**CHAPTER III**

**RESEARCH DESIGN AND METHODOLOGY**

This chapter presents the research design and methodology of the proponents system.

**Research Design**

This study is a descriptive-developmental research on the Automated Charting System (FDAR) for any Hospitals that are using manual charting of records.

The Adaptive Development Cycle is the model used by the proponents for the development system since it is usually step by step process as it met the stages of the software system development cycle. ADC focuses attention upon processes destruction and reorganization, which are open neglected in favor of growth and conversation. We used ADC method as a guide for the process of the proponent’s research in developing a system and constructing a software development. ADC is much easier to use as methodology. It can also manage a system anytime you want it to change when some ideas come during development of the system. The system was evaluated by the nurses in any hospitals using the standardized ISO System and Software Quality and these are the ISO System and Software Quality Requirements and Evaluation (SQuaRE) instrument or ISO/IEC 25022 software characteristics for as experts evaluation instrument and McCall’s Software Evaluation Criteria for Software Quality for the participants of the study to evaluate the acceptability of the system. Both instruments are interpreted as the following.

**Adaptive Development Life Cycle**

The Adaptive Development Cycle are nested in hierarchy across time and space which help explain how adaptive system can, for brief moments generate novel recombination that are tested during longer periods of capital accumulation and storage.

Adaptive Development Cycle manage project does what title suggests it adapts. With adaptive project management the scope of a given project can vary. While the time needed to complete the project are constants, the project scope can be adjusted as it is being executed. This method get maximum value out of each project, such as when new ideas or opportunities are unlocked during the development of a project.

***Figure 1****: Adaptive Development Cycle*

Figure 1 Shows how the research and process being implement during the start of the process until it has been settled. ADC is much easier to use as methodology, the diagram shows the step by step process to implement a system. The advantage of ADC method from other methodologies is that can manage your system anytime you want it to change when some ideas come during development of the system, it upgrade the system anytime when there is opportunity to change.

**Assess Problem**

In assessing of problems it must conduct first interviews for research before it proceed in a process. Brainstorming is needed to know the use and purpose of this system.

**Design**

The system design should be a user-friendly when it comes to the features of the system, though it has secured so that cannot be easily to access the system and the process on how to use the system can be followed to the unauthorized personnel to ensure the safeties of the right information and the issues of data or documents recorded from the patients. First the proponents must create a sample design and consult to the client if there have a suggestions to the design in order to provide by the proponents.

**Implementation**

The proposed system is being installed to the production process. The user will instruct on how to use the system. In this phase the effort are also required to be implemented, resolving the identified problems, and also planning for sustaining the system.

**Analysis**

The proponents prepared a letter to conduct a preliminary interview and observation on the person-in-charge to the hospital. The proponents conducted an interview to gather some information in order to minimize the effort of all nurses and lessen the time consumed in writing a record of the patient in the paper, so we make a user-friendly system.

After the interview, we create an advanced and easy charting of FDAR from the patient that provide more reliable of recording and putting the data of the patient based on what the nurse observed to the particular patient. The one who’s able to use for that system is the one who authorized to perform an FDAR method.

**Context Diagram**

The use case diagram show the user’s interaction with the system and its relationship between different use cases and the user is involved.

Admin

FDAR Automated Charting System

Patient

Nurse

Pass the patient’s information (Admition)

Encoding Patient’s information

Ask the Gathering

Patient Patient

Condition Condition

Generating

FDAR records

Create FDAR chart

For patient

***Figure 2:*** *Context Diagram of Automated Charting System*

**Figure 2** shows the general processes of the developed system. It also demonstrates the input requirements needed to filled-up by the administrator and the expected processed output from the system.

**Data Flow Diagram**

Generating FDAR Data

**Nurse**

**1.0** Log in

**1.2** Create FDAR

**1.2**

Search Patient

Patient’s Profile

**1.4**

Create Data

**1.3**

Create Focus

**Admission (Patient Profile)**

**D1**

Verifying

**1.5**

Create Action

**1.6**

Create Response

**1.7**

Sending

Confirm

Doing Diagnosis

Data Analysis

Performed

Admin

2.0

Received

2.1

Saving

Verifying Data

**FDAR Records**

**D3**

**Accounts**

**D2**

Verifying

Confirm

Manipulating Data

**Figure *3.*** *Data Flow Diagram of Develop System*

Figure 3 shows the entire data flows, the processes, input requirements, processed outputs and the storage of developed system.

