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MedSched: Digitalizing Health Process and Automating Services

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ABSTRACT: This study presents MedSched, a web-based system developed to digitalize appointment scheduling and medical record management at the Rural Health Unit (RHU) of Cantilan. The system provides patients with an online platform to schedule and track appointments, while medical staff can efficiently manage schedules and patient records. MedSched features role-based access for patients, doctors, and administrators to ensure secure and organized operations. Administrative tools support user, service, and appointment management, reporting, and monitoring. By replacing manual processes, the system reduces inefficiencies, improves service coordination, and supports digital transformation in resource-limited rural healthcare facilities.

KEYWORDS: MedSched, Appointment Scheduling, Medical Record Management, Web-Based System, Rural Healthcare

I. INTRODUCTION

Many local and community-based clinics still rely on manual records, storing patient information in physical files that slow down the retrieval of crucial data and reduce overall efficiency. This traditional method often delays patient care, complicates clinic operations, and increases the risk of lost or damaged records. MedSched: Digitalizing Health Processes and Automating Services provides a digital platform for safely archiving and organizing medical records, ensuring accessibility at any time. The system also integrates an automated appointment scheduling feature. By adopting MedSched, clinics can enhance productivity, minimize errors, and provide faster, higher-quality healthcare services.

The study focuses on the development and implementation of MedSched: Digitalizing Health Processes and Automating Services, a system designed to automate medical appointments and manage patient records. Research indicates that web-based appointment scheduling systems and electronic health records enhance patient engagement and healthcare delivery by improving access to care and reducing administrative workload [1]. These findings support the development of MedSched as a unified digital platform that streamlines appointment scheduling and medical record management, improves workflow efficiency, and minimizes manual record-keeping in resource-limited healthcare facilities.

This project tackles the ongoing challenges of managing and archiving patient records in small- to medium-sized clinics that rely on paper-based systems. Existing digital tools often only handle scheduling and lack comprehensive record management. MedSched: Digitalizing Health Processes and Automating Services addresses this gap by offering a centralized web platform that streamlines appointment booking and securely stores patient records. Deployed at RHU Cantilan, it allows staff to manage appointments and patient data efficiently through role-based access and real-time

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retrieval. MedSched reduces delays, prevents lost records, optimizes workflows, and enhances healthcare service quality and reliability.

II. LITERATURE SURVEY

The digital transformation of healthcare services has become increasingly important as clinics and healthcare institutions seek to improve efficiency, accuracy, and quality of patient care. Many facilities, particularly small and community-based clinics, continue to rely on manual processes for appointment scheduling and record management, which often leads to delays, inefficiencies, and increased administrative burden. Recent studies emphasize the role of digital appointment systems and electronic medical records in addressing these challenges by streamlining workflows, improving data accessibility, and enhancing patient experiences. This section reviews related literature that supports the development of integrated digital solutions such as MedSched.

Online appointment scheduling systems have been shown to significantly improve patient attendance and clinic efficiency. Betancor *et al.* found that the use of digital scheduling platforms reduces no-show rates and optimizes the utilization of healthcare resources by allowing patients greater flexibility in booking appointments and receiving timely reminders [1]. Their findings demonstrate that automated appointment systems help minimize administrative workload while improving overall patient flow, making them particularly beneficial in both hospital and outpatient settings.

Digital scheduling systems also contribute to reduced patient wait times and improved healthcare service delivery. According to a 2025 analysis by Simbo AI, automated scheduling tools enhance operational efficiency by balancing appointment loads, minimizing scheduling conflicts, and enabling real-time updates. These systems help clinics better manage patient volume, resulting in shorter waiting periods and more predictable service timelines, which ultimately improves patient satisfaction and clinic productivity [2].

Electronic Health Record (EHR) systems further support operational efficiency by improving scheduling accuracy and optimizing resource utilization. HealthManagement.org reports that integrating EHRs with scheduling processes allows healthcare facilities to better allocate staff, examination rooms, and equipment based on real-time patient data [3]. This integration reduces redundancies, prevents scheduling errors, and supports more informed decision-making, highlighting the value of digital records in improving administrative and clinical coordination.

The digitalization of outpatient consultation processes has also been shown to enhance healthcare service delivery. Angeles and Garcia examined the implementation of digital systems in outpatient settings and found that digital consultation workflows improve record accessibility, reduce manual documentation, and support faster patient processing [4]. Their study emphasizes that digital solutions are particularly effective when tailored to the operational needs of clinics, reinforcing the importance of system design aligned with local healthcare environments. Finally, integrating electronic medical record systems across healthcare institutions has been found to improve continuity of care and data accessibility. Goh *et al.* reported that integrated EMR systems enable seamless sharing of patient information, reduce duplication of services, and enhance coordination among healthcare providers. These benefits underscore the importance of unified digital platforms that combine scheduling and record management, supporting the rationale for systems like MedSched that aim to centralize healthcare operations [5].

Table 1. Summary of Relevant Literatures

No.	Paper Title	Author Name	Key Points	Remarks
1	Efficient patient care in the digital age: Impact of online appointment scheduling on no-show rates	Betancor et al., 2025	Online appointment systems reduce no-shows, improve attendance, and optimize clinic resources through automated bookings and reminders [1].	Supports the use of digital appointment scheduling in MedSched to improve clinic efficiency and patient compliance.

