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A DIAGNOSTIC CENTER MANAGEMENT SYSTEM FOR HEALTHCARE DIAGNOSTIC CENTER: DESIGN, IMPLEMENTATION, AND ISO/IEC 25010 QUALITY EVALUATION

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Abstract

A diagnostic management system in healthcare is a digital platform designed to streamline and integrate clinical and administrative operations within a medical facility. This study focuses on the development of such a system to address the challenges of manual processes, including lost patient information, difficulty tracking laboratory results, and inefficient appointment handling. The proposed system aims to digitize patient registration, appointment booking, test result management, and record-keeping. Employing a developmental research methodology, the system was created using the Rapid Application Development (RAD) model to ensure efficient and iterative progress. Key features include a centralized dashboard for managing appointments, user accounts, and test records, as well as functionalities for generating receipts, uploading results, and facilitating communication between patients and staff. The system was evaluated by IT experts and end-users using standardized quality and usability questionnaires. The findings indicate that the system is a reliable and efficient tool, rated very satisfactory in terms of functionality, security, and ease of use. It successfully minimizes manual workload, enhances data accuracy, and provides a convenient platform for patients to access services. This research concludes that a digital management system significantly improves operational efficiency and service delivery in a diagnostic center.

Keywords: Diagnostic center management system, patient registration; appointment scheduling, laboratory test management, health information system, software quality evaluation; ISO/IEC 25010, usability.

1. INTRODUCTION

The rapid integration of technology into healthcare has revolutionized clinical operations, with diagnostic management systems becoming vital tools for streamlining patient registration, laboratory test booking, and records management in medical

facilities [10][14]. These digital platforms are designed to enhance efficiency and accuracy in handling daily transactions, moving away from error-prone manual processes [1][7]. The Healthcare Diagnostic Center in Bantayan, Cebu, which specializes in laboratory and clinical testing, currently operates using a manual system. However, this traditional approach presents significant challenges, including lost or incorrect patient information and the cumbersome manual tracking of laboratory results, which ultimately compromises service delivery and patient data integrity [3].

To address these critical gaps, this study proposes the development of a Diagnostic Center Management System. This web-based solution serves as a digital bridge, automating core administrative and clinical workflows to replace the existing manual methods [11][13]. The system provides a centralized platform for patient registration, online appointment booking for available services, and the secure generation and management of patient records. Key features include a summary dashboard for administrators, test list management, receipt generation, upload functionality for test results, and a integrated communication portal between patients and clinic staff. By digitizing these processes, the proposed system aims to minimize errors, save time and resources for both patients and providers, and create a more reliable and efficient operational environment for the diagnostic center [5].

1.1 Objectives of the study

This study aimed to develop a Diagnostic Center Management System. Specifically, it aimed to:

1. Design and develop a system with an administrative dashboard that provides a summarized overview of key modules, including test list management, appointment management, registered users, account credentials, and system information.

2. Provide administrative tools that enable the management of:

a. User registration and authentication, allowing for account creation and secure sign-in (login and logout);

b. Appointment scheduling, allowing patients to book available services;

c. System information security, ensuring patient data protection against unauthorized access;

d. Laboratory test records, providing a history of both ongoing and completed patient tests.

3. Evaluate the developed system in terms of:

a. System functionality based on development objectives.

b. Software quality characteristics using the ISO/IEC 25010 Software Quality Model.

c. Usability, including usefulness, ease of use, ease of learning, and satisfaction, using the USE questionnaire

METHODS

2.1 Study Design

This research study utilized the Developmental Research methodology. It is the systematic study of designing, developing, and evaluating instructional programs, processes, and products that must meet criteria of internal consistency and effectiveness [9]. In addition, this study uses the descriptive type of analysis in presenting the data through the dashboard of the system.

2.2 System Development Approach

In this study, the researcher used the Rapid Application Development (RAD) model in developing the software.

