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UoN HIV Capacity Building Fellowship Project Implementation Report

PROJECT TITLE: AUTOMATING THE PMTCT PROCESSES FOR BUSIA COUNTY REFERRAL HOSPITAL

Project Report Submitted to University Of Nairobi HIV Capacity Building Fellowship

by

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AUGUST, 2017

DECLARATION

I **Michael Muia Munyao** do declare that this project report is original and has not been published or submitted to any other University or research institution.

Sign ………………………………………….. Date 16 August 2017

Supervisor: **Dr. EVANS MIRITI**

Sign ………………………………………….. Date 16 August 2017

Health Informatics Track Lead: **Dr. ELISHA OPIYO**

Sign ………………………………………….. Date 16 August 2017

DEDICATION

I dedicate this report to my family members and in a special way to any child under age of five years who is HIV positive.

ACKNOWLEDGEMENT

Table of Contents

LIST OF ABBREVIATIONS

ADT	Anti-Retroviral Dispensing Tool
AMPATH	Academic Model Providing Access to Healthcare
ART	Anti-Retroviral Therapy
BCRH	Busia County Referral Hospital
CCC	Comprehensive Care Clinic
HCT	HIV counseling and testing
HIS	Health Information System
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
LTF	Lost to Follow up
KAIS	Kenya AIDS Indicator Survey
MCH	Maternal and Child Care
PLWHA	People living with HIV and AIDS
PMTCT	Preventing Mother-to-Child Transmission
SDLC	System Development Life Cycle
TB	Tuberculosis
UON	University of Nairobi
UNITID	University of Nairobi Institute of Tropical and infectious Disease
WHO	World Health Organisation

PROJECT SUMMARY

HIV is still a major cause of death in children under the age of five, the majority of whom contract HIV from their mother during pregnancy, delivery or breast feeding. This transmission of HIV from HIV positive mothers to infants is preventable and with proper interventions the risk can be reduced to zero percent.

Effective and efficiency provision of Prevention of Mother-to-Child Transmission of HIV (PMTCT) interventions that improves maternal health and infant HIV-free survival is required. At Busia County Referral Hospital the PMTCT data was initialy processed manually with the risk of losing the manual files together with the critical clients' details. It is very cumbersome to carryout analysis on the manual files by extracting relevant information that could guide in managing the patients. There were challenges of monitoring the HIV mothers comprehensively. For this reason there was need to build a PMTCT application system that will ensure HIV positive mothers' data is securely maintained and enhance the efficiency and effectiveness of the data management. Automating the PMTCT processes will enhance intervention plans with an objective of reducing transmission of HIV from mother to child to zero percent. The tool will ensure that the PMTCT data is accessible to all in a stigma free environment. The system will assist in ensuring that the lost to follow up cases are reduced to zero. The system will optimize the PMTCT data by ensuring that the proper guidelines are adhered to and improve maternal and child health.

All the system development phases were adhered to with the user requirements properly gathered and documented. The system was appropriately designed using tools like ERD, Data Flow Diagrams and sequence diagram. The usability principles was used as a guide to ascertain easy use of the system. The system was be implemented in phases after putting up more computers for linkage and train users on proper use of the system. The whole project took a duration of eight months for development and four other months for implementation, system testing and training users. One of the lesson learned is the importance of user involvement in the entire process of developing the system, I also acquired the system design and development skills. The system is approximated to have cost Ksh 500,000.

1.0 INTRODUCTION AND BACKGROUND INFORMATION

Health Information Systems allows loads of health related data to be accurately captured, and securely maintained. The data collected can later be analyzed and at times matched up with the knowledge that the clinicians possess to build intelligence. The intelligence allows for accurate predictions of possible consequences of a treatment options, provision of timely reminders and accurate guidelines for various clinical procedures. The insightful knowledge derived from these systems can be used to reduce the cost of health care services and improve the quality.

Busia County referral hospital (BCRH) has an excellent health information system "SANITAS". The system contains several modules in which most of the clinical and non-clinical processes within the hospitals have been automated. Within the hospital AMPATH as a partner has set up a Comprehensive care clinic that caters for all the HIV/AIDS clients. However, recently the government of Kenya directed that all the PMTCT services be integrated in Maternal and Child Health/Family Planning clinic. By the time these services were reverted to the hospital the SANITAS system had already been developed, without the module to manage the PMTCT processes. The PMCTC data at BCRH is manually managed. The patients' data is kept in files that can easily be lost. With time there is tear and ware and it's absolutely cumbersome to analyze these data to provide accurate reports.

Sanitas System Interface

In order to provide best practice in data management of PMTCT processes that will enhance effective and efficient provision of services, there is need to observe the proper guidelines. To achieve this, the PMTCT application system will be built and integrated with the current health information system at BCRH. The system will have mobile application capability that will be used to collect and securely store the data of the infected HIV client, monitor the CD4 results of the clients and the PCR results for children at 6weeks, 9months and 18months. The system will also facilitate clients follow-up, defaulter tracing and provide timely reminders to client on drug use.

1.1 Objectives

Broad objective

To develop and implement an automated database system for Prevention of Mother to Child Transmission (PMTCT) processes in Busia county referral hospital.

