
a. Access role-specific features/content
b. View assigned affiliated department content
c. Receive notifications
c. 1. System announcements
c. 2. Department updates
4.3 Utilize inquiry chatbot
5. Implement Generative AI-Powered Chatbot Module
5.1 Chatbot Configuration
a. Configure Language Model settings
a. 1. Set up multiple LLM support (ChatGPT/Claude/Gemini)
a. 2. Manage API configurations
b. Configure Embedding Model settings
b. 1. Set up embedding models (ADA-002/Gemini)
b. 2. Manage embedding API configurations
5.2 Knowledge Base Management
a. Handle content ingestion
a. 1. Process text-based content
b. Implement Retrieval-Augmented Generation system
b. 1. Manage text chunking
b. 2. Generate content embedding
b. 3. Store and index knowledge chunks
5.3 Conversation Management
a. Process user inquiries
a. 1. Handle user messages
a. 2. Retrieve relevant context
a. 3. Generate contextual responses
b. Manage chat interactions
b. 1. Track conversation history
b. 2. Store user interactions
5.4 Content Access
a. 1. Answer common queries
a. 2. Retrieve from knowledgebase relevant information to answer queries
6. Implement Notification Module
6.1 Notification Types
a. 1. Handle content review notifications
a. 2. News review status updates
a. 3. Event review notifications
a. 4. Announcement review alerts
a. 5. Resource review updates
b. Process system notifications
b. 1. System updates
b. 2. Department notifications
6.2 Notification Management
a. Handle notification status
a. 1. Track read/unread status
a. 2. Update notification states
a. 3. Maintain notification history
b. Manage notification access
a. 1. Role-based notification delivery
a. 2. User-specific notifications
a. 3. Department-related updates
6.3 Notification Display
a. 1. Show notification listings
a. 2. Display notification details
a. 3. Present notification history
a. 4. Show unread notification count
7. Evaluate the developed system using the ISO 25010 industry standard in terms of:
7.1. Functional Suitability
7.2. Performance Efficiency
7.3. Compatibility
7.4. Usability
7.5. Reliability
7.6. Security
7.7. Maintainability

7.8. Portability

Scope and Delimitations

The scope of this project involves the development of the Web Portal with a Generative AI-Powered Chatbot, designed to enhance user interaction and information accessibility for ACI stakeholders. The system encompasses several key modules, including the Admin Module for managing user accounts, roles, and content; the Staff/Teacher Module for profile setup and content contribution; the Student Module for accessing student-specific information and engaging with the chatbot; and the Guest Module for accessing publicly available content. Central to the project is the Generative AI-Powered Chatbot, which is designed to handle inquiries related to ACI, its academic departments, admissions, events, news, and careers. The chatbot's knowledge base can be trained and updated by administrators to ensure accurate and relevant responses. The system's performance and effectiveness will be evaluated using ISO 25010 standards, focusing on functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. The project will involve ten (10) IT professionals and ten (10) end-users to assess the system's functionality and usability.

The delimitation of this project excludes the development of features beyond the predefined modules and functionalities. Specifically, the project will not include advanced integrations with third-party systems unrelated to ACI's core operations or the creation of custom modules not outlined in the project objectives. Offline functionalities and integration with legacy systems are also beyond the scope, and the system will not cater to extensive user preference customizations beyond standard configurations. The chatbot's performance may be limited in terms of contextual understanding and accuracy, particularly with nuanced queries, and its language capabilities will be restricted primarily to English. Furthermore, the system will not support non-text-based content such as images, sound, or video in the chatbot's responses. The responsibility for updating the web portal content lies with the admin, staff, and teachers, who will contribute and maintain the information, meaning the developer will not gather or update new content. Additionally, the system will not include outdated content such as old news or past events, focusing instead on essential and current information like ACI's mission and vision.

Gap Bridged by the Study

The review of related literature and systems revealed significant advancements in the integration of web portals and AI-powered chatbots within educational settings. Existing implementations demonstrated the potential of AI-enhanced platforms to improve information access, streamline administrative processes, and provide personalized support to students. These systems commonly featured the ability to handle user inquiries, provide relevant information, and enhance user engagement through automated interactions. Both international and local implementations showcased the growing adoption of AI-powered assistants in educational

institutions, highlighting their effectiveness in managing various aspects of student services and administrative tasks. These existing solutions paved the way for more sophisticated integrations of AI technology in educational contexts, setting a foundation upon which more advanced systems could be built.

However, the ACI Web Portal with Generative AI-Powered Chatbot distinguished itself through several unique features not prominently addressed in the reviewed systems. It integrated a comprehensive web portal with a state-of-the-art generative AI chatbot, creating a unified system that went beyond simple information retrieval or rule-based responses. This integration allowed for a more dynamic and adaptive user experience, where the chatbot could generate contextually appropriate responses to a wide range of college-related inquiries. Additionally, the ACI Web Portal was specifically tailored to the unique needs and context of Aemilianum College Inc., a feature not prominent in the reviewed literature. This bespoke approach ensured that the system reflected the college's specific administrative processes, academic offerings, and institutional culture. By bridging these gaps, the ACI Web Portal aimed to provide a more holistic, efficient, and user-centric digital experience for students, faculty, and staff, potentially setting a new standard for integrated, intelligent, and institution-specific digital solutions in higher education.

