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ONLINE APPOINTMENT AND RECORD MANAGEMENT FOR MIRANDA DENTAL CLINIC

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INTRODUCTION

Background of the Study

Online appointment scheduling has become more common in recent years. To help ease the appointment setup process, many different sorts of organizations employ some sort of web-based online appointment management system (Teke, A., et al., 2019). The Clinic Registration System was created to enhance clinic management by automating clinic processes. This approach considers every clinic activity. The patient will register first. Patient data is gathered and maintained in the database even if the patient has never registered before. If the patient is already registered, their information can be searched using their IC number. This will speed up registration and enhance the patient's medical record. The patient is currently assigned to the doctor.

Clinic was predominantly paper-based and it is associated with problems such as misplacement of patients' record, unnecessary duplication of patients' record as well as lack of effective back up facilities (Joseph, Gadzama, & Egu, 2020). But manual keeping of patients' medical records and time spent in organizing the files has led to exploration of alternative ways of enhancing service delivery without compromising their quality (Ofusori, Umoru, Oluwade, & Adetoye, 2017).

One of the main problems captured with the significant ongoing clinical process is lots of time-wasting, because of the manual paperwork system (Madushika, Uwanthika, Premarathna, 2021). Most of the staff in the clinic still using paper works in their workflows. Those paper works such as patient registration using form, patient record

using manila card, open bill statement using handwriting, record appointment using book and so on (Ang, 2015).

Medical records were usually kept and maintained by health care providers, but there also people who opt to keep a personal medical record (Ayanlowo, Shoewu, & Olantinwo, 2013). Patient records constitute the bulk of the medical records of almost all the health care centers all over the world (Joseph, Gadzama, & Egu, 2020). However, the data in such systems suffer from various challenges such as security, reliability, and convenience, to name a few (Iqbal, Jamil, Ahmad, & Kim, 2021).

In many dental clinics, Patients wait for long time in the healthcare facility before they are attended to by the health personnel. This trend is on the increase and it is a potential threat to healthcare services (Obulor, & Eke, 2016). Therefore, an appointment booking system lies at the intersection of providing efficient and timely access to health services (Iduwo, Adeosun, & Williams, 2014).

Appointment scheduling systems have been mainly studied in the literature with respect to achieving better efficiency in outpatient clinics. A well-designed appointment scheduling system in outpatient clinics facilitates the efficient use of resources and ensures timely access of patients to health services (Lee, Min, Ryu, & Yih, 2013). Moreover, Appointment scheduling systems are potentially useful tools for enhancing the patient satisfaction. When an appointment scheduling system is designed and implemented based on the patient's needs and wishes, it helps providers better understand patient's problems, identify the system weaknesses, increase patient satisfaction, and improve clinical outcomes (Habibi, et. al., 2018).

Online appointment system is a system through which a user or guest or simply, patients can access the website of the doctor, and through the online software, patients can easily make their appointments (Akinode, & Oloruntoba, 2017). Moreover, the current available appointment systems come up with problems such as missing appointments by the patients due to the long queues given by clinics. By implementing technological solutions it's possible to obtain benefits such as eliminating waiting lists, enhancing patient's timely access to services, and reducing no show problem. Therefore, we suggest creating a mobile application system to enhance the process of booking appointments at clinics (Hussein, Salim, & Ahmed, 2019).

Appointment scheduling systems are utilized mainly by specialty care clinics to manage access to service providers as well as by hospitals to schedule patient appointments (Kyambille, & Kalegele, 2016). But the problems of keeping their records for quick access by the management and provision of confidential, secure medical report that facilitates planning and decision making and hence improves medical service delivery are vital issues (Abisoye, Alabi, & Ojonuba, 2016).

Medical services have been rapidly changing from traditional through clinics and institutions and focusing on dealing with a quiet driving method. The development of the market for these sensitive medical services, large-scale, needs to communicate with many types of machines required in clinic (Qiu, 2021).