Specific objectives

1. To collect and analyze data from the manual file of Prevention of Mother to Child Transmission (PMTCT) clients.
2. To design the PMTCT data application system.
3. To develop and an intelligent automated file management system for the PMTCT data processes in Busia county referral hospital**.**
4. To implement the designed automated file management system for the PMTCT data processes in Busia county referral hospital**.**
5. To train the system users

2.0 METHODOLOGY

The Agile system development methodology was used in development of the Busia County Referral Hospital PMTCT system. According to Ambler (2004), in the Agile system development methodology, the development tasks are divided into time boxes (small time frames) to deliver specific features. The methodology was used because of its iterative approach in building information system. The Agile manifesto principles that include individuals and interactions, working software, customer collaboration and responding to changes was adhered to, throughout the system development phases. The system was implemented using the phases of SDLC in a sequential, iterative or simultaneous approach to some activities. Each phase, discussed in the preceding section, details the activities, tasks and the actors involved.

2.1 Planning and requirement Analysis

This is an important and fundamental phase that ensures that the user requirements are clearly gathered and documented. The various techniques like interviews, stakeholders meeting, document review and observation were used to gather the user requirements. The product feasibility study in economical, operational and technical areas was done to establish the viability of the project. Planning for quality assurance requirements and identification of risks associated with the project was also done. The BCRH PMTCT staff were involved in the problem identification. The existing manual file, like the green card were reviewed. A visited KNH to done to compared the system specifications gathered at BCRH and the existing system.

A system specification document was prepared; the document contains details on description of system users, their accounts and privileges. Some of the system users include the system administrator, hospital clinicians, mentor mothers laboratory technicians and nutritionist. The functional and non-functional requirements were also documented. These include mainly registration of the client details, both PMTCT mothers and infants. Capturing the clients triage details, the HIV management details, the clinical review details, the patient treatment adherence details, the HIV intervention details and laboratory test results. Other requirements include report generation especially the details of clients expected in a particular day for reviews, those who fail to show up for reviews and the CD4 details. The non functional details documented include details on system usability, reliability security issues system users help section

2.2 System design phase

The software requirements specification document was used to guide in the design of the various system components like the input design, user interface design, guided by the Nielsen's heuristics, database design, security design, output design and the systems transactions design. Various design tools like ERD, DFD, Sequence diagrams flow chat diagrams and data dictionary were produced.
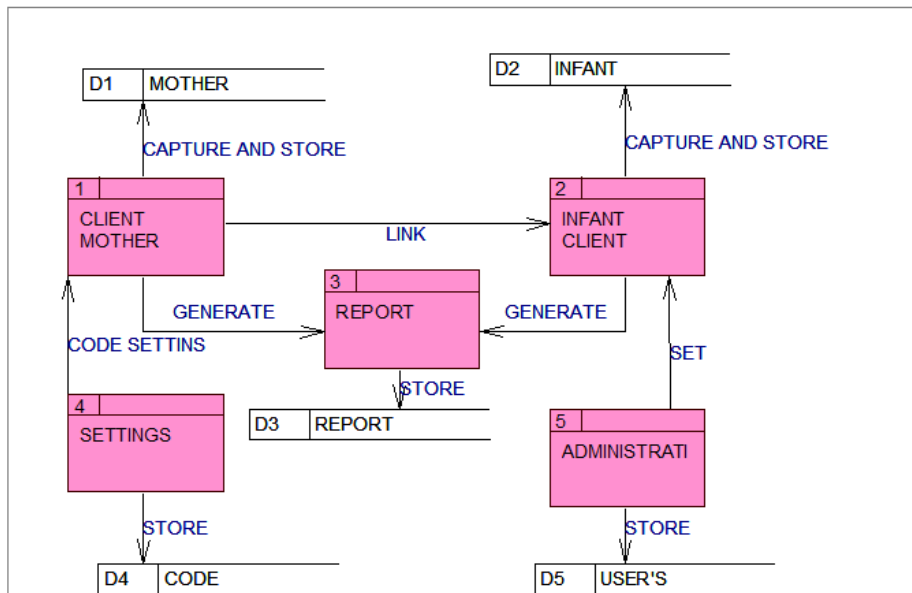
2.3 product development

The system database was developed using the SQL and the XAMPP Server was used to hold the database. The Interface was generated using HTML and PHP.

2.4 Product testing

The developed system was executed with the intention of identifying errors and validate logic in system transactions. The information system defects were identified, fixed and retested until the product reached the expected quality standards. Both the black and white box testing techniques were conducted. All the testing activities namely: program testing, unit testing and acceptance testing were carried out. The programmers checked each program with the goal of identifying errors and resolving them. The main tasks were running test cases and recording the outcomes. Each module was subjected to unit testing. The activities included: preparation of test data, running test reviewing the results and debugging. During the black box testing the users inputted data as programmers checked on the outputted results. System testing documentation was developed that contains details of all the transactions, user activities, their expected results and actual results. Finally the management of the BCRH reviewed the system as part of the acceptance testing.

2.5 Training

Training is a vital activity for a new project; it does not only ensure stakeholders' involvement in the development and validation process but also impacts on ownership and acceptance. The system administrator was trained. The BCRH staffs were also be trained. The staffs were initially allowed to interacting with the system, using dummy data to understand the system and enhance the acceptability and usability of the new system. The following system training activities were implemented.

