# **CHAPTER THREE**

# **SYSTEM ANALYSIS AND DESIGN**

## **3.0 INTRODUCTION**

This Chapter begins with a brief description of the case study and current process of carrying operations in the university clinic. Next, the method of data collection, how that data and results would be analyzed and results would be generated. The results would be a key factor for establishing the user requirements for the new system. Then the System’s design will be discussed in this chapter and also the file specification, database file, system flow chart.

## **3.1 CASE STUDY DESCRIPTION (FUD CLINIC)**

The Federal University Dutse clinic is a school-based clinic healthcare facility catering to the medical needs of students, staff and faculty members. Despite its vital role in providing healthcare services, the clinic has been facing challenges related to manual appointment booking and the need to improve in overall patient care and experience.

Some of the challenges faces by the University include;

* Manual appointment booking: the clinic relies on a manual appointment booking system, leading to inefficiencies, longer waiting times, and the potential for overlapping appointments.
* Inconsistent patient care: the limited resources and manual processes sometimes result in inconsistent care experience, impacting overall patient satisfaction.

Strategy and implementation;

* Digital appointment booking system: to address the manual booking system’s challenges, the clinic will decide to implement a digital appointment booking system. This online platform will allow students and staff to schedule appointment conveniently, reducing waiting time and optimizing clinic’s resources.

## **3.2 ANALYSIS OF EXISTING SYSTEM AND DESIGN**

System analysis is a process of investigating, analysis, design, installation and evaluation of information system either for change or modernization. The main objective of a system analysis is to study the requirement of FUD clinic.by putting into consideration what the clinic is doing, its problem’s and ways of improving their differences.

## **3.3. CURRENT SYSTEM APPROACH IN FUD CLINIC**

Presently, the current system approach employed by the university clinic is the manual method of booking appointment. That is to say, patients will have to visit the clinic first in order to book appointment. But with the implementation of this system, patients won’t have to be present at the clinic before they can book appointment.

## **3.4. DATA COLLLECTION**

In this project research work, there are two main type of data collection, which include primary collection and secondary collection. These two categories of data collection type were used in this research work.

### **3.4.1. The primary collection**

The primary collection which is also known as interview method are the original collection of material or study unit from which information is to be collected on first hand basis through interview and observation. But here, during the research I was only able to interview a staff of the clinic. Reviewing and sharing their experience about the problem of the existing system. Through this; useful information is collected, analyzed and recorded.

### **3.4.2. The Secondary collection**

The secondary collection is a method whereby the data are collected or obtained indirectly unlike the primary collection. Here I review the existing document and patient medication forms were reviewed and data were collected. Also make use of existing literature, research report; internet downloads and so on, in order to understand the diagnosis system.

## **3.5 INSTRUMENT DESIGN**

The purpose of this instrument design is to create a brief and effective survey to gather feedback from patients regarding their experience with the clinic appointment booking process. The insight collected will be used to identify areas for improvement and enhance the overall appointment booking system at the clinic. The survey will consist of a series of structured questions to be administered to patients after their clinic appointments. Certain questions were prepared to guide the interview towards the satisfaction of research objectives.

Question 1. How do you collect and analyze patient feedback to improve the overall patient experience?

Question 2. How does the current appointment booking system work, and are there any challenges with it?

Question 3. How do you manage the allocation of medical staff during busy periods to ensure efficient patient care?

The main purpose of the interviews conducted was to understand the current process of handling appointment booking in the clinic.

### **3.5.1 Data presentation and findings**

This section table 3.1 contains the presentation of the in-depth interviews. Using a table to illustrate the questions and answers helps to present the result more effectively and it also categorizes the answers according to the aim of the dissertation. Table 3.1 illustrates the breakdown of the interview with one of the staff of the clinic.