Miranda Dental Clinic manually records the information about each of its patients on the dentist file and stores it in a cabinet. The manual recording of patient information can result in various issues, such as time consumption, limited access, and records that are overlooked or missed. Therefore, the simplest strategy to enhance processes would

be to modify the methods so that the required improvement in manual recording can be facilitated by this system. Using an online appointment and record management system, the process becomes much faster and more efficient than the traditional way. Information technology is a great tool for improving the processes of the dental clinic. Miranda Dental Clinic is located at Sta. Maria-Burgos Road, Baliw Laud (in front of Northcoast Oil), Sta. Maria, Ilocos Sur, Philippines. It is owned by Dr. Elaine P. Miranda. The clinic is operated by one dentist. The clinic's operating hours are 8:00 a.m. to 5:00 p.m. on weekdays and 10:00 a.m. to 5:00 p.m. on Saturdays. Daily, the dentist is accommodating an estimated 4–8 patients from Ilocos Sur and nearby towns. The clinic is still using manual recording of the information about each of its patients on the dentist file and stores it in a cabinet. Miranda Dental Clinic can be contacted through their mobile number.

Conceptual Framework of the Study

The conceptual framework shows the input, process, and output of the Online Appointment and Record Management System for Miranda Dental Clinic. It served as the outline on how the proponents will conduct the study.

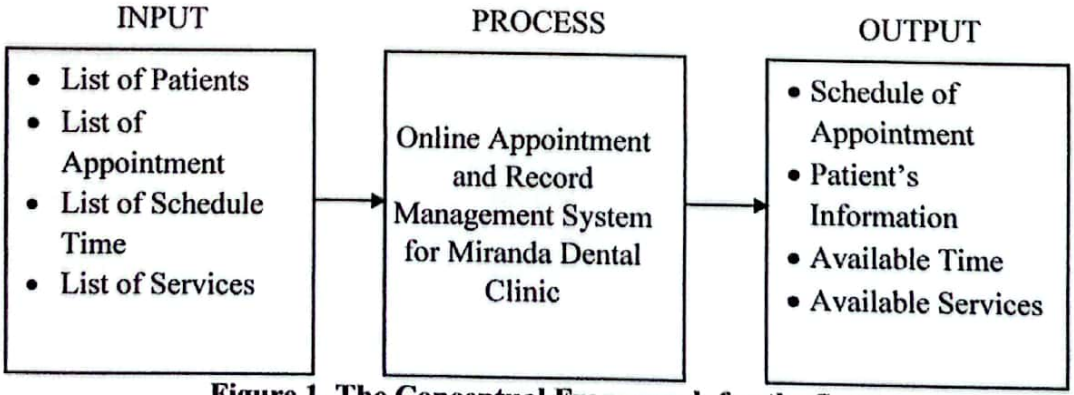

Figure 1. The Conceptual Framework for the System

This conceptual framework of the study was guided using the input-process-output framework as shown in Figure 1.

In the conceptual framework, the input included the list of patients, appointments, schedule time and services. The process of the study was the developed on live appointment and record management system, which allows the clients to browse and book an appointment online. The output of the study is the admin side, in which the admin manages the patient's information, and schedule appointment. The admin can also manage the available time and services they offer.

Objectives of the Study

This study aimed to develop an Online Appointment and Record Management System for Miranda Dental Clinic. Specifically, it sought to achieve the following objectives:

1. To identify the current appointment and record management processes in Miranda Dental Clinic.
2. To determine the functionality and non-functionality requirements.
3. To evaluate the acceptability of the developed system.

Scope and Limitation of the Study

This study was conducted from August 2022 to January 2023 at ISPSC, Sta. Maria, Ilocos Sur, and the Miranda Dental Clinic at Baliw Laud, Santa Maria, Ilocos Sur, Philippines.

This proposed system includes a client and admin users. The client side and admin side can access the system online. A new client needs to register and wait for a confirmation. Once confirmed, the client can login, view the availability of the doctor's

date and time, and then make an appointment. The client can also cancel a submitted appointment. The admin side is for the dentist, where she can manage all the appointments submitted by clients. The dentist can view, update, edit, and cancel appointments; print individual patient records and master lists; manage services; manage data and time; and update the payment remarks. The system can be accessed using the following web browsers: Mozilla Firefox versions 104.1.0 to 109.1.1 and Google Chrome versions 105.0.5195.68 to 109.0.5414.75. The system can also be accessed using a smart phone with an Internet connection.

The system does not include the billing services. Since this is an online system, an internet connection is required to access the system. The system is not available in the Google Play Store.

Importance of the Study

The present study is significant to the following persons, foremost of whom are as follows:

The **Dentist** can easily maintain the database, and it can be access easily when viewing the patient's information and managing an appointment.

The **Patient** can save time and effort by booking an appointment or checking the availability schedule of their doctor.

The **Researchers** enables to find strong evidence and enhance their ability in writing skills.