Plan

In the initial phase of developing the Web Portal with Generative AI-Powered Chatbot for Aemilianum College Inc., a thorough analysis of the institution's current information system was conducted. The planning stage revealed that the existing school portal primarily functions with template-based content, lacking substantial school-specific information and interactive features. The current method of disseminating information heavily relies on social media platforms and direct communication channels, which often results in delayed information delivery and inconsistent messaging across different stakeholder groups.

Through direct observation, it was noted that students, faculty, and staff frequently need to visit multiple offices physically to obtain information or submit inquiries. This traditional approach not only consumes significant time but also creates unnecessary bottlenecks in administrative processes. The absence of a centralized information system means that stakeholders must often rely on direct interaction with specific personnel to access needed information, leading to inefficiencies and potential communication gaps.

The current plan was formulated based on direct consultation with ACI administrators regarding their current system and processes. Through informal discussions and observation of daily operations, the researcher gained insights into how information is currently disseminated and managed within the institution. The researcher noted the manual processes involved in handling student inquiries, sharing announcements, and managing content across different departments. These observations and consultations helped identify key areas where automation and digital transformation could significantly improve operational efficiency.

By directly observing the institution's daily operations and engaging in informal

conversations with staff members, a clear picture emerged of the challenges faced by both administrative staff and students in accessing and sharing information. Staff members often need to repeatedly answer the same basic questions from students, while students frequently have to visit multiple offices to get the information they need. These insights formed the foundation for understanding the institution's specific needs and requirements for a more efficient information management system.

Based on these observations and discussions, it became evident that Aemilianum College Inc. required a modern, integrated solution to streamline its information management and communication processes. The proposed Web Portal with Generative AI-Powered Chatbot was conceptualized as a comprehensive solution to address these challenges. The system was envisioned to serve as a centralized platform for information access and management, featuring automated inquiry handling through an advanced AI chatbot, role-based access control for different user groups, and real-time updates and announcements capabilities. This solution aims to transform the institution's digital presence while significantly improving the efficiency of administrative processes and enhancing the overall user experience for all stakeholders.

Through careful analysis of the current system and understanding of the institution's needs, the researcher established clear objectives and deliverables that would guide the development process. The proposed system was designed to not only address current limitations but also to provide a scalable platform that could evolve with the institution's future needs. This planning phase laid the foundation for the subsequent stages of development, ensuring that the final product would effectively meet the institution's requirements while providing a user-friendly and efficient solution for all stakeholders.

Requirements

The development of the Web Portal with Generative AI-Powered Chatbot for Aemilianum College Inc. necessitated specific hardware and software infrastructure requirements to ensure optimal performance and reliability. The server hardware specifications were established (see Table 3.1) to support the system's core functionalities, particularly the AI-powered features and concurrent user interactions. Client-side requirements were defined for both desktop/laptop users (see Table 3.2) and mobile device users (see Table 3.3), ensuring broad accessibility across different platforms. The software environment specifications detailed both server-side components (see Table 3.4) and client-side browser requirements (see Table 3.5). Project development timelines and resource allocation were structured according to the constraints outlined in the Gantt chart (see Table 3.7).

These comprehensive requirements gathering ensured that all technical aspects were adequately addressed, from the robust server infrastructure needed to handle the AI-powered chatbot operations to the client-side specifications that would enable seamless access across different devices and platforms. The requirements phase established the foundation for the subsequent design and development stages, ensuring that the system would meet both the technical and functional needs of the institution.

Development

The development phase of the Web Portal with Generative AI-Powered Chatbot for Aemilianum College Inc. involved implementing the system according to the established design specifications and objectives. This section presents the actual implementation through screenshots of various system interfaces and features, demonstrating how the theoretical design was transformed into a functional system.

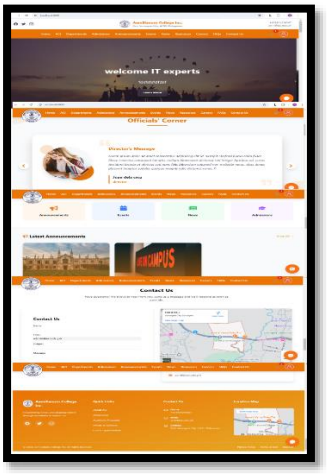

Figure 4.7 Homepage Interface Implementation

Figure 4.7 shows the implementation of the homepage interface featuring a dynamic carousel system for featured content display. The interface includes a prominent quick access navigation menu at the top, providing easy access to key sections. The officials' corner section is positioned strategically to highlight institutional messages, while the news showcase area displays current events and announcements. The contact information section with integrated map is placed at the bottom of the page for easy reference. This implementation fulfills the design objectives for an accessible and informative front-facing portal interface.