➢ Identification of training needs
➢ Specification of the training goals
➢ Develop training content and the tasks to be performed
➢ Specify the learning objectives
➢ Carry-out the training
➢ Develop and implement evaluation instruments to assess training objectives

3.0   SYSTEM DESCRIPTION

This section describes the developed PMTCT system solution in details including the stakeholders and users. It also illustrates the needs and wants of the stakeholders that were identified in the brainstorming and data gathering exercise as part of the requirements of the system. It further lists and briefly describes the main system features that include the database design, transaction design and user interface design.

3.1   The system overview

The developed PMCTC system is web based (can be accessed through a web browser) system. The system is composed of four major components. The PMTCT Mother module, that captures the maternal profiles, that triage details, drug adherence details, clients clinical review details, lab test details intervention measures details and WHO staging details.
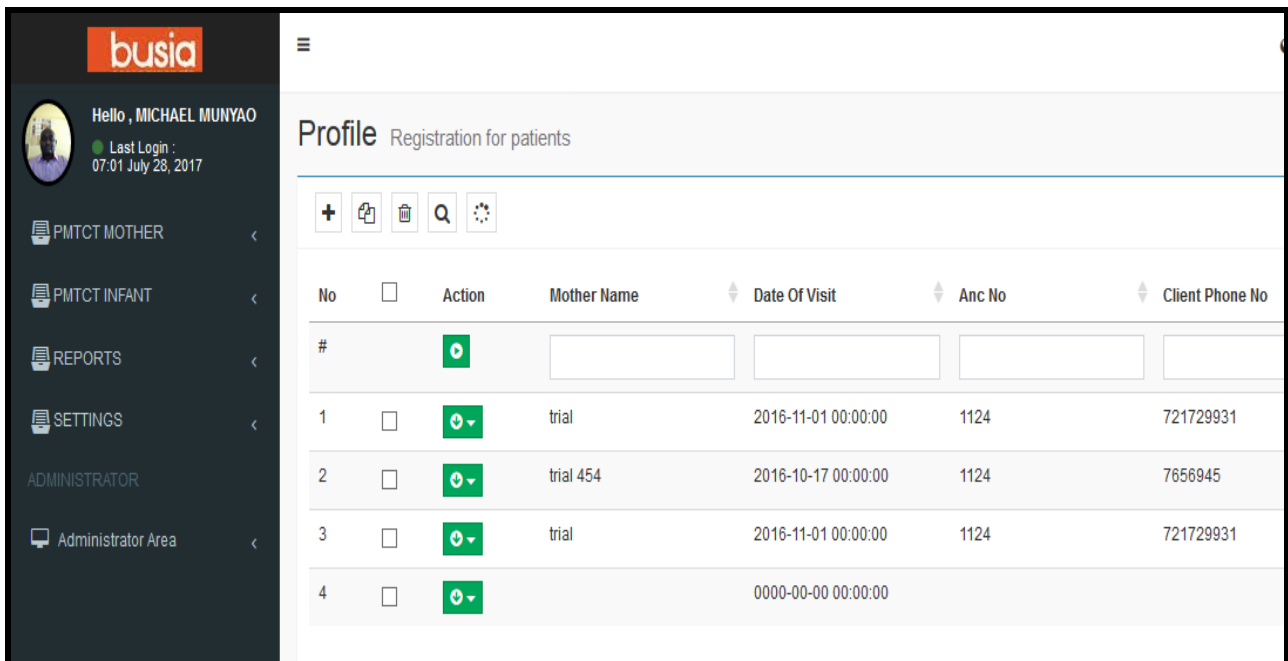
Developed PMTCT system interface

The other module is PMCT Infant module that captures details of the infant profiles, infants vitals, clinical review details, immunization details and infant mother details. The report module provides summary details of clinical attendance. It provides daily details of defaulters. Monthly details of successful cases.
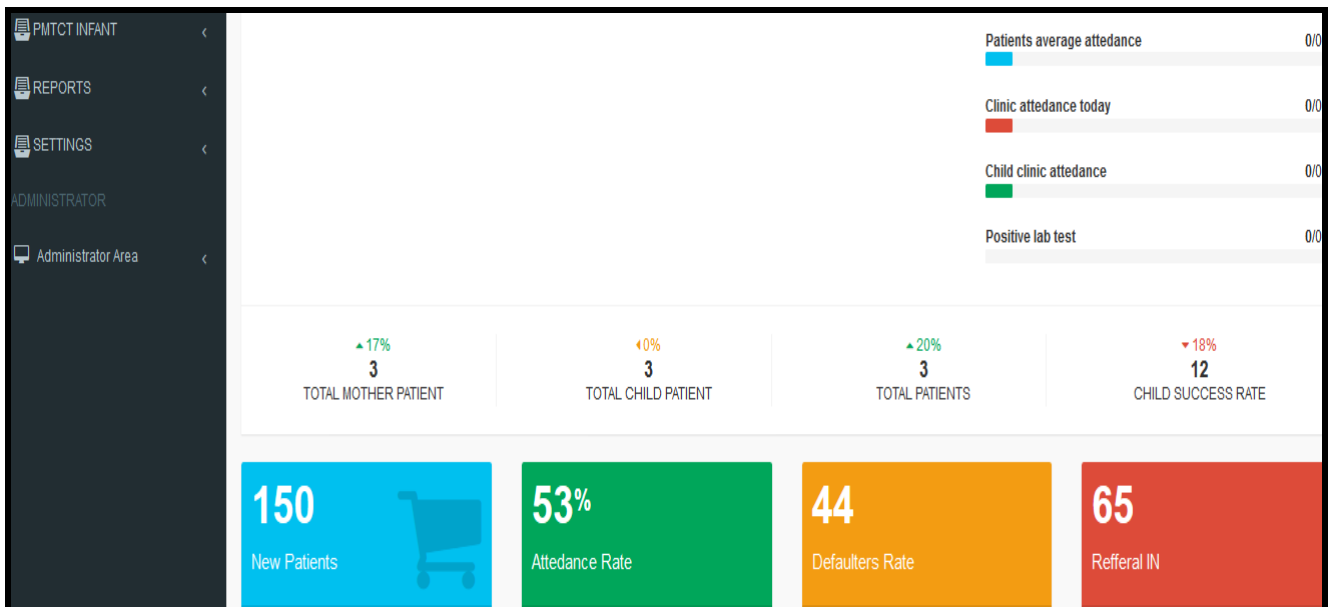
PMTCT report module