The **Future Researcher** would be benefited to them in a way that it can serve as a guide for a similar system that they plan to develop and in a way that it can serve as an advanced study for some clinics that use a manual process workflow.

Chapter 2

METHODOLOGY

This chapter discussed the research design, software model, project plan, project assignments, population and location of the study, research instruments, and data analysis.

Research Design

A descriptive developmental type of research was used in this study to organize the presentation, discussion, and interpretation of the data. According to Shona McCombes (2022), descriptive research is a good option when the goal of the study is to discover traits, frequencies, trends, and classifications. Developmental research was to systematically examines the products, tools, processes, and models to provide reliable, usable information to both practitioners and theorists. Developmental Research is only one of several types of research methods that can provide practitioners with usable data, its focus on the design, development, and evaluation of instructional products and processes is unique (Ritchey & Klein, 2005). This research design was made the proponents to better understand the current processes of Miranda Dental Clinic. The questionnaires used are interview sheet to identify the current appointment and record management processes used at Miranda Dental Clinic and a WAMMI questionnaire for testing the acceptability of the system.

Software Model

Agile Project Management divides project activities into smaller cycles known as "sprints" or "iterations" as a means of planning and directing them (Alexander S. Gillis, 2021).

This agile scrum methodology relied on incremental development. Each iteration consists of two to four-week sprints, where the goal of each sprint is to build the most important features first and come out with a potentially deliverable product.

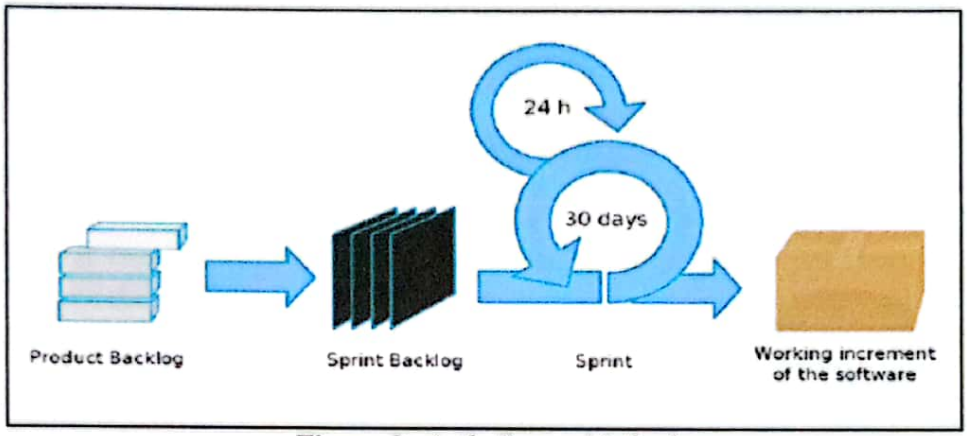

Figure 2: *Agile Scrum Method*

The Agile software methodology has the following phases: product backlog, sprint backlog, daily scrum meetings, and product increment phase.

Product Backlog Phase. A development team's prioritized list of tasks is called a "product backlog," and it is formed from the roadmap and its requirements (Dan Radigan, 2022). Plans must be developed to assist the researchers during implementation and closure. The researchers spoke with Dr. Elaine P. Miranda to learn more about the present process, which would serve as the basis for figuring out the attributes of the suggested method.

Sprint Backlog Phase. A sprint backlog is the responsibility of the development team working on the product, although the process of deciding on the contents almost always involves input from and discussion with the product owner. The researchers identified the features and functions to be included in the system. The researchers also came up with the hardware and software needed by the system.

Daily Scrum Phase. The product owner participates as a developer if they are actively working on issues in the sprint backlog (Ockerman, 2022). The flow chart, use case diagram, and entity-relationship diagram were all constructed during this stage by the researchers. Since a portion of the transaction is conducted online, the developer used PHP, JavaScript, a MySQL server, and a WAMP or XAMPP server for the database when writing the modules' code.

Product Increment Phase. A product increment is the total of all backlog items that were completed during a sprint and sprints that have already ended and are prepared for delivery or system deployment. During this stage, the researchers showed Miranda Dental Clinic the developed system. The constructed method was tested for acceptance, and the dentist offered comments that the researchers was utilized to improved it further.

Project Plan

The timeline used as a project management tool to show the Miranda dental clinic's online appointment and record management system's development status is shown in Figure 3. Additionally, it specifies the duration and placement of each of the Agile Scrum Model's four stages.