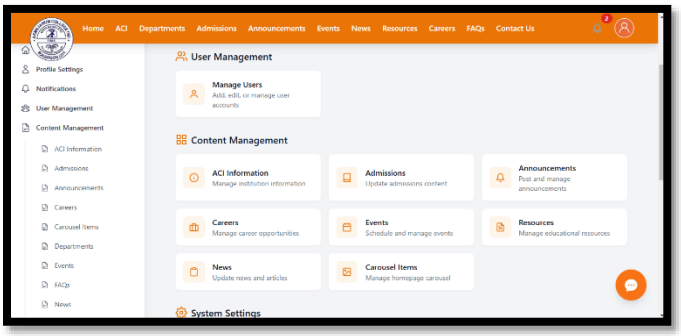

Figure 4.8 Administrative Dashboard Overview Implementation

Figure 4.8 shows the administrative dashboard interface of the Web Portal, featuring a comprehensive menu structure and content management system. The interface is divided into three main sections: user management, content management, and system settings. The left sidebar provides quick access to all administrative functions including Profile Settings, Notifications, User Management, and Content Management with sub-sections for ACI Information, Admissions, Announcements, Careers, Carousel Items, Departments, Events, FAQs, and News. The main content area displays cards for managing different aspects of the system, with clear icons and descriptions for each function. The top navigation bar includes essential links and a notification indicator, ensuring administrators can efficiently monitor and manage all aspects of the portal.

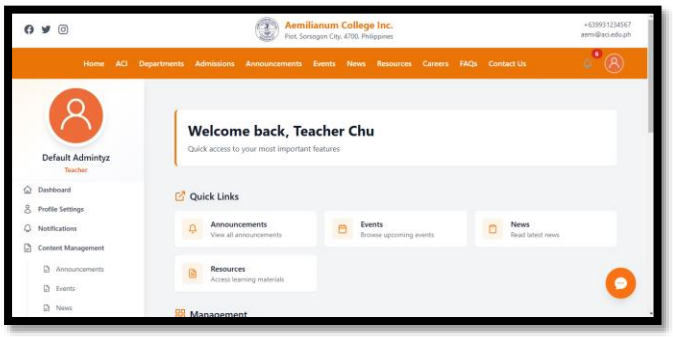

Figure 4.9 Teacher Dashboard Interface Implementation

Figure 4.9 showcases the teacher dashboard interface, which serves as the primary access point for faculty members to interact with the portal's features. The interface presents a welcoming and personalized experience, greeting users with "Welcome back, Teacher Chu" and providing immediate access to essential functions. The layout is organized with a clear hierarchical structure, featuring a comprehensive left sidebar navigation menu that includes Dashboard, Profile Settings, Notifications, and Content Management options with specific sections for Announcements, Events, News and Resources. The main content area displays Quick Links for frequently accessed features, including announcements viewing, event browsing, news reading, and learning resource access. The interface maintains professional branding with the college logo and contact information prominently displayed in the header, alongside social media integration links. This implementation effectively balances functionality with user-friendly design, ensuring teachers can efficiently manage their responsibilities and access relevant information while maintaining consistent navigation patterns throughout the portal.

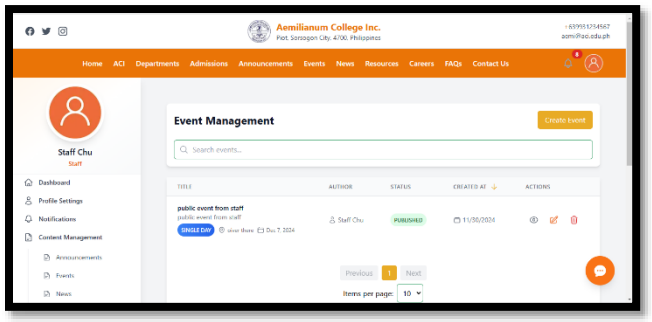

Figure 4.10 Staff Content Management Interface Implementation

Figure 4.10 presents the staff content management interface, showcasing the Events Management view as a representative example of the portal's content management system. The interface maintains the same left navigation structure as the teacher dashboard, featuring Dashboard, Profile Settings, Notifications, and Content Management with its subsections. This Event Management page exemplifies the standard layout used consistently across other content types (Announcements, News, and Resources), featuring a "Create Event" button, search functionality, and a structured table view displaying content details such as Title, Author, Status, Creation Date, and Actions. The interface demonstrates how staff members can efficiently manage different types of content while maintaining a familiar and consistent user experience across all content management sections.

