**eMed: A web and mobile based application for RXCue Pharmacy - A Digital Marketing Approach**

A non-thesis Project

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##### CHAPTER 1

##### INTRODUCTION

## Project Context

Over the past several years, many pharmacies have found it difficult to retain staff and pay competitive salaries, resulting in staff shortages in the pharmacy and nursing sections. At the same time, the state and federal governments, the Institute of Safe Medication Practices (ISMP), and the JCAHO are emphasizing the need to reduce medication errors (Kimble & Chandra, 2001). Fortunately, advancements in technology provide healthcare professionals with the tools to achieve this mandate for a safer health delivery system.

Currently, a substantial shortage of pharmacists exists. Hospitals treat sick patients with complex drug therapies, while nursing homes and assisted living facilities face high drug use. The reports of federal Health Resources and Services Administration encompass an outstripped supply and medication shortages. The demand for pharmacy services is growing for specialized needs (Knapp, 2002), therefore, as developers, we made the decision to integrate statistical analysis and predictive functionality into the administrative interface. This enhancement enables us to monitor the distribution of clients based on their addresses, making it simpler to identify optimal locations for new branch openings. Additionally, this empowers us to forecast the demand for medicines over the next three years, aiding in better inventory management and resource allocation.

Other studies describe technology-based pharmacy as a user-friendly resource that can enhance the efficient management of pharmaceutical inventories within pharmacy operations (*Verano\_ Revitalizing Health Service with E-Pharmacy\_*, n.d.).

RXCUE Pharmacy, located in Calero, Calapan City, Oriental Mindoro, faces various manual problems in its traditional pharmacy operation. These issues encompass prescription filling errors, inventory tracking inefficiencies, sales and billing inaccuracies, and the potential for regulatory non-compliance due to outdated record-keeping methods. Moreover, relying on face-to-face communication with clients and suppliers can limit accessibility and responsiveness, while also impeding data analysis and reporting.

Within the context of our project, it is crucial to recognize that healthcare services stand as a cornerstone of human well-being. They constitute an indispensable requirement for individuals to engage in their daily activities with efficiency and vitality. This understanding forms the backdrop against which we delve into our project's objectives and significance.

To address these challenges, the researchers decided to develop an "eMed: A web and mobile based application for RXCue Pharmacy - A Digital Marketing Approach "**,** which can improve customer satisfaction, and enable better services while keeping up with evolving industry standards.

## Objectives

Generally, this study aims to develop a system entitled "eMed: A web and mobile based application for RXCue Pharmacy - A Digital Marketing Approach ", that seamlessly integrates web, desktop, and mobile platforms to enhance medication management, facilitate customer transactions, improve branch expansion decisions, and ensure patient convenience.

Specifically, it aimed to

1. Design and deploy a user-friendly pharmacy system accessible through web browsers (Web), providing administrative and cashier functions via desktop (Admin/cashier/branch), and a client interface via mobile devices (Mobile).
2. Develop an automated notification system for medication expiration, allowing pharmacy staff to proactively manage and restock expired medicines to ensure patient safety.
3. Enable online browsing of available medicines with the option to reserve for walk-in pick-up, integrating an appointment number system to expedite the in-store transaction process.

## Scope and Limitations

The scope of this project is to develop and implement a web and mobile-based application for RXCUE Pharmacy with a focus on integrating digital marketing strategies in Calapan City, Oriental Mindoro. The study will encompass the design, development, and deployment of the system, targeting improved efficiency in pharmacy operations. There are three users in the system; the admin, cashier, and the users. The admin can add new pharmacy branches and manage users for each branch including location details and contact information. On the other hand, cashier can check the availability of medicines in real-time, providing accurate information to clients, and can also process online purchases for clients, maintaining seamless operations between online and in-store transactions. Lastly, users can access an e-commerce feature, allowing them to browse and purchase medicines online. The system will be accessible in desktop, web, and mobile devices and will be available online so that its users can easily access it. The research will cover a six-month implementation period, with ongoing monitoring and evaluation.

## Definition of Terms

In order to further explain the study in an explicit way, the researchers defined the words operationally as:

**PHP** - PHP is an open-source server-side scripting language that many developers use for web development. It is also a general-purpose language that you can use to make lots of projects, including Graphical User Interfaces (GUIs) (Chris, 2021).

**SMS –** In this study, it is a process where SMS was use as notification to notify the users for website promotions and updates as well as the availability of the medicine.

**eMed –** In this study, eMed is the name of the web and mobile application. It serves as a specific identifier for the developer’s project.

**Web and Mobile based Application –** In this study, web and mobile based application is a software that operates on both web browsers and mobile devices, allowing users to access its features and functions and cater a diverse range of users and their preferred platforms.

**RXCue Pharmacy –** In this study, RXCue Pharmacy serves as the client organization, and the study's primary focus is directed toward addressing their needs and requirements.