Table 3.1 INSTRUMENT AND FINDINGS

|  |  |  |
| --- | --- | --- |
| Q1. How do you collect and analyze patient feedback to improve the overall patient experience? | Q2. How does the current appointment booking system work, and are there any challenges with it? | Q3. How do you manage the allocation of medical staff during busy periods to ensure efficient patient care? |
| “We collect our patient feedback and record it in their personal file which is a manual method. Each patient is expected to have a clinic card which is provided by the clinic”. | “The current appointment booking system is done manually. Patients will have to visit the clinic in order to book appointment with us” | “During busy periods, students will have to wait or reschedule appointment with us” |

*Figure 3.1 Instrument and Findings*

## **3.6 LIMITATION OF THE EXISTING SYSTEM**

a. The manual appointment booking process can be time-consuming for both clinic staff and patient.

b. Manual booking system may not be 24/7 accessible for patients to book appointments.

c. Human errors are more likely to occur in manual systems, leading to appointment scheduling mistakes, overlapping appointments or data entry errors.

d. Gathering and analyzing data on patient appointment patterns and preferences can be cumbersome with manual systems.

## **3.7 SYSTEM REQUIREMENTS**

1. User Registration and Authentication:

- User registration with email verification or mobile number verification.

- Secure authentication mechanisms (e.g., username/password,) to ensure user account security.

2. User Interface and User Experience (UI/UX):

- Intuitive and user-friendly interface for easy navigation. I used Figma to design the UI of the web application.

- Responsive design to provide a consistent experience across various devices (desktops, tablets, and mobile phones).

3. Appointment Booking Functionality:

- Ability for users to search for available appointment slots based on date, time, and medical professional.

- Real-time availability updates to prevent double booking.

4. Notifications and Reminders:

- Automated appointment confirmation emails or SMS notifications to users.

- Reminder notifications for upcoming appointments to reduce no-show rates.

5. Calendar Integration:

- Integration with users' personal calendars (e.g., Google Calendar) to sync appointment schedules.

## **3.8 SYSTEM DESIGN**

Design is the first step in the development stage. Software design involves three technical activities - design, coding, implementation and testing that are required to build and verify the software. The design activities are of main importance in this part, because in this activity, decisions finally affecting the success of the software implementation and its ease of maintenance. Design is the only way to correctly translate the customer requirements into finished software or a system. Design is the place where quality is bringing up in development.

### **3.8.1 System Architecture**

Book Appointment /

View Appointment

Database

Graphic user interface

Student/Staff authentication

Security strength

Authentication

User Profile

*Figure 3.1 System Architecture*

### **3.8.2 Entity relationship diagram (ER Diagram)**

ER diagram is a graphical representation of entities and their relationship to each other, typically used in computing regarding the organization of data within database or information systems. Entity is a piece of data, object or concept which described which data should store. Relationship is how data is shared between entities.

**Entity**

Which are represented by rectangle. An entity is an object or concept that has its existence in the real world. It includes all those things about which data is collected. A weak entity is an entity that must defined by a foreign key relationship with another entity as it cannot be uniquely identified by its own attributes alone.

**Attributes**

Which are represented by ovals. A key attribute is the unique, distinguishing characteristic of the entity. For example, an employee's social security number might be the employee's key attribute.

**An Entity**

Set It is a set of entities of the same type that share the same properties, or attributes.

**Process**

A process shows a transformation or manipulation of data flows within the system.

**Actions**

Which are represented by diamond shapes, show how two entities share information in the database.

Appointment

View

Manage

Administrator

Patient

*Figure 3.2 ER Diagram*

### **3.8.3 Activity Diagram Login module**

Login

Enter username and pass to login

Make an appointment

Cancel appointment

Reschedule appointment

View available appointments

Receive confirmation

Logout

*Figure 3.3 Activity Node Diagram*

## **3.9 CONCLUSION**

This chapter has investigated by the means of interview the existing process of management in Federal University Dutse clinic. The survey gathered opinions regarding certain behaviors the proposed management system the prototype should exhibit. The findings lead to the generation of user’s requirement which will serve as a basis for constructing the model of the prototype.

The next chapter will focus on the presentation of the model and to implement the evaluation and testing of the system.