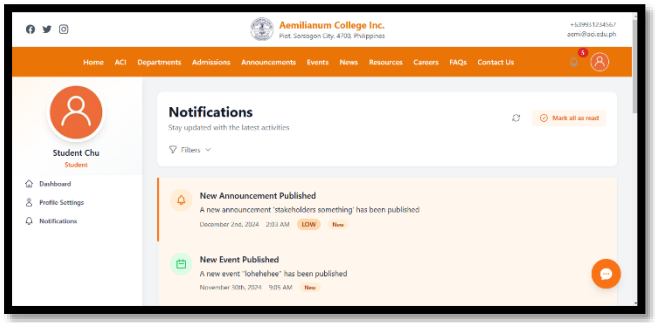

Figure 4.11 Student Notification Interface Implementation

Figure 4.11 showcases the student notification interface, providing students with real-time updates on portal activities. The interface features the same left navigation structure seen in previous dashboards (Dashboard, Profile Settings, and Notifications), but simplified for student access. The main notification area displays a clean, organized list of updates with features for efficient notification management, including a "Mark all as read" option and Filters functionality. Each notification entry provides clear visual indicators of content type (shown by icons), notification title, brief description, timestamp, priority level (such as "LOW"), and status indicators (like "New"). The interface effectively demonstrates the notification system's ability to keep students informed about various portal activities, such as new announcements and events, while maintaining the consistent design language used throughout the portal.

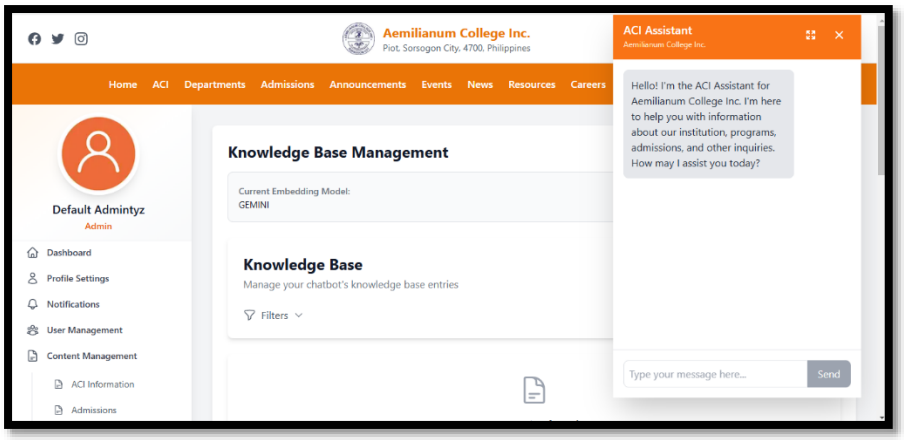

Figure 4.12 Chatbot Management and Interface Implementation

Figure 4.12 presents a dual view of the chatbot system: the administrative Knowledge Base Management interface and the user-facing chatbot interface. The main screen shows the administrative panel for managing the chatbot's knowledge base, featuring the current Embedding Model (GEMINI) settings and tools for managing chatbot knowledge entries with filtering capabilities. Simultaneously, the image displays the chatbot interface that appears when users click the chat icon, shown as "ACI Assistant" in the top right corner. The chatbot presents a welcoming message introducing itself as the ACI Assistant for Aemilianum College Inc., offering help with information about the institution, programs, admissions, and other inquiries. The interface maintains the portal's consistent design language while providing an intuitive text input area with a "Send" button for user interactions.

Testing

During the testing phase of the Web Portal with Generative AI-Powered Chatbot for Aemilianum College Inc., a comprehensive evaluation was conducted to assess the system's performance and readiness for deployment. The evaluation process involved 20 evaluators: 10 IT experts and 10 school stakeholders. The evaluation utilized ISO 25010 software quality standards as the primary framework for assessment.

Table 4.10 Overall ISO 25010 Evaluation Summary

Characteristic	IT Experts	Stakeholders	Weighted Mean	Interpretation
Functional Suitability	3.91	3.91	3.91	More than what is expected
Performance Efficiency	4.10	4.10	4.10	Far more than what is expected
Compatibility	4.15	4.15	4.15	Far more than what is expected
Usability	4.33	4.33	4.33	Far more than what is expected
Reliability	3.95	3.95	3.95	More than what is expected
Security	4.32	4.32	4.32	Far more than what is expected
Maintainability	4.26	4.26	4.26	Far more than what is expected
Portability	4.40	4.40	4.40	Far more than what is expected
Over All Average	**4.18**	**4.18**	**4.18**	**Far more than what is expected**

Table 4.10 provides the Overall ISO 25010 Evaluation Summary, reflecting the system's performance across multiple quality characteristics. The weighted mean scores range from 3.91 to 4.40, with the highest rating in "Portability" at 4.40, indicating exceptional adaptability across environments. "Usability," "Security," "Maintainability," and "Compatibility" also received high scores, showcasing the system's intuitive design, robust safeguards, and efficient management. While "Functional Suitability" and "Reliability" were rated slightly lower, they still met expectations with a weighted mean of 3.91 and 3.95, respectively. The overall average score of 4.18, interpreted as "Far more than what is expected," highlights the system's outstanding compliance with ISO 25010 standards, ensuring a high-quality user experience.