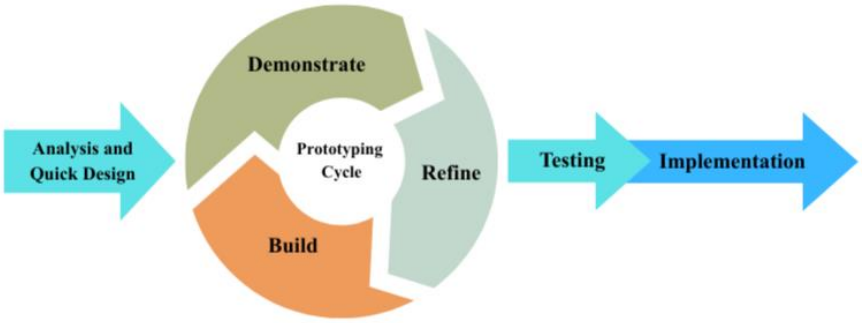

Figure 2. Rapid Application Development model

This research uses the Rapid Application Development approach in creating its system since this method is a fast project management strategy that is popular in developing software. The main benefit of the RAD approach is the fast completion of the project, making it an attractive choice for developers working in fast-paced environments such as software development. This step is made possible by RAD's focus on minimizing the planning stage and maximizing prototype development. Reducing planning time and emphasizing prototype iteration, RAD allows programmers to accurately measure progress and communicate in real time about problems or changes that are develop. These yields greater efficiency, faster development, and effective communication (Hamzah, et.al., 2019).

2.3 Participants

The standard questionnaires were used, such as the USE Questionnaire: Usefulness, Satisfaction, and Ease of use questionnaires and the ISO/IEC 25010 software characteristics. The IT expert group used the ISO/IEC 25010 Software Quality Model questionnaires. In contrast, the sample population evaluated the system using the USE Questionnaire: Usefulness, Satisfaction, and Ease of use. The user and the experts tested the Clinic Management System.

2.4 Instruments

Three evaluation instruments were utilized:

System Functionality Survey aligned with development objectives

ISO/IEC 25010 Software Quality Model — used to evaluate functional suitability, performance efficiency, compatibility, reliability, security, etc. ISO/IEC 25010 [2].

USE Questionnaire assessing usefulness, ease of use, ease of learning and satisfaction.

2.5 Data Collection Procedures

For the Diagnostic Center Management System to be tested, the researcher allowed the Clinic Staff to use the system by exploring its functionalities and modules. An evaluation form was distributed to gather feedback regarding the functionality of the system for possible changes to be made and or applied. The overall output of the system is 100% running and out of errors based on the objectives required for the system. The result shows that the developer meets the requirements and standards of the user.

RESULTS

3.1 System Functionality Evaluation

System Functionality evaluation indicated very satisfactory performance across all criteria.

Table 1. Functionality Evaluation of the System

Criteria	Mean	Interpretation
Dashboard visualisation	4.66	Very Satisfactory
CRUD operations	5.00	Excellent
Online accessibility	4.88	Very Satisfactory
Mobile responsiveness	4.66	Very Satisfactory
Overall user friendliness	4.88	Very Satisfactory
Overall Mean	4.81	Very Satisfactory

Table 1 shows the functionality evaluation of the system yielded mean scores ranging from 4.66 to 5.00, with an overall mean of 4.81(Very Satisfactory). Among the criteria, CRUD operations received a perfect score of 5.00 (Excellent), while online accessibility and overall user-friendliness both scored 4.88, and dashboard visualization and mobile responsiveness scored 4.66. This indicates that the system fully meets its intended functions and is both functional and user-friendly.

3.2 ISO/IEC 25010 Software Quality Evaluation

ISO-based evaluation indicated very satisfactory performance across all criteria.

Table 2. ISO/IEC 25010 Evaluation Results

Criteria	**Mean**	**Interpretation**
Functional suitability	4.44	Very Satisfactory
Performance efficiency	4.88	Very Satisfactory
Compatibility	4.79	Very Satisfactory
Reliability	4.42	Very Satisfactory
Security	4.88	Very Satisfactory
Overall Mean	4.23	Very Satisfactory

Table 2 shows the ISO/IEC 25010 software quality evaluation results, with an overall mean of 4.23 (Very Satisfactory), indicating that the system meets recognized software quality standards in terms of functional suitability, performance efficiency, compatibility, reliability, and security [2].

3.3 USE Questionnaire Results

Usability evaluation also indicated very satisfactory performance.

Table 3. USE Questionnaire Results

Criteria	**Mean**	**Interpretation**
Usefulness	4.67	Very Satisfactory
Ease of Use	4.14	Very Satisfactory
Ease of Learning	4.36	Very Satisfactory
Satisfaction	5.00	Very Satisfactory
Overall Mean	4.54	Very Satisfactory

Table 3 shows that the system achieved an overall mean score of 4.54 (Very Satisfactory) in usability evaluation, with ease of learning receiving the highest rating, indicating that users can quickly understand and operate the system. High scores in usefulness, ease of use, and satisfaction suggest that the system provides a positive user experience.