**Use Case Diagram,**

FDAR Record

Workers Profile

Patients Data

Data Server

Workers Data

Accounts

FDAR Data

FDAR System

Nurse

Doctor

Patients Profile

Log in

Sign up

Data

History

Response

Action

Result/Records

Focus

Admin

***Figure 4.*** *Use Case Diagram of the proponents Developed System*

**Figure 4**. Shows the major tasks that actor must be done in order to implement the system. As the figure shows, the admin has all job to perform in order for the system to implement. Its job are to check the record of all the patient.

The corresponding use case description for the above actors are:

**Admin** – a person who manages the server and the keeper of data of the FDAR chart of the Hospital with the developed system.

**Nurse** – the one who is intended to use the FDAR Charting System by recording and submitting the data that they observed on the patient’s condition using the system.

**Doctor** – the person who are in charge of checking FDAR chart if the nurse is doing it using the system based on observation that comes from the patient.

**Use Case Description**

The Table below describes the function, conditions and alternatives flows to be met of the actor in the use case diagram.

Table 5. FDAR Form

**Use Case Name:**

FDAR Form

**Actors:**

Nurse

**Description:**

This case is describe the automated charting system which can provide a given data that you needed.

**Pre-conditions:**

The nurse is logged in the FDAR charting system

**Post-conditions:**

The nurse has received an acknowledgement from the keeper that the recording of data was on process to check or if not complete a keeper may call you and asked for your reports.

**Main Success**

**Scenario**

After the nurse created the FDAR successfully it will send to the database for keeping of records.

Table 6. Patient

**Use Case Name:**

Patient

**Actors:**

Doctor, Nurse

**Description:**

This system will type of form which is the Doctor/Nurse should fill up all those required information about the admitted Patients.

**Post-conditions:**

The Actors has received an acknowledgement from the system that the information of the admitted Patient was successfully added and the system will saved all of new Patient’s information into the database.

**Pre-conditions:**

The Doctor/Nurse interview the patient or his/her guardian about the information in his/her cause of accident.

**Main Success**

**Scenario**

The Admin will keep the records of the patient that being passed by the nurse and keep it for evidential purposes.

Table 7. Workers

**Use Case Name:**

Workers

**Description:**

This system will type of form which is the new employee nurse should fill up all those required information about their biography.

**Actors:**

Admin, Doctor

**Post-conditions:**

The actors has received an acknowledgement from the system that the New Employee was successfully added and the system will saved all of new employee.

**Pre-conditions:**

The Doctor/Admin should get all of New Employee’s information.

**Main Success**

**Scenario**

The Admin is going to encode the information of the recruited workers after getting hired.

Table 8. Log In

**Use Case Name:**

Log in

**Post-conditions:**

The actors has received an acknowledgement from the system that their account was found and the system will redirect the actors to specific homepage of the system or if not found a message explaining the failure. Welcome.

**Pre-conditions:**

The actors should create an account.

**Description:**

This case is where you using an Account that requires your username and password.

**Actors:**

Admin, Doctor, Nurse

**Main Success**

**Scenario:**

The user is successfully entered in the system of FDAR charting.

Table 9. Sign Up

**Use Case Name:**

Sign up

**Post-conditions:**

The actors has received an acknowledgement from the system that their account was found and the system will redirect the actors to specific homepage of the system or if not found a message explaining the failure. Welcome.

**Pre-conditions:**

The actors should put username and password for their account.

**Description:**

This case is where you creating an Account that requires your username and password and etc.

**Actors:**

Admin, Doctor, Nurse

**Main Success**

**Scenario:**

The user has been successfully registered according to the system.

**Activity Diagram**

The activity diagram shows the interactive flow of activities done by the actor of the developed system.

**Admission**

Nurse

Admin

Get Patient’s Information

Forward to Administrator

Forward to Administrator

***Figure 5.*** *Admission diagram of the Developed System*

**Figure 5** shows the steps of add, update and archive of patient’s information

**FDAR Charting**

Nurse

Admin

Verifying by the server

Log In

Confirmed

Find Patient

Get Patient Info.

Creating Focus

Encode Data

Creating Data

Saved

Creating Action

Creating Response

Pass the Data to server

***Figure 6.*** *FDAR Charting Diagram of the Developed System*

**Figure 6.** Shows the steps of creating an FDAR chart for patient’s information.

**Decomposition Chart**

Decomposition Chart shows the break down process and its sub-process of the whole system.

**Web-Based Automated Charting System**

2

Patients

5

Workers

4

Sign up

3

Archives

1

Accounts

6

FDAR chart

6.1

Generating FDAR Charts

Add

Add

Restore

Patient

Add

1.1

Generate

Accounts

6.2

Add charts

Display

Update

Archive

Display

Update

Archive

Restore

Sign up

Restore

Workers

Restore

FDAR Records

Display

6.3

Archive

Update

Archive

***Figure 7.*** *Decomposition Chart of Web-Based Automated Charting System*

**Figure 7** shows the breakdown processes and its sub-processes of the developed system. Every processes is been labeled and mark to equate the functionality of the whole system.