Findings

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

1. The project successfully implemented a front-facing web portal module with a dynamic homepage featuring a carousel for content display, quick navigation, institutional messages, and news showcases, alongside public content access for institutional updates, academic information, downloadable resources, career opportunities, FAQs, a generative AI chatbot, and a contact form with map integration.
2. The project successfully developed and deployed an Administrative Management Module encompassing comprehensive user account workflows, role-based access control, and authentication systems; robust content management for institutional and dynamic content; system administration for portal settings, chatbot configuration, and branding; and notifications to streamline content review and administrative processes.
3. The Staff/Teacher Management Module enabled secure profile management, content contribution with approval tracking, role-specific portal access, and real-time notifications for system updates and departmental communications.
4. The Student Management Module facilitated secure profile management, role-based portal access, real-time notifications for announcements and updates, and chatbot integration for streamlined inquiries.
5. The Generative AI-Powered Chatbot Module successfully integrated multi-language model configurations (ChatGPT, Claude, Gemini), advanced knowledge base management with retrieval-augmented generation, and robust conversation handling capabilities to provide contextual and accurate responses to user inquiries while supporting seamless content access and interaction tracking.
6. The Notification Module effectively manages various types of notifications, including content review alerts, system updates, and department-specific messages, while enabling role-based access and maintaining detailed notification histories for users, ensuring efficient tracking and display of notifications based on their status and relevance.
7. The findings indicate that the system achieved an overall average rating of 4.18, interpreted as "Far more than what is expected," demonstrating exceptional performance across all ISO 25010 characteristics, particularly in usability, portability, and security.

Conclusions

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

1. The front-facing web portal module was successfully implemented, offering dynamic features for content display, public access to institutional resources, and an integrated chatbot for inquiries, enhancing the user experience.
2. The Administrative Management Module was effectively developed, providing robust user management, content

administration, system configuration, and notifications, streamlining administrative tasks and ensuring seamless operation.
3. The Staff/Teacher Management Module was successfully implemented, enabling secure profile management, content contribution with approval tracking, and real-time notifications, ensuring efficient communication and content handling.
4. The Student Management Module was effectively deployed, providing secure profile management, role-specific access, real-time notifications, and chatbot integration for a smooth user experience.
5. The Generative AI-Powered Chatbot Module was successfully integrated, offering multi-language support, advanced knowledge base management, and accurate, contextual responses to user inquiries, improving interaction and content accessibility.
6. The Notification Module was efficiently implemented, providing various notification types with role-based access, status tracking, and detailed histories, ensuring timely and relevant communication across the system.
7. The system's overall performance, with an average rating of 4.18, exceeded expectations in all evaluated categories, demonstrating high standards in usability, portability, and security.

Recommendations

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

1. Continuously update the content and chatbot knowledge base to ensure relevance and enhance user engagement.
2. Consider integrating more advanced reporting and analytics features to further optimize administrative processes and decision-making.
3. Future improvements could include enhanced collaboration tools for staff and teachers to improve workflow and content creation efficiency.
4. It is recommended to explore additional personalization features for students to enhance their overall experience and engagement with the portal.
5. Regular updates and improvements to the chatbot's natural language processing capabilities should be conducted to maintain high accuracy and relevance.
6. Expanding the notification system to support more user customization options could further enhance user engagement and satisfaction.
7. Maintain high performance, it is recommended to conduct regular system audits and user feedback surveys to identify areas for continuous improvement.
8. Ensure long-term success and adaptability, it is recommended to implement a comprehensive user training program for all stakeholders to maximize the effective use of the system's features and capabilities.

References

1) Abaño, J. A., Acuram, L. G. M., Barro, E. R., Caliva, A. L., & Francisco, C. J. M. (2021). Interactive chatbot for customer service with voice recognition. International Journal of Advanced Trends in Computer Science and Engineering, 10(4), 3229-3235. https://www.warse.org/IJATCSE/static/pdf/file/ijatcse141042021.pdf