The web based /online system is within the hospital setup and provides the point of management and administration of the various system features. The system is installed in a computer at the hospital where all information will be stored.

3.2 System users/ user accounts /privileges

The system features are accessed using usernames and passwords that are given upon registration. Data tracking is done automatically and reports generated. The various system users have varied privileges when accessing functionalities in the system (they only access what is necessary for them) this is particularly to ensure data integrity and confidentiality. The developed system provides for the following roles:

System admin
Nurses
Clinical officers
Mentor mother
Nutritionist

System admin
At the top of the hierarchy shall be a system admin whose role will be to manage the system
Manage roles of other people in terms of what to access and when. Register users and the manage system content. The admin should provide overall Support to the rest of the team of users

Nurses
Nurses are be able to :Register the clients, View registered clients, Dispense drugs, View report of drug dispensing: monthly weekly, daily, etc. They will also have access to Log details of client status, View client status, Schedule appointments and Subscribe drugs. The Nurse is also able to Set the Lab requests and or pull the results into the system.

Public health
Is able to Tracking the clients (also done by social workers) and access the Statistics of clients

Mentor mother
The mentor mother is able to provide Psychosocial support to the clients, and log the information into the system. Advice on Family planning advice on Breast feeding and log the information.
Advice on Partner status check, Cancer screening, Disclosure, ensure Drug adherence and hence track drug use.

CLIENTS

Clients are able to get Nutritional advice, Information on Danger signs in pregnancy, information on Drug adherence and get reminders among other functionalities.

3.3   Requirements

The system requirements were broadly broken down into two:

1. Functional Requirements
2. Non Functional requirements

Functional Requirements

The system specifications that were gathered during the data gathering phase were used to build the functionalities of the PMTCT system. The developed system has the functionality of registering system users and clients, edit and search their details and provide timely required reports. The system can securely capture all the required clients profile details, triage details, HIV management details clients clinical review and laboratory. The system can assist in tracking clients, especially the default cases.

Non Functional requirements

Usability

Graphical User Interface

The system is developed with a uniform look and feel between all the web page. The system is able to provide a logs of all happenings in the system on the web application. The system has in-build icons and toolbars.

Accessibility

The system provides access if correct credentials are used. The system provides access based on user privileges. The system is reliable & available within the hospital.

Hosting databases

The system provides storage of all databases on redundant data being backed up hourly. The system will also provide for replication of databases to off-site storage locations.

Security

Data Transfer

The system is designed to use secure sockets in all transactions that include any confidential customer /outlet information. The system shall automatically log out all customers after a period of inactivity. The system shall not leave any cookies on the customer's/user device containing any of the user's confidential information. Data transfer will be done through an encrypted secure socket

Data Storage

The Users/ web browser shall never display his/her password. It shall always be echoed with special characters representing typed characters. The system's back-end server shall never display a user's password. The users' password may be reset but never shown. The system's back-end servers shall only be accessible to authenticated administrators. The system's back-end databases shall be encrypted.

Supportability

Configuration Management Tool

The source code developed for this system shall be maintained in configuration management tool that can be reconfigured in future

Design Constraints. All the form element have been validated to minimize any data entry errors.

Standard Development Tools

The system was developed using a standard web page development tool that conforms to most GUI standards.

There are no memory requirements. The computers must be installed with web browsers such as Internet explorer, Mozilla Firefox or Google chrome. A general knowledge of basic computer skills is required to use the system

4.0   PROJECT RESULTS

The key deliverable in this project was automation of the PMTCT processes at BCRH. The developed system ensures that the PMTCT data is securely gathered and kept within the system. The system facilitates ease of search of any information that may be required. Manual file and critical data is never lost. The system assist in tracking and tracing the default clients. The management of the HIV positive clients is now effective and efficient because all the required information is readily available. Most important the system will ensure that that there is zero percent cases of transfer of HIV from mother to child. The system provides daily and monthly report to track these cases.

All that system development Phases were systematically adhered to. The system user's were fully involved in all the phases. As a result the system specifications were correctly gathered and documented.   The users were also involved in system testing and system test results well documented. The system user's were thoroughly trained before system implementation and the system user manual developed.

System user's training session

5.0   PROJECT IMPACT

The main objective of developing this system was to was to ensure that we have zero percentage transfer of HIV from the HIV positive mothers to infants. The system will facilitate monitoring of the infants and mother clients for two years before they are discharged. The system will ensure that all the client details are securely captured. These details will facilitate efficient management of HIV cases for expectant women, mothers and infants.

In the untimely event of any infant acquiring HIV, then the system will provide timely and adequate information for investigation and further research.