**Entity Relationship Diagram**

Relational database management system (RDBMS) is a database management system (DBMS) based on relational model of data. In conformity, the Entity Relationship Diagram shows the relationship and the connection of all tables in database in a working system.

PK Account\_Id

Username

Pass

Account

PK Sign\_Id

username

password

repassword

Sign up

PK fdar\_Id

Focus

reason

Data

reason

Action

Response

Date

Time

Signature

FDAR

PK worker\_Id

firstname

middlename

lastname

department

position

gender

Workers

PK patient\_Id

firstname

middlename

lastname

bday

bplace

age

Patient

***Figure 8.*** *Entity Relationship Diagram of the Proponents Developed System*

**Figure 8** shows the connection of all the tables in the database. Each table in the database requires specific information in order to work the system.

**Data Dictionary**

The tables below shows the list of all tables and the data stored in the database on the Web-Based Automated Charting System. It provides the attribute, data types and also the description for each fieldnames to recognize the data being stored in the database.

Table 10. Account

|  |  |  |  |
| --- | --- | --- | --- |
| Fieldname | Description | Type | Length |
| Account\_Id | Account identification | INT | 10 |
| Username | User’s name | VARCHAR | 20 |
| Pass | User’s password | VARCHAR | 20 |

Table 11. Sign up

|  |  |  |  |
| --- | --- | --- | --- |
| Fieldname | Description | Type | Length |
| Signup\_Id | Sign up identification | INT | 5 |
| username | User’s name | VARCHAR | 50 |
| pasword | User’s password | VARCHAR | 50 |
| repassword | Password confirmation | VARCHAR | 50 |
| department | User’s department | VARCHAR | 50 |
| position | User’s position | VARCHAR | 50 |

Table 12. Patient

|  |  |  |  |
| --- | --- | --- | --- |
| Fieldname | Description | Type | Length |
| ID | Patient identification | INT | 10 |
| firstname | Patient’s first name | VARCHAR | 50 |
| middlename | Patient’s middle name | VARCHAR | 50 |
| lastname | Patient’s last name | VARCHAR | 50 |
| mont | Month of birthdate | VARCHAR | 50 |
| days | Day of birthdate | VARCHAR | 50 |
| year | Year of birthdate | VARCHAR | 50 |
| birthplace | Birth place | VARCHAR | 50 |
| age | Patient’s age | VARCHAR | 50 |
| gender | Patient’s gender | VARCHAR | 50 |

Table 13. Workers

|  |  |  |  |
| --- | --- | --- | --- |
| Fieldname | Description | Type | Length |
| ID | Worker identification | INT | 5 |
| firstname | Worker’s first name | VARCHAR | 50 |
| middlename | Worker’s middle name | VARCHAR | 50 |
| lastname | Worker’s last name | VARCHAR | 50 |
| department | Department | VARCHAR | 50 |
| position | Position | VARCHAR | 50 |
| B-day | Worker’s birthdate | VARCHAR | 50 |
| gender | Worker’s gender | VARCHAR | 50 |
| status | Worker’s status | VARCHAR | 50 |

**Operational Framework**

**Design**

The system design should be a user-friendly when it comes to the features of the system, though it has secured so that cannot be easily to access the system and the process on how to use the system can be followed to the unauthorized personnel to ensure the safeties of the right information and the issues of data or documents recorded from the patients. First the proponents must create a sample design and consult to the client if there have a suggestions to the design in order to provide by the proponents.

**Build**

In order to create a model for the system the proponents first create forms and we base on our gathered data and information from the respondents to make an inputs. In line with this process, we also try to code so that we can run and test if there is some instance that will be polished or errors that might be encountered, after creating model, the demonstration of the system model follows.

**Demonstrate**

After designing the system model it should be demonstrate to the respondents on how the process in using of the said system so that they can easily manage and know on how to use it.

**Testing**

In this stage the proponents test the program together with the respondent’s presence if it is workable and reliable on the said system. The testing of the proposed system plays an important role because in this process the company will see if the system is totally effective and can make the work of the respondents easier and faster.

**Implementation**

The proposed system is being installed to the production process. The user will instruct on how to use the system. In this phase the effort are also required to be implemented, resolving the identified problems, and also planning for sustaining the system.

**Architectural Diagram Interface of Hardware**

Architectural diagram show the process of the interaction between the user and the hardware.