2) Andaya, Howell John D., Baldo, Jocellyn Kaye D., Cañada, Michelle Ann M., Saligumba, Nikko Bryan C., & Sumalinog, Jenevieve Pearl A. (2023). Silver lining of ChatGPT artificial intelligence (AI) tool: Through the lens of Department of Teachers Education in Panabo City, Philippines. ResearchGate. https://www.researchgate.net/publication/378032286_Silver_Lining_of_ChatGPT_Artificial_Intelligence_AI_Tool_through_the_Lens_of_Department_of_Teachers_Education_in_Panabo_City_Philippines
3) Anderson, P., White, R., & Thomas, E. (2022). Chatbot-assisted information systems in educational institutions. Educational Technology & Society, 25(3), 345-358. Retrieved from https://ieeexplore.ieee.org/abstract/document/9742871
4) Aoki, N., Nakamoto, T., & Omori, Y. (2024). Perceptions and usage of AI chatbots among students in higher education. Computers & Education: Artificial Intelligence, 100129. https://www.sciencedirect.com/science/article/pii/S2666920X24000626
5) Badua, R. M. R., Bihag, J. M. M., & Asprec, J. A. V. (2022). Design and development of chatbot request system. International Journal of Scientific and Academic Intelligence, 1(1), 7-13. https://www.warse.org/IJSAIT/static/pdf/file/ijsait011132022.pdf
6) Bañar, J. A. G., Flores, M. A. A., Gongob, K. K. G., Juario, J. D. P., & Libot, J. J. A. (2022). E-AccesstoAces: A web-based customer support system driving academy using chatbot technology. Journal of Engineering, Computing and Technology, 2(1), 1-7. https://www.isujournals.ph/index.php/ject/article/view/51
7) Bautista, Edna B., Buñao, Bonny R., Camara, Judy C., & Labung, Gina J. (2023). Effectiveness of chatbot as an innovative modality in grade reporting in the new normal. European Journal of Education Studies, 10(1), 272-288. https://oapub.org/edu/index.php/ejes/article/download/4686/7321
8) Brown, K., & Williams, L. (2020). Digital portals for academic institutions: Centralizing resources and enhancing engagement. Journal of Educational Technology, 34(2), 123-134. Retrieved from https://www.irma-international.org/viewtitle/318388/?isxn=9781668462348
9) Bunag, J. G., & Sabellano, M. J. (2022). Developing a rule based chatbot to aid DLSU counselors in student study habit assessment [Unpublished manuscript]. De La Salle University. https://animorepository.dlsu.edu.ph/etdm_infotech/7/
10) Cabailo, Giana Alyssa C., Cenas, Jenica Rose C., Espinosa, Alvin A., & Tamoria, Karla Mae G. (2023). ChatGPT as an academic support tool on the academic performance among students: The mediating role of learning motivation. ResearchGate. https://www.researchgate.net/publication/375527759_ChatGPT_as_an_academic_support_tool_on_the_academic_performance_among_students_The_mediating_role_of_learning_motivation
11) Chen, L., Chen, P., & Lin, Z. (2023). Chatbots in education and research: A critical examination of ethical implications and solutions. Sustainability, 15(7), 5614. https://www.mdpi.com/2071-1050/15/7/5614
12) Davis, J., & Miller, S. (2020). AI in higher education administration: Streamlining processes and improving accuracy. Journal of Higher Education Administration, 45(4), 567-579. Retrieved from https://www.ijraset.com/research-paper/college-enquiry-chatbot-using-conversational-ai
13) Gaje, J. B., Ligacao, M. R. C., Uy, R. C. M., & Zamoranos, K. M. N. (2022). Development and evaluation of chatbot: A messaging automation system in learning earthquake and faults [Unpublished manuscript]. University of Science and Technology of Southern Philippines. https://www.studocu.com/ph/document/university-of-science-and-technology-of-southern-philippines/research-and-project-development/development-and-evaluation-of-chatbot-a-messaging-automation-system-in-learning-earthquake-and-faults/60051522
14) Grana, Jennifer P. M., Lamchek, Jay S., & Sombillo, Nassef B. (2023). Adoption of artificial intelligence (AI) in local governments: An exploratory study on the attitudes and perceptions of officials in a municipal government in the Philippines. Journal of Public Affairs and Development, 10(1), 99-128. https://www.ukdr.uplb.edu.ph/cgi/viewcontent.cgi?article=1043&context=jpad
15) Guan, X., Chen, Y., & Liu, Z. (2024). The future of AI chatbots in higher education. Qeios. https://www.qeios.com/read/UE841K
16) Harris, A., & Cooper, D. (2023). Integrating generative AI in educational systems: Innovations and implications. Journal of Educational Innovation, 29(1), 101-115. Retrieved from https://www.psvpec.in/jcres/2024_1/58.pdf
17) Johnson, R., & Carter, M. (2022). Web portals with AI-enhanced information retrieval: Improving access and relevance. Journal of Information Technology in Education, 37(5), 678-690. Retrieved from https://www.researchgate.net/publication/367524393_An_Interactive_Chatbot_for_College_Enquiry
18) Kabiljo, J., & Konecki, M. (2023). Role of AI chatbots in education: Systematic literature review. International Journal of Educational Technology in Higher Education, 20(1), 31. https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-023-00426-1
19) Liu, Q., Zhang, Y., & Wong, M. (2021). Educational AI chatbot integration: Enhancing communication and support. Computers & Education, 165, 104159. Retrieved from https://www.irjmets.com/uploadedfiles/paper/issue_4_april_2023/35710/final/fin_irjmets1681208604.pdf
20) Luz, Juan Miguel. (2023, July 3). On chatbots and Philippine education. BusinessWorld. https://www.bworldonline.com/opinion/2023/07/03/531711/on-chatbots-and-philippine-education/
21) Macapagal, Jerico R., Mariano, Jester M., Mendoza, Kristine A., Ocampo, Charmaine A., & Reyes, Kimberly A. (2023). Attitudes toward the positive and negative features of Chat GPT by selected first year college students. ResearchGate. https://www.researchgate.net/publication/374848238_ATTITUDES_TOWARD_THE_POSITIVE_AND_NEGATIVE_FEATURES_OF_CHAT_GPT_BY_SELECTED_FIRST_YEAR_COLLEGE_STUDENTS