The developed system ensures that it's very easy to search for any clients details, unlike the earlier situation where manual files were kept with the risk of losing the files or critical clients details. The system has in-build capability of searching for any clients details using any search criteria.

Tracking and tracing the default client cases is now effective and efficient, because the system provides daily details of clients who do not turn up of clinical appointment.

Lastly the system provides monthly report of successful and unsuccessful cases. Which is useful information for evaluation of the PMTCT services.

6.0 RISK MANAGEMENT PLAN

One approach used to manage the risks was proper planning, definition of the scope of the system and frequent consultation with all the stakeholders. The plan stated what activities should be done, at what time and by which individual. Documentation of what had been done and frequent reporting during meetings increased chances of success. For delayed funding, activities still went on and were paid for once funds were available. To ensure availability of programmers during coding phase, I contracted two of them incase one is not within reach. Indeed, if risks hadn't been planned for, it would have been difficult to complete the project.

7.0 PROJECT MONITORING AND EVALUATION

Monitoring and evaluation was based on activities, tasks that were to be done and the completion dates. Timelines, as indicated on the Gantt chart in Appendix 3, were used to measure achievement of targets. The activities were evaluated against the set targets and results documented. There were scheduled review meeting to report on progress and revise on each version released. The technical working group frequently met to discuss on progress and challenges that may arise and affect project implementation.

8.0 ETHICAL ISSUES

The data involved in PMTCT is very critical and must be handled with utmost care. To achieve this adherence to the guidelines of the Ethical Review Committee pertaining to the following was observed:

 ➤ Security – The users of the systems were assigned access rights based on their responsibility.

 ➤ Privacy and confidentiality – The system displays the results with the patient's numbers, patients' names and supporters' numbers authenticated. The patient profile is also read only by authorized personnel.

9.0 LESSON LEARNT

Hands-on skills on project management were acquired, the project scope management, project time management, project cost and quality management and human resource management especially the need to involve all the stakeholders throughout the system development phases. This allows the specifications gathered to be accepted and owned together with the developed product. Communication skills were acquired, the need to keenly listen to the stake holders and patiently explain to them all the activities that are being carried out.

The system development skills were enhance, these include the specification documentation skills system design skills especially the database design that would meet the data requirements of the PMTCT processes. Other skills are programming skills, system testing skills and user training skills.

HIV care and management skills were gained. PMTCT processes were learned and clearly understood.

10.0 CHALLENGES

The overall project implementation was a great success, however there were few challenges that were encountered. Gathering and documenting system specifications was a great challenge. The users were not fully aware of their interest, they kept on raising new specifications throughout the development process, the system kept on being changed to incorporate the new requests. There was delay in disbursement of the project funds, which slowed down the activities as planned in the timelines. Lastly the developed PMTCT system being a web application requires access to internet within the BCRH facility, so when there are network challenges the system is affected.

11.0 PROJECT SUSTAINABILITY

The management of BCRH and particularly the staff at MCH and PMTCT sections will ensure that the project has continuity after implementation. All the system user were thoroughly trained and involved in all phases of system development to enhance system ownership. The system administrator was virtually involved in all activities of the project development and implementation, he was trained and has the capacity and capability and supporting the system. The system user manual was developed and made available for all the system users. Lastly I remain available for any consultations that appertains to the functionality of the system.

12.0 CONCLUSION

The broad goal of the PMTCT processes and services is to ensure that there is a zero percentage transmission of HIV from HIV positive mothers to HIV exposed infants. The developed PMTCT system will assist in tracking the mother from entrance up-to two years, this will help in Early Infant Diagnosis and put the children on treatment or at the end of the two years HIV Exposed Infant will graduate HIV negative. The system can provide all the required information and timely reports to ensure that this broad objective is effectively and efficiently achieved.

Involvement of stakeholders throughout the process of system development and training users proved to be vital activities that facilitate ownership of the developed system.

REFERENCES

1. Barron, P., Pillay, Y., Doherty, T., Sherman, G., Jackson, D., Bhardwaj, S., ... & Goga, A. (2013). Eliminating mother-to-child HIV transmission in South Africa. *Bulletin of the World Health Organization*, *91*(1), 70-74.

2. Bennett, S., McRobb, S., & Farmer, R. (2005). *Object-oriented systems analysis and design using UML*. McGraw Hill Higher Education.

3. Both, J. M. C., & Van Roosmalen, J. (2010). The impact of Prevention of Mother to Child Transmission (PMTCT) programmes on maternal health care in resource-poor settings: looking beyond the PMTCT programme—a systematic review. *BJOG: An International Journal of Obstetrics & Gynaecology*, *117*(12), 1444-1450.

4. Dennis, A., Wixom, B. H., & Tegarden, D. (2015). *Systems analysis and design: An object-oriented approach with UML*. John Wiley & Sons.

5. Kendall, K. E., & Kendall, J. E. (2010). *Systems analysis and design*. Prentice Hall Press.

6. Laudon, K. C., & Laudon, J. P. (2016). *Management information system*. Pearson Education India.

7. Lippeveld, T., Sauerborn, R., Bodart, C., & World Health Organization. (2000). Design and implementation of health information systems.

8. Mate, K. S., Bennett, B., Mphatswe, W., Barker, P., & Rollins, N. (2009). Challenges for routine health system data management in a large public programme to prevent mother-to-child HIV transmission in South Africa. *PloS one*, *4*(5), e5483.

