**II. Review of Related Literature**

This chapter will discuss the related studies and systems developed for dental clinic and other health care facilities. Specifically, we will go to the context of how manual dental clinic systems in the Philippines works and its implications and how computerized dental clinic system in different countries works and what are their implemented features. The sources in discussion below are found on the internet that consists of studies, publication, and software where we go over on the features they implement and how it addresses key-problems in dental clinic systems.

## Context of Dental Clinics’ System in The Philippines

Dental clinics around the Philippines are coping with the technology to provide better services to their patients, however, most of the improvement are just limited to reaching the dental clinic through social media for booking an appointment and having general inquiry. Patient’s queueing in clinics that caters greater number of patients still relies on manual way of writing down one’s name in a paper then they will be given a numbered card that will be the basis for the queueing.

In a study conducted in Wesleyan University Philippines in Nueva Ecija, they found out problems in a dental clinic that they are developing a system for such as storing of patient’s information manually that results to several problems such as loss patient data, redundant data and slow retrieval of data that is also a problem of most dental clinics in the Philippines [1]. These lapses in availability of patient information could also affect diagnoses’ accuracy. On the other hand, accessibility of important data that are poorly formatted in the index card like the teeth model and procedures done on each tooth can improve doctor’s diagnosis [2].

## Similar Dental Clinic System

There have been various dental clinic systems implemented around the world. Some of the systems available are My Dental Clinic, Plato Dental Clinic, Klinika.ph, Dental4Windows and Doctor Assist that provides an automated system for dental clinics from registration of patients, appointment scheduling, information management, graphical model of teeth, medical notes, and other features to improve the dental clinic system such as payment processing and inventory management [3], [4], [5], [6], [7]. Some of these systems have implemented other features that separate them from their competitors. In Plato Dental Clinic, they reduce waiting time of the patient by providing a feature in the appointment system where patient can receive a Short Messaging Service (SMS) when they are near the queue [8]. Similarly, Dental4Windows implement messaging and calls for other reminders such as monthly visit date for orthodontics procedure [7]. While most of these systems implement a visual teeth model that is vital in dentistry, they have different charting methods that vary from 3d or 2d, color-coding and more, that will depend on the dentist’s preference.

## Management of Patient Information in Dental Clinic System

Information plays a significant role in a dental clinic system. From formatting of data on how it will be viewed by the doctors, what information should be available to which user, syncing of information in different devices and more.

Most dental clinic systems mentioned above implements a registration of the patient prior from going to the clinic that helps reduce workload for front-desk and reduce the use of papers [8]. However, patient’s personal information is not the only data that is needed to be inputted in the system, medical records are also needed to be recorded that is inputted by the doctors and data should sync to other devices [9] just like when the doctor will input the total cost of the procedure and the accounting will be able to see it. This concept is supported in Plato Dental Clinic, where real-time data syncing is implemented so that sharing of data from doctors and staff will be more effective that can result to increase in productivity and make room for other improvements [5].

## Appointment Feature

Dental Clinics face numerous issues including long wait time that results to negative patient experience. Although there are techniques implemented like numbered-card system in most clinics’ patient queue nowadays, it barely addressed the issue of long waiting time as different lapses can be found by using a numbered-card system.

Appointment scheduling feature in a system’s application makes it easier to handle appointments throughout the day. Patients can check themselves by limited interaction with personnel or using physical ticket/ numbered cards with an appointment scheduling solution. This has a huge impact on the patient’s experience because it can reduce wait periods upon arrival, thus, they can better arrange their day because waiting times are lesser.

On the clinic’s part, they will have a greater understanding of how many guests will arrive each day, allowing them to cut wait times and improve customer satisfaction. This can manage and spread the number of patients away from peak hours and towards less busy days avoiding overwhelming number of patients in certain day that results to various problems. Moreover, it can lessen employee’s anxiety while saving their time to focus on other activities inside the clinic [10].

In the study conducted about Hybrid Appointment System in UAE (United Arab Emirates), implementing an appointment system that will still consider walk-ins by allowing the doctor to manage patient’s schedule based on the patient’s preference have greatly improved customer’s satisfaction and productivity [11]. This study will allow the idea of catering walk-in patients and emergency-related cases to still be handled by doctors immediately by not making one doctor available in the appointment feature but can still handle patients that are scheduled when there is no walk-in, moreover, this can also lessen patients’ waiting time.

## Interactive Teeth Model

One of the fundamental components in patient’s information in dental clinics is the teeth model that represents the current situation of a patient’s teeth. This model will be very useful in determining diagnosis and giving the doctors the idea on what should they suggest based on their patient’s current situation. Several dental clinic software such as “My Dental Clinic” and “Plato Dental Clinic” supports this kind of feature [3, 8]. The difference in the two software being referred to is that the Plato’s feature has more precise representation as each tooth is divided into quadrant which can help to make a more detailed analysis of a certain problem. Each quadrant will be colored specifically based on the classification of what disease is associated within and extracted tooth will be colored black. Doctors can input information in a specific tooth quadrant which, when clicked, can be viewed for a more detailed information.

## Synthesis

The systems and related studies gathered above are crucial to the development of the project. It gives the developers the base knowledge in the fundamentals of Dental Clinic Systems. Features such as registration of patients, appointment scheduling, information management, graphical model of teeth, medical notes and payment processing will be implemented in the system that will be developed by the developer. However, other aspects such as inventory management will still be decided to whether implement it or not as the developer progress on doing the system. Furthermore, SMS update, data syncing to other devices optimized even there’s no Wi-Fi connectivity will be implemented as well.

Some other differences from the features of the systems mentioned above to the system that will be developed are implemented just on modification to tailor-fit the current business process of Apelo Dental Clinic. For example, in patient registration, patient’s initial information that they registered in the system themselves will still be verified in the front desk and doctors, this can help ensure the validity of data they input that can also be used in allowing later payments which is one of the causes why patients are peak on some time of the month. Through this, number of patients can be spread throughout the month allowing for less waiting time and overwhelming day for the clinic.

In the appointment system, the concept of having one doctor to be not available in the appointment will be implemented too but we are eyeing on modifying it because patients have preference of which doctor will treat them, thus, making all the doctors available on their schedule is important too.

The developer also thinks of providing dashboard that will also differentiate the system from other mentioned above. This will provide overview of key performance of the clinic such as number of patient’s served, number of each procedures done, how many patients does each doctor finished and what procedures have they done. This data will be very useful in introducing new approach that will improve the clinic such as providing incentives and making strategies for increasing sales.

There will still be prior modifications on the systems that will be developed. Nevertheless, this chapter was able to discuss the features that is crucial in a Dental Clinic System.

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