22) Matos, F., & Oliveira, T. (2023). Introducing a chatbot to the web portal of a higher education institution to enhance student interaction. Education Sciences, 13(5), 465. https://www.mdpi.com/2673-4591/56/1/128
23) Navarro, J. A., Lozano, J. C., Espiritu, J. E., Lagasca, E. J., & Villareal, C. D. (2021). Cheerbot: A customer service AI chatbot for Foam-Pom Pangasinan. In 2021 IEEE 13th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment, and Management (HNICEM) (pp. 1-6). IEEE. https://ieeexplore.ieee.org/abstract/document/9681419
24) Nicomedez, P. M., Adizas, J. A., Abello, J. R. B., Del Rosario, R. A., & Naco, L. B. (2023). Enhancing the barangay information system by integrating geolocation technology and Tagalog chatbot using NLP algorithm for efficient community engagement and service. International Journal of Computing Sciences Research, 7(1), 934-950. https://pdfs.semanticscholar.org/0c04/909e00c4bfab5994b8f6fa26a8d3fc19e116.pdf
25) Okonkwo, C., & Ade-Ibijola, A. (2021). Chatbots applications in education: A systematic review. Computers and Education: Artificial Intelligence, 2, 100033. https://www.sciencedirect.com/science/article/pii/S2666920X21000278
26) Oliveira, P. F., & Matos, P. (2023). Introducing a Chatbot to the Web Portal of a Higher Education Institution to Enhance Student Interaction. *Proceedings*, *56*(1), 128. https://www.mdpi.com/2673-4591/56/1/128
27) Perez, Josephine Esplanada C., Ibe, Patricia Pauline P., & Balahadia, Francis F. (2023). ChatGPT, AI tools, and opportunities and challenges for research. Asian Pacific Social Science Review, 23(1), 122-128. https://animorepository.dlsu.edu.ph/cgi/viewcontent.cgi?article=1492&context=apssr
28) Rahimi, S., Yazdani, S., & Hamidi, H. (2023). Enhancing administrative efficiency in higher education with AI: A chatbot solution. Journal of Applied Research in Higher Education. Advance online publication. https://www.researchgate.net/publication/378170981
29) Reyes, Vicente Chua. (2023). Artificial intelligence in the Philippine educational context: Circumspection and future inquiries. SSRN Electronic Journal. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4442136
30) Roberts, T., King, H., & Stewart, C. (2021). AI-powered educational platforms: Delivering personalized content and support. Journal of Educational Research, 39(7), 845-859. Retrieved from https://sist.sathyabama.ac.in/sist_naac/aqar_2022_2023/documents/1.3.4/b.e-cse-batchno-176.pdf
31) Serrano, J. V., Belegal, J. A. C., Cañas-Llamas, A. M. E. F., Petrasanta, L. P., & Almodiel, M. C. (2021). Ask Iska and IskOU: Analysis of UPOU's chatbot for information support services. International Journal on Open and Distance eLearning (IJODeL), 7(1), 63-67. https://ijodel.upou.edu.ph/index.php/ijodel/article/view/45/129
32) Serrano, J. V., Belegal, J. A. C., Cañas-Llamas, A. M. E. F., Petrasanta, L. P., & Almodiel, M. C. (2021). Ask Iska and IskOU: Analysis of UPOU's chatbot for information support services. International Journal on Open and Distance eLearning, 7(1), 63-67. https://ijodel.upou.edu.ph/index.php/ijodel/article/view/45/129
33) Smith, A., Lee, J., & Brown, P. (2020). University inquiry chatbots: Enhancing student interactions with AI. International Journal of Educational Technology, 28(6), 490-502. Retrieved from https://ieeexplore.ieee.org/document/9515065
34) Sumalinog, Jenevieve Pearl A., & Gayoberos, Karla Mae. (2023). Attitudes toward the positive and negative features of Chat GPT by selected first year college students. ResearchGate. https://www.researchgate.net/publication/374848238_ATTITUDES_TOWARD_THE_POSITIVE_AND_NEGATIVE_FEATURES_OF_CHAT_GPT_BY_SELECTED_FIRST_YEAR_COLLEGE_STUDENTS
35) Taclan, Evelyn D., & Domingo, Jocelyn P. (2023). Chatbot learning integration: Learners' performance enhancement tool. SciMatic, 3(3), 76-89. https://scimatic.org/storage/journals/11/pdfs/2482.pdf
36) Taylor, M., Green, E., & Johnson, L. (2021). AI-based student support systems: Personalized academic planning. Journal of Educational Psychology, 43(9), 902-914. Retrieved from https://ieeexplore.ieee.org/abstract/document/10450003
37) Uy, C. A., Suarez, M. T., & Azcarraga, J. P. (2020). VHope: An empathetic virtual hope chatbot using neural conversational model for students mental well-being. De La Salle University. https://animorepository.dlsu.edu.ph/etdm_softtech/2/
38) Vera, M. C. D., Makalintal, J. M. A., Abrogar, C. J. D., Mercado, J. P. D. G., & Magpantay, J. A. D. (2023). Implementation of a smarter herbal medication delivery system employing an AI-powered chatbot. International Journal of Computing Sciences Research, 7(1), 1-15. https://www.researchgate.net/profile/Maria-Concepcion-Vera-2/publication/369791031_Implementation_of_a_Smarter_Herbal_Medication_Delivery_System_Employing_an_AI-Powered_Chatbot/links/642cd3754e83cd0e2f8df8b3/Implementation-of-a-Smarter-Herbal-Medication-Delivery-System-Employing-an-AI-Powered-Chatbot.pdf
39) Wang, X., Johnson, R., & Smith, L. (2021). AI-driven academic portals: Enhancing student engagement and resource access. Journal of Educational Computing Research, 59(2), 230-247. Retrieved from https://ieeexplore.ieee.org/abstract/document/9742871
40) Widyasanti, A. A., Turnip, M., & Suherman, A. (2023). Implementation of intelligent chatbot in student portal: A systematic literature review. International Journal of Advances in Data and Information Systems, 4(1), 74-84. https://www.researchgate.net/publication/368368688_Implementation_of_Intelligent_Chatbot_in_Student_Portal_A_Systematic_Literature_Review
41) Wrike.com; The Agile Software Development Life Cycle; year published: 2020; date accessed: September 20, 2022; https://www.wrike.com/agile-guide/agile-development-life-cycle/
42) Xie, H., Wang, F., & Zhang, J. (2023). Chatbots in education: Enhancing administrative efficiency and student engagement. Expert Systems with Applications, 211, 118538. https://www.sciencedirect.com/science/article/abs/pii/S0952197622002081