9. Schouten, E. J., Jahn, A., Midiani, D., Makombe, S. D., Mnthambala, A., Chirwa, Z., ... & Zachariah, R. (2011). Prevention of mother-to-child transmission of HIV and the health-related Millennium Development Goals: time for a public health approach. *The Lancet*, *378*(9787), 282-284.

10. Sherr, K., Gimbel, S., Rustagi, A., Nduati, R., Cuembelo, F., Farquhar, C., ... & Gloyd, S. (2014). Systems analysis and improvement to optimize pMTCT (SAIA): a cluster randomized trial. *Implementation Science*, *9*(1), 55.

11. Siau, K. (2000). Systems analysis and design using UML. *Journal of Database Management*, *11*(4), 3.

12. Thomson, K. A., Cheti, E. O., & Reid, T. (2011). Implementation and outcomes of an active defaulter tracing system for HIV, prevention of mother to child transmission of HIV

(PMTCT), and TB patients in Kibera, Nairobi, Kenya. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, *105*(6), 320-326.

13. World Health Organization. (2005). *The World Health Report 2005: Make every mother and child count*. World Health Organization.

14. Youngleson, M. S., Nkurunziza, P., Jennings, K., Arendse, J., Mate, K. S., & Barker, P. (2010). Improving a mother to child HIV transmission programme through health system redesign: quality improvement, protocol adjustment and resource addition. *PloS one*, *5*(11), e13891.

APPENDIX I: ACTIVITY SCHEDULE

Task	Description
Task 1	Problem identification and definition
Task 2	Proposal writing and submission
Task 3	User requirements gathering and analysis
Task 4	System design
Task 5	System development
Task 6	System testing
Task 7	User training
Task 8	System implementation
Task 9	Develop the system user manual
Task 10	Summative evaluation & Report writing

Table 1

APPENDIX II: A GANTT CHART FOR THE WORK PLAN

TASK	TIME (MONTH/YEAR)										
	2015	2016							2015		
	Sep-Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Task 1	■										
Task 2		■	■								
Task 3				■							
Task 4				■	■	■					
Task 5						■	■	■	■	■	
Task 6							■	■			
Task 7								■	■		
Task 8									■		
Task 9									■		
Task 10										■	■

Table 2

APPENDIX IIII: BUDGET

Item Description	Unit	Number of Units	Unit cost (Kshs)	Total cost (Kshs)
Personnel/Salaries and Benefits				
Programmer	2	60 days	2000	240,000
Data clerk	2	20 days	1500	60,000
Sub- total				**300,000**
Equipments				
External Hard Drive StoreJet: Model: **Transcend 2TB**		1	15,000	15,000
Desktop: HP Pro One 400		1	39,600	39,600
UPS APC 650V		1	10,900	10,900
HP PRINTER L/JET 1102 Printer		1	15,000	15,000
Mobile Phone Galaxy A5 Duos 16Gb ROM, 2GB RAM, 13MP Camera		1	34,000	34,000
Sub-total				**114,500**
Stationeries				
A 4Printing paper		5	430	2,150
Printing toner		2	3,800	7,600
Drawing books and notebooks, Pencils, pens, sharpeners, erasures, mark pens, flip charts			15,750	15,750
Sub-total				**25,500**
Other Costs				
allowance during stakeholder meetings	8	4 days	1000	32,000
allowance for participants attending the training	7	4 days	1000	28,000
Sub-total				**60,000**
Grand Total				**500,000**

APPENDIX IV: PMTCT PROJECT MONITORING AND EVALUATION FRAMEWORK

AUTOMATING THE PMTCT PROCESSES FOR BUSIA COUNTY REFERRAL HOSPITAL			
OBJECTIVES	**INDICATORS**	**MEANS OF VERIFICATION**	**ASSUMPTIONS**
Goal **ERADICATE MOTHER TO CHILD HIV TRANSMISSION**	*NUMBER OF INFECTED CHILDREN UNDER 2 YEARS*	**System reports**	*All the hiv positive patients detailes will be captured*
Outcome 1 **PMTCT system design**	**DFD**		**Patients will have mobile phones** **Patients will respond to the reminder messages**
Output 1.1 **DATA BASE DESIGN**	*ERD*	*System design document*	*All system requirements will be captured*
Output 1.2 **TRANSACTION DESIGN**	*Sequence diagram*	*USABILITY OF THE SYSTEM*	*ALL THE SYSTEM FUNCTIONALITIES WILL BE DEVELOPED*
Output 1.3 **INTERFACE DESIGN**	*NO OF PATIENTS INTERACTING WITH THE SYSTEM*	*SYSTEM LOGS*	*SYSTEM USERS WILL COOPERATE*
Activities	Inputs/resources TIME,	Costs & sources	
Outcome 2 **TO TRAIN THE SYSTEM USERS**	NO OF SYSTEM USERS TRAINED		SYSTEM USERS WILL UNDERSTAND THE USAGE OF SYSTEM
Output 2.1 **DEVELOP THE TRAINING MANUAL**	Training manual document	Training document	Training manual will be easily understood
Output 2.2 TRAINING WORKSHOPS	No of trained staff	Attendance register	TOT WILL cooperate
Activities	Inputs/resources	Costs & sources	
Outcome 3 **TO PROVIDE THE MANAGEMENT WITH ACCURATE INFORMATION ON THE STATUS OF HIV**	No of reports generated by the system	System generated reports	Reports requirements are fully captured Management will be able to adequately interact with the system
Output 3.1 **DESIGN THE SYSTEM REPORTS**	System reports documents		
Output 3.2 **DEVELOP THE SYSTEM REPORTS**	Generated system reports		Management will be able to generate the system reports
Output 3.3			
Activities	Inputs/resources	Costs & sources	