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2	Exploring the impact of digital scheduling systems on patient wait times and overall healthcare efficiency	Simbo AI, 2025	Digital scheduling reduces patient wait times, avoids conflicts, and improves service flow with real-time management [2].	Justifies integration of automated scheduling in MedSched to enhance patient experience and efficiency.
3	Electronic Health Records Improve Scheduling Accuracy & Resources Utilisation	HealthManagement.org, 2025	EHR systems improve scheduling accuracy, optimize resources, and reduce administrative inefficiencies when linked to appointments [3].	Supports the integration of medical records and scheduling features within MedSched..
4	Implementation of Outpatient Consultation Digitalization for Healthcare Services: Basis for Development Plan	Angeles and Garcia, 2025	Digitalizing outpatient consultations improves record access, reduces paperwork, and speeds up patient processing [4].	Reinforces the importance of digitizing clinic workflows, aligning with MedSched's objectives.
5	The Benefits of Integrating Electronic Medical Record Systems Across Care Institutions	Goh et al., 2025	Integrated EMR systems enhance care continuity, reduce data duplication, and enable efficient patient information sharing [5].	Provides strong support for a unified system like MedSched, centralizing patient records and appointments.

In conclusion, the reviewed literature consistently highlights the importance of digital appointment scheduling and electronic medical record systems in improving healthcare efficiency, accuracy, and continuity of care. The studies emphasize that integrated digital solutions reduce administrative workload, minimize errors, and enhance patient experience, particularly in resource-limited clinic settings. These findings support the development of MedSched as a centralized platform that combines appointment scheduling and secure medical record management to address the operational challenges of small and community-based healthcare facilities.

III. METHODOLOGY

Research Design

This study used a descriptive-developmental research design to develop and evaluate the MedSched system for the Rural Health Unit (RHU) of Cantilan. The system was develop using the Software Development Life Cycle (SDLC) with the Agile Model, which allowed iterative development and continuous improvement based on user needs. The system was evaluated using an ISO/IEC 25010–based survey questionnaire, and the data were analyzed through descriptive statistical methods to assess its functionality, usability, performance efficiency, reliability, and user satisfaction.

Instrument

The main research instrument used in this study was a survey questionnaire based on the ISO 25010 Software Quality Model. This questionnaire measured the system's functional suitability, usability, performance efficiency, reliability, and user satisfaction. It was distributed to patients, RHU staff, and IT practitioners who tested the MedSched system. The researchers also used observation to monitor how users interacted with the system during testing. These instruments helped gather accurate feedback on the system's overall effectiveness and performance.

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Data Collection and Participants

The population of this study includes the users of the MedSched system from the Rural Health Unit of Cantilan, specifically patients, medical staff, and IT practitioners. From this population, a total of 50 respondents were selected as the sample: 25 patients who evaluated the system's usability, 15 RHU staff and medical personnel who assessed its reliability and integration into their workflow, and 10 IT practitioners who examined the system's technical performance. Purposive sampling was used to ensure that all selected respondents had direct interaction with or experience using the system.

Data Analysis

The data collected from surveys, interviews, and system evaluations of MedSched were processed using statistical and analytical methods, with the following treatments applied:

1. Weighted Mean: Used to determine the overall assessment of MedSched based on the ISO/IEC 25010 software quality characteristics, including functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability.
2. Scale Interpretation: Respondents' ratings were interpreted using a five-point descriptive scale (4.21–5.00 = Excellent, 3.41–4.20 = Very Good, 2.61–3.40 = Good, 1.81–2.60 = Fair, 1.00–1.80 = Poor).
3. Qualitative Data Analysis: Responses from interviews and open-ended survey questions were summarized to identify common themes related to system usability, appointment scheduling, and medical record management.
4. Triangulation: Data from surveys, interviews, and system observations were cross-checked to ensure the validity and consistency of the findings.

IV. RESULTS & DISCUSSION

System Features

MedSched offers a comprehensive platform to streamline healthcare operations at RHU Cantilan. It provides secure user authentication with role-based access, allowing patients, doctors, and administrators to access features based on their roles. The system supports appointment scheduling, enabling patients to book appointments and doctors or administrators to manage them efficiently. Patient medical records are securely stored, updated, and accessible to authorized personnel, while an email notification system keeps users informed of appointment changes. Administrators can oversee services and staff, and dashboards with analytics provide insights on appointments and system usage. With strong data security and authorization controls, MedSched ensures patient information remains protected and accessible only to authorized users.

Performance Evaluation

The system received a 'Highly Acceptable' (HA) rating overall, with an average score of 4.17. Among the evaluated software quality attributes, User Satisfaction scored the highest at 4.33, while other attributes also received high ratings, reflecting the system's reliability, efficiency, usability, and effectiveness in meeting user needs and improving healthcare operations.

Table 2. Performance Evaluation System Tabulation

Table	Quality Characteristics	Mean	Verbal Interpretation
1	Usability	4.3	Very Highly Acceptable (VHA)
2	Perfrormance Efficiency	4.17	Highly Acceptable (HA)
3	Reliability	3.89	Highly Acceptable (HA)
4	User Satisfaction	4.33	Very Highly Acceptable (VHA)
	Over-All Mean	**4.17**	**Highly Acceptable (HA)**

V. CONCLUSION

The MedSched: Digitalizing Health Process and Automating Services System was developed using a client-server architecture accessible via LAN or Wi-Fi, enabling efficient use by administrators, staff, and patients. The system addressed the clinic's challenges of slow manual processes, inaccurate records, and inefficient scheduling by automating key functions, improving data accuracy, reducing administrative work, and enhancing service delivery. Its user-friendly design allows administrators to manage accounts, records, and appointments easily, while patients can

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schedule visits and access medical information. Overall, MedSched provides a reliable, scalable, and valuable solution for the digital transformation of healthcare services at RHU Cantilan.

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