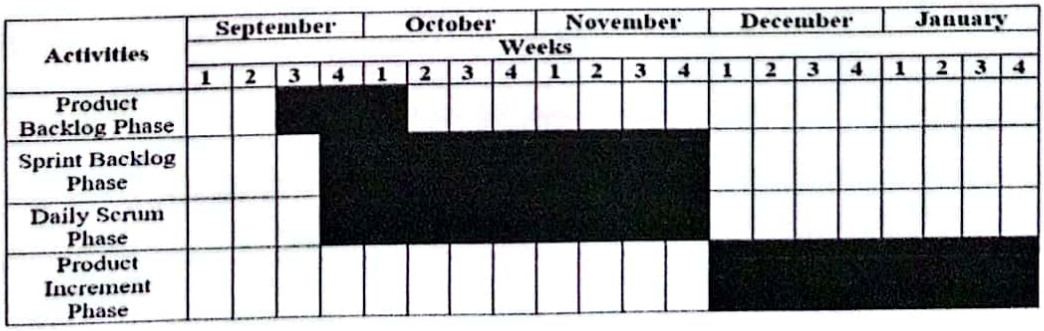

Figure 3: Project Schedule

Project Assignment

Roles and duties of the project team members within the proposed system, the Online Appointment and Record Management System for Miranda Dental Clinic.

Roles	Name	Functions
Project Manager	Mark Christian Visaya	▪ Keep lines of communication open with each member
System Analysis and Designer	Mark Christian Visaya	▪ Organizes the technical team's efforts to tackle problems, ensuring that solutions are consistent and workable.
Programmer Developer	Mark Christian Visaya	▪ Accountable for leading the project's construction, planning, and design team.
QA Tester	Windel Carpio Jessa Prado Charmine Amorozo	▪ Charged with reviewing the project's debugging queries. ▪ Evaluate software needs and report findings to the project team.
Documenter	Windel Carpio Jessa Prado Charmine Amorozo Cedrick Manegdeg Grace Agtang	▪ An update on the project's overall status. ▪ Published the project requirement document and the project schedule.

Table 1. Project Assignment

Population and Locale of the Study

The research was conducted at Miranda Dental Clinic, Sta. Maria-Burgos Road, Baliw Laud (in front of Northcoast Oil), Sta. Maria, Ilocos Sur, Philippines.

Purposive sampling was used by the researchers to determine the respondents' distribution. The researchers selected at least 15 among the respondents for the study, namely the owner of Miranda Dental Clinic or dentist (1), an IT specialist (3), and

patients who are under medical care or treatment (11). The researchers used WAMMI as a tool for the survey.

Respondents	No.
Dentist	1
IT Specialist	3
Patient	11
TOTAL	15

Table 2. Distribution of Respondents

Research Instruments

The tools used in the study were interview, a documentary analysis, internet and library research, and a survey questionnaire.

The WAMMI (Website Analysis and Measurement Inventory) was utilized by the researchers to gauge how usable the system was. By measuring and recording user responses to the acceptability of their websites, WAMMI was an innovative web analytics tool that enabled website owners all over the world to achieve this. It gauges user happiness by having website users contrast their expectations with their actual experiences (Ismail, 2021).

Data Analysis

As data collection methods, questionnaires and interviews were used. For Miranda Dental Clinic's online appointment and record-keeping system, mean, and frequency count.

The descriptive interpretation of the proposed system's level of acceptance is displayed in Table 3.

Point value	Mean Range	Descriptive Rating	Descriptive Interpretation
5	4.21-5.00	Strongly Agree	Very highly acceptable
4	3.41-4.20	Agree	Highly Acceptable
3	2.61-3.40	Neither agree	Moderately Acceptable
2	1.81-2.60	Disagree	Slightly Acceptable
1	1.00-1.80	Strongly Disagree	Not Acceptable

Table 3. Descriptive Interpretation on the level of Acceptability of Online Appointment and Record Management System for Miranda Dental Clinic.

The collected information was graded on a scale from "Not Acceptable" to "very highly acceptable." A mean score of 1.00-1.80 indicates a strong disagreement and is interpreted as not acceptable; 1.81-2.60 indicates a disagreement and is interpreted as slightly acceptable; 2.61-3.40 indicates a neither agree and is interpreted as moderately acceptable; 3.41-4.20 indicates agreement and was interpreted as very highly acceptable.

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