DISCUSSION

The results demonstrate that the Diagnostic Center Management System significantly improves the efficiency of managing patient records, appointments, and laboratory services [8]. The system's dashboard allows administrators to monitor test lists, registered users, and appointment schedules in real time, reducing the time required for manual record management.

The high ratings in functional suitability and performance efficiency indicate that the system effectively meets the operational requirements of the clinic [2]. In addition, the strong evaluation in security and reliability suggests that the system can safely manage sensitive patient data [12].

The usability evaluation further confirms that users found the system easy to operate and helpful in simplifying their tasks. The high score in ease of learning shows that clinic staff can quickly adapt to the system without extensive training.

Overall, the findings suggest that the implementation of the Diagnostic Center Management System can improve clinic operations by reducing manual workload, minimizing data errors, and providing faster services to patients [15]. The system also enhances communication between patients and administrators through messaging features and provides convenient access to laboratory records.

The study concludes that the proposed system is a reliable and effective solution for managing diagnostic center operations and can significantly contribute to improving healthcare service delivery.

CONCLUSION

The developed Diagnostic Center Management System successfully provides a platform for clinics to manage patient registration, appointment scheduling, test result uploading, and receipt generation [3]. Evaluation results from IT experts and users indicate that the system is highly functional, reliable, and user-friendly, achieving very satisfactory ratings across software quality and usability criteria [2]. The system can serve as a valuable tool for improving clinic operations and patient experience in diagnostic centers.

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References

1. National. (2020). *Online clinic management system*.
2. All, P. (2017). *Social media use, collaborative learning and students' academic performance: A systematic literature review of theoretical models*. Retrieved October 2017, from ResearchGate
3. Adones, E. (2021). *Clinic management system*. Retrieved August 7, 2021, from IT Source Code
4. Fertig, A., et al. (2019). *Clinic management information system (CMIS)*. Retrieved January 29, 2019, from The International Growth Centre
5. Gowda, B. (2019). *Online clinic management system*. Retrieved October 7, 2019, from National Center for Biotechnology Information
6. Jane App. (2021). *Appointment booking screenshot*. Retrieved March 17, 2021, from Software Connect
7. Jibrin, M., et al. (2019). *Web-based clinic management system (CMS)*. Retrieved May 2019, from ResearchGate
8. Kareo Clinical. (2021). *Kareo clinical overview*. Retrieved March 17, 2021, from EHR in Practice
9. Arojana, K. B. (2020). *Clinic management system*. Retrieved from Academia.edu
10. Lubis, M., et al. (2019). *Clinic management system: Business process re-engineering based on user experience (UX)*. Retrieved November 2019, from ResearchGate
11. Anton, M. (2021). *Small clinic management system: Pharmacy and inventory system*. Retrieved from ResearchGate
12. Savva, N., et al. (2021). *A review of the healthcare-management modeling literature published in Manufacturing & Service Operations Management*. Retrieved December 2019, from ResearchGate
13. Tergundi, P., et al. (2017). *Web-based clinical data management system*. Retrieved January 30, 2017, from Semantic Scholar
14. Patient Scheduling Software. (2021). *Best medical appointment scheduling software*. Retrieved March 17, 2021, from Amelia WordPress Booking Plugin
15. Patient Manager. (2021). *Patient manager overview*. Retrieved March 17, 2021, from Software Connect
16. Sagenda. (2021). *Online appointment scheduling software*. Retrieved March 17, 2021, from Sagenda
17. SimplyBook.me. (2021). *Online appointment software for medical companies, clinics, doctors and healthcare*. Retrieved March 17, 2021, from SimplyBook.me
18. TimeTap. (2021). *Best appointment scheduling apps*. Retrieved March 17, 2021, from Zapier
19. Trafft. (2021). *Medical scheduling software*. Retrieved March 17, 2021, from Trafft
20. UnoCMS. (2021). *Clinic management system*. Retrieved March 17, 2021, from LinkedIn
21. vCita Online Scheduling. (2021). *Top appointment scheduling software solutions*. Retrieved March 17, 2021, from FinancesOnline