APPENDIX V: PMTCT SYSTEM USER MANUAL

SYSTEM REQUIREMENTS AND instalation
1. Installed PHP server (xampp server)
2. Mysql
3. Browser preferred Google chrome

Install the php server and set the mysql server too
Unzip the provided zip and have them in the root of your server, edit the .env file with the appropriate configurations that you have set up for your environment.
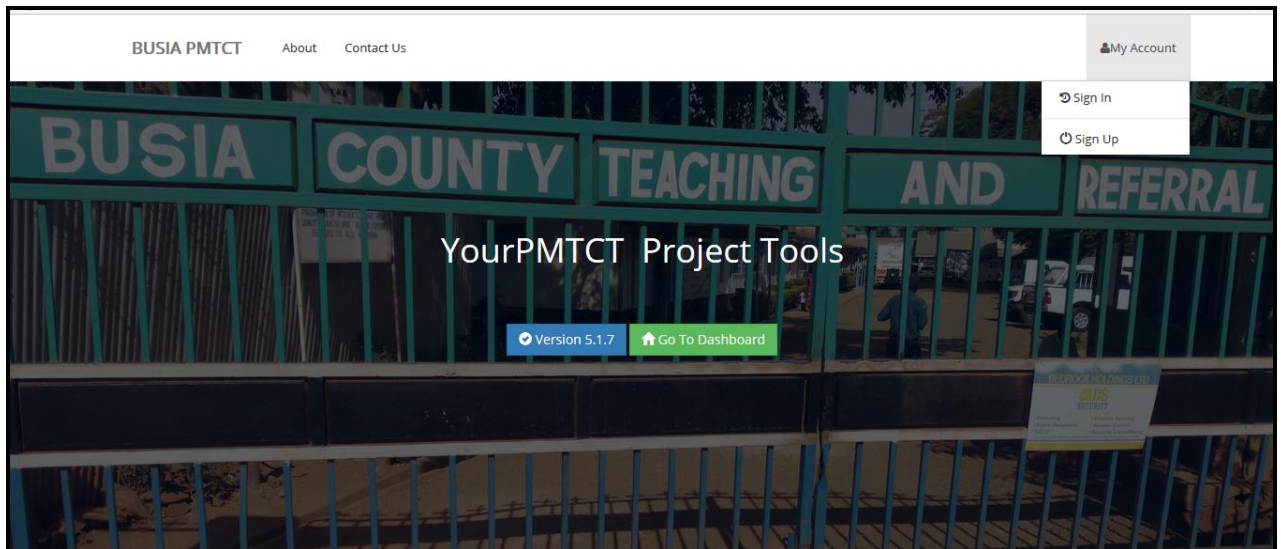
System setup
1. On the browser access you url and once the page is loaded click my account and sign in using

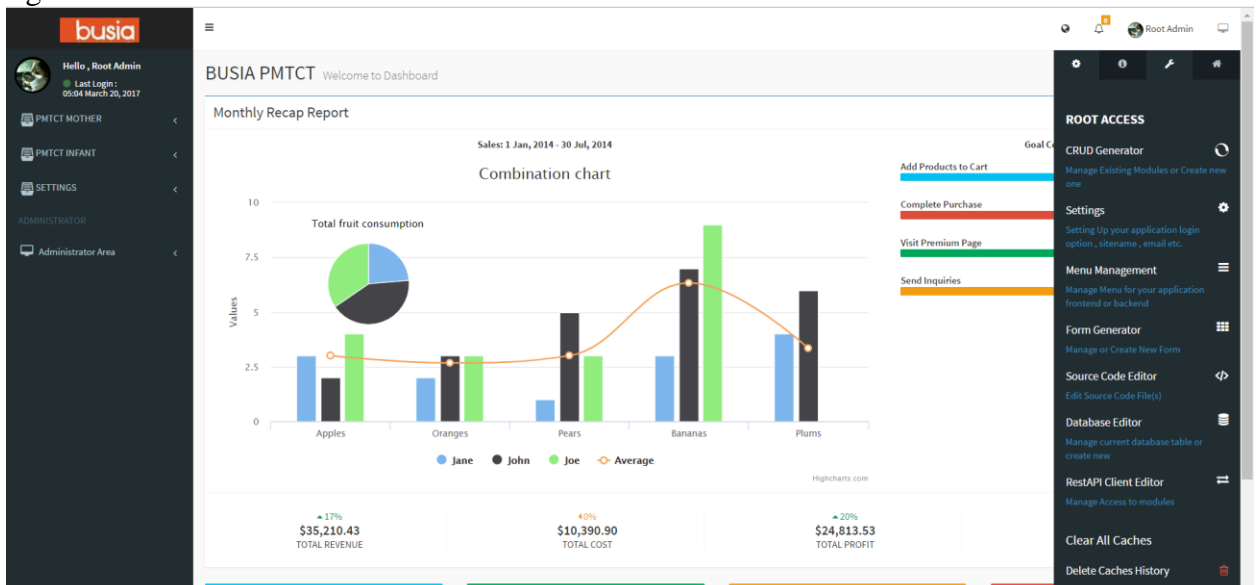> Username: superadmin@mail.com
> Password:password
> Then click on dashboard to access the backend