**FDAR**

**Patient**

**Nurse**

**FDAR**

**Head Dept.**

**Server**

**Computer**

***Figure 2****: Architectural Diagram of Automated Charting System of FDAR*

***Figure 9.*** *Architectural Diagram of Automated Charting System of FDAR*

Figure 9: shows Architectural diagram if the system it starts with the nurse, the nurse will register for his/her account and identity as: After registration now he/she gets the information or the data he/she gathered from his/her patient’s condition using Automated Charting System to record and send it to the server to database. Then the admins of the server will keep and prepare it for purposely use like: serve as evidences and surveys of the Hospitals to gain more reputations.

**System Testing and Implementation**

In order to prove that the system is really reliable, in terms of producing information that will be given by the system, it should be first tested so that the client or the proponent will see if the system that is being proposed is effective in terms of its purpose and uses so that can make them satisfied. The proposed system has been tested by other group as client in the school laboratory. We select some of the students to act as a patient, nurse and admin so that can visualized if the process is correct as well as the storing of data’s during operation. The system is only designed to provide the needs of the medical workers in the Hospital to make the FDAR charting process easy and accurate.

**Hardware and Software Requirements**

**Automated Charting System Feature**

The Automated Charting System provides the following feature that is commonly done in their charting process as well as the recording of data’s.

* Provide the patients information and status
* Provide the information of workers
* Provide the log in log out feature for the workers
* Provide the account for the admins
* Provide the list of what department they belong
* Provide the FDAR functionality and process information
* Providing the computerized data and reports of the patient’s condition
* Securing storage of accounts, data, information and reports.

**Recommended Hardware Specification**

For Automated Charting System to develop and run a program in perfect function, first you need to implement the following hardware specifications:

**For workers room station:**

* Computer
* Processor type (64 bit)
* RAM (4-8 GB)
* Memory (8-16 GB)
* Hard drive (500 GB)
* Internet Connection
* Electronic Pen
* Mouse and Keyboard
* Printer

**For Server workstation:**

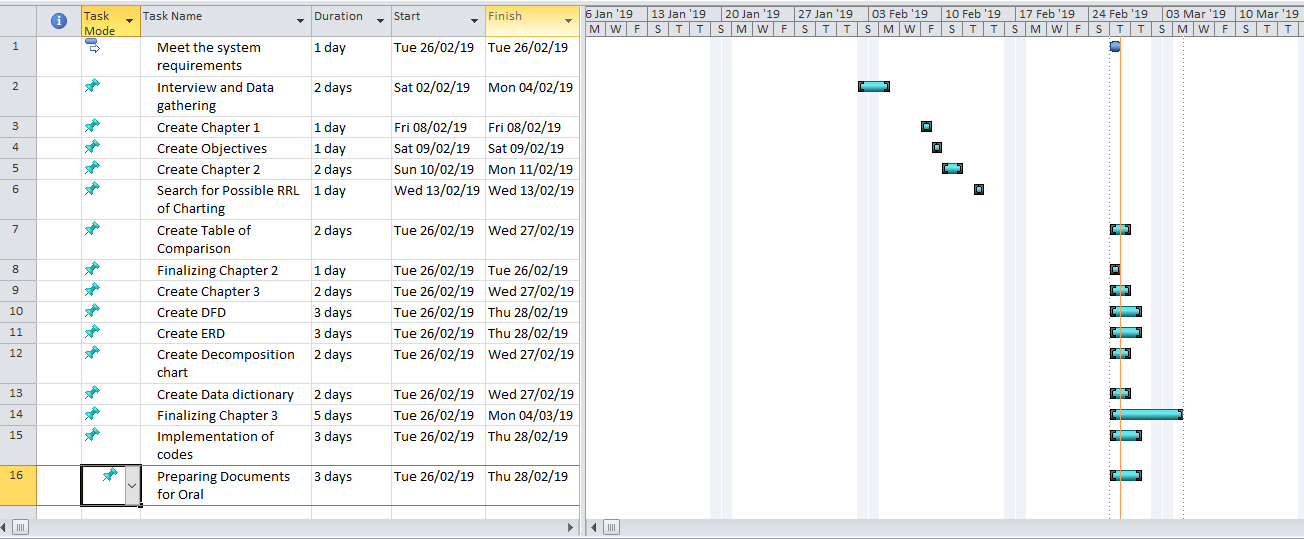
* Computer
* Mouse and Keyboard
* Server
* Modem
* Router
* Internet Connection
* Windows 10 up (if possible)
* 64 bit processor
* RAM 8-16 GB
* Memory (64 GB up)
* Hard drive (1000 Terra bytes)

**Recommended Software Specification**

For Automated Charting System to develop and run a program in perfect function, first you need to implement the following software specifications:

* Heidi SQL (v. 9.4)
* Android Software
* Java Application (Netbeans 8.0 or higher)
* XAMPP

**Gantt Chart**

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