**Digital Marketing -** In this study, digital marketing refers to the use of online strategies to engage clients of RXCue Pharmacy for promotions and important announcements.

# CHAPTER 2

# REQUIREMENTS SPECIFICATION

This chapter explained the specific requirements and functionalities necessary for the effective completion of our project.

## Hardware and Software Requirements

##### Software Requirements

**Visual Studio Code** - Visual Studio Code (VS Code) is a popular code editor.

**CodeIgniter 4** - CodeIgniter is a PHP web

application framework.

**Microsoft Edge or Google Chrome browser** - These are web browsers.

**Windows 7 to Windows 11** - These are different versions of the Windows operating system.

**Laragon** - Laragon is a web development environment for Windows.

**phpMyAdmin** - phpMyAdmin is a web-based tool for managing MySQL databases.

## Hardware Requirements

**Server/s -** In the development of a pharmacy system, one or more servers will be essential for hosting. These servers will serve as the backbone of the system, accommodating various components and functionalities, each representing a crucial part of the comprehensive pharmacy system.

**CPU and Memory -** To manage the anticipated load, the server should have sufficient CPU and memory resources. It is crucial to have multi-core CPUs and enough RAM.

**Storage -** The system should have ample storage capacity for patient records, medication inventory, and transaction history, with Solid State Drives recommended for improved data access speed.

**Network Infrastructure -** A fast network connection is crucial for pharmacists, staff, and patients, facilitating efficient prescription processing, inventory updates, and online transactions, ensuring seamless experience.

## Functional Requirements

Functional requirements specify what the system can do. This will serve as the manual of the system that includes the functional specifications, the process of the system to create reports and the process of data that will be manipulated inside the system.

***Admin side***

* The system should allow the admin to add new pharmacy branches, including location details and contact information.
* Admin should be able to add and manage users for each branch, assigning roles and permissions as needed.
* The system should provide the admin with the capability to manage the inventory for each branch, including adding, updating, and tracking medicines and related items.
* Admin should have access to statistical data, represented in pie graphs, to easily view the percentage of clients in different areas. This aids in data-driven decisions for new branch locations.
* The system should offer predictive analytics to forecast pharmaceutical needs and trends for the upcoming three years.
* Admin should be able to conduct digital marketing campaigns, sending SMS, push notifications, and email updates to clients for promotions and important announcements.
* The system should generate notifications for medicines approaching expiration, following the First-In-First-Out (FIFO) method to ensure medication safety.

***Client side***

* Clients should have access to an e-commerce feature, allowing them to browse and purchase medicines online.
* Clients can schedule appointments through the system, receiving appointment numbers to facilitate quick and convenient in-store transactions for pick-up and payment.

***Cashier side***

* Cashiers should be able to check the availability of medicines in real-time, providing accurate information to clients.
* The system should support sales management, allowing cashiers to process transactions efficiently.
* Cashiers should have access to inventory management features, ensuring the accurate tracking of available medicines and related products.
* Cashiers can process online purchases for clients, maintaining seamless operations between online and in-store transactions.

**Non-Functional Requirements**

### Operational Requirement

**User-Friendly Interface** - The system should have an intuitive and user-friendly interface to ensure ease of use for applicants of varying technical expertise.

**Usability** - The user interfaces across web, desktop, and mobile platforms should be intuitive, ensuring ease of use for both clients and staff.

**Scalability** - The system should be capable of handling an increasing number of pharmacy branches and a growing client base without a significant drop in performance.

**Compliance** - The system should adhere to relevant healthcare regulations and data protection laws to ensure legal compliance.

**Maintenance** - It should be easy to maintain and update the system to adapt to changing requirements and emerging technologies.

**24/7 Accessibility** - The system should be accessible 24/7 to accommodate patients who need medicine.

### Performance Requirement

**Response Time** - The system should respond to user inquiry, such as what medicines are available.

**Load Handling** - The system must efficiently handle peak loads, such as during promotional events, without a significant performance drop.

**Concurrent User Capacity** - The system should be able to handle a large number of concurrent users without experiencing a significant drop in performance, ensuring that all users can access and use the system concurrently.

**Data Accuracy** - The system should maintain a high level of data accuracy, especially in inventory, sales management, and users’ information.

**Predictive Analytics** - The predictive analysis feature should provide accurate predictions with a high degree of precision.

### Security Requirement

**Data Encryption** - All sensitive data, including users’ information must be encrypted to ensure confidentiality and data security.

**Access Control** - The system should enforce role-based access control to ensure that only authorized personnel can access and modify sensitive application data.

**Firewall Protection** - Security measures like firewalls systems should be in place to protect against cyber threats.

**Audit Trails** - The system should maintain audit trails to track user activities and changes in data for accountability and compliance.

**Database Security Measures** - Database access should be tightly controlled, and database security measures such as encryption, access controls, and regular security assessments should be implemented to protect the integrity of stored data

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