43) Zhang, K., & Aslan, A. B. (2021). AI technologies for education: Recent research & future directions. Computers and Education: Artificial Intelligence, 2, 100025. https://www.sciencedirect.com/science/article/pii/S2666920X21000199

ACKNOWLEDGEMENT

The researcher extends sincere gratitude and appreciation to the following individuals, whose guidance and inspiration played an invaluable role in the realization of this study:

At **Aemilianum College Inc**., the researcher is not only afforded the opportunity to become an integral member of the Aemilian community but also to pursue the prestigious MIT degree, thereby enriching both her academic and personal growth. The researcher is profoundly grateful for the invaluable opportunities extended;

Special thanks are extended to **Rev. Fr. Rey Genaro M. Malabanan, CRS**, director of Aemilianum College Inc., whose leadership and encouragement have been an unwavering source of inspiration. His commitment to the institution's vision and mission has motivated the researcher to align this study with the values of excellence and innovation;

The researcher wishes to express her heartfelt gratitude to **Josefina Rey Sarmiento, MIT, PhD**, esteemed adviser and dean, for her tireless guidance, unwavering patience, and unparalleled expertise. Her steadfast support and invaluable mentorship have served as a cornerstone of this study's success. The researcher is truly indebted to her for everything she has consistently provided;

The researcher is deeply thankful to the distinguished thesis committee: **Lindsey M. Datos, MIT; Marneil Allen G. Sanchez, MIT; Milan E. Bausa, MIT; Oliver J. Sepnio, MSECE, PECE; and Rev. Fr. Mandee N. Batac, CRS,** for their valuable time, constructive feedback, and insightful recommendations that greatly improved the quality of this study;

To the researcher's beloved family - **Mamot, Papot, Rugrats 1.0, Rugrats 2.0, her siblings, Vanessa,** and most especially **Chubear** - words cannot fully capture the depth of her gratitude for your unwavering support, unconditional love, and steadfast belief in her capabilities. You have been her rock, her constant source of strength, and her guiding light during moments of doubt and challenge. Your sacrifices, encouragement, and faith in her dreams have been the foundation upon which this achievement stands. Your love and support have inspired her to persevere, push beyond limits, and strive for greater heights. For this, and so much more, she is eternally grateful;

Above all, the researcher is deeply grateful to **God Almighty**, whose divine guidance and blessings have been her constant source of strength and resilience throughout this journey. The grace and wisdom He have provided have been instrumental in the successful completion of this study;

To everyone who has contributed, supported, or inspired in any way, the researcher extends her heartfelt gratitude. This accomplishment is a testament to the collective efforts of those who believed in and supported this endeavor.

G. C. O.

***