This is the frontend page of the system that can be customized to fit and carry any message that you will require.
2. Once in the dashboard to access the admin portal click on the computer screen on the right

I. **CRUD generator** contains all modules used in the system please don't edit or remove any of this
II. **Settings**
    a. general settings of the website, email addresses to be used,
    b. logins and security where one can set up the different secure ways to have logins. We can also restrict certain ip addresses from accessing the application and only allow others
III. Menu management this is used to order different menus and also give rights to user to be able to view different menus available.
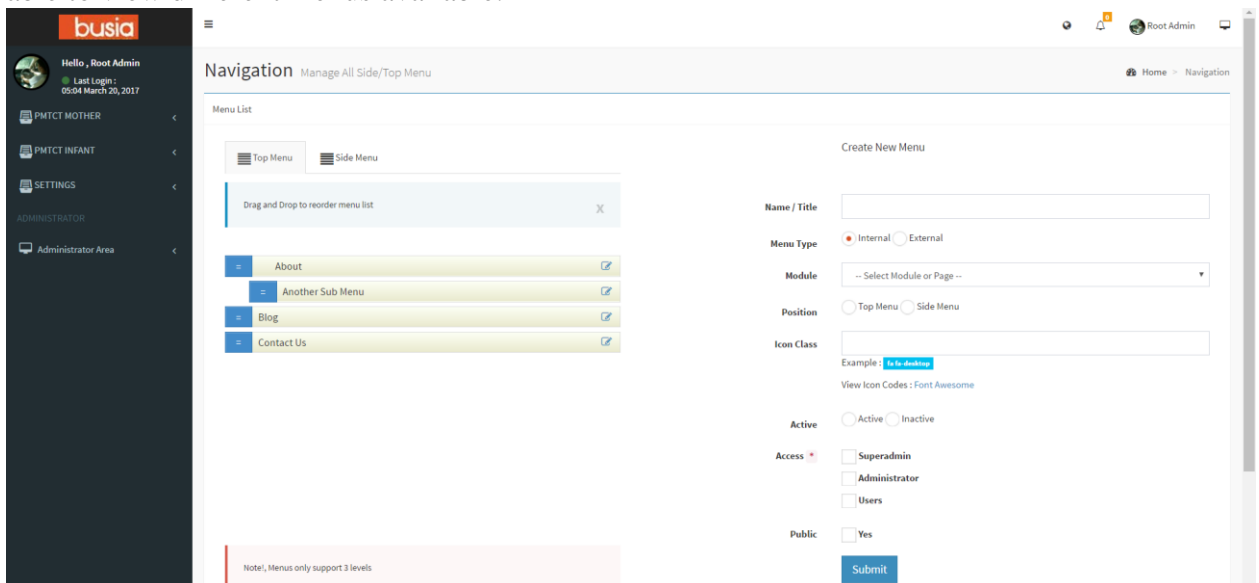
    a. To edit the menu click menu setting and click on the side menu click on the edit menu then it will open the menu on the right side of the screen here you free to edit to nay configurations you want. Remember after changing anything ensure you save.
    b. Under the access subsection select the roles that you want to access the menu

3. ON the right side of the screen you can access the following menus.
    i. ADMINISTRATIVE AREA – it contains administrative tasks:
        a. user groups and emails where one can set up groups and give them rights to different menus and pages. Users are also defined in this tab
        b. Page cms that is used to manage the front end pages of the system they can be edited and saved from this point
        c. Activity logs where one can monitor how users interact with the system
    ii. PMTCT MOTHER this contains all information that is captured about mothers and their treatment in the hospital,
        a. Patient Profile- contains registration details of patients and subsequent visits
        b. Triage, have all vitals signs the patient has ever been taken in the hospital
        c. Management, shows all records of the mother during pregnancy the different test done and results
        d. Adherence contain different adherence questions and test done to the client
        e. TB Screening, contains tb results of the client
        f. Clinical Review, all clinical notes that are done by the clinical officer
        g. WHO staging, the staging given by who of the patient
        h. interventions, what drugs the patient is on
        i. Lab test different lab test done on the patient
    iii. PMTCT INFANT,MOTHER this contains all information that is captured about child and their treatment in the hospital,
        a. Infant profile, contains the various infant profile for the baby
        b. Infant and mother profile, contains a connection between the mother and baby

c. clinical review, all clinical notes done for the baby
d. immunization, all immunization records for the baby
e. lab test
iv. SETTING this contains different settings that can be used as dropdown menus in different sections of the system

APPENDIX VI: PMTCT SYSTEM SAMPLE DATABASE TABLES

tbl_users	
User_id	(int)autogenerated(pk)
Full_name	Varchar(50)
Phone_no	Varchar(20)
email	Varchar(50)
role	FK_tbl_roles
status	Int()
Pk(user_id)	

Tbl_client_type	
client_type_id	Int PK
client_type_name	Enum(PMTCT,HEI)

tbl_roles	
id	Int(pk)
Role_name	Varchar(50)
description	Varchar(50)
status	int

Tb1_client_mother	
Client_mother_id	(int)Pk
Mother_name	Varchar(50)
Date_of_visit	Date
Anc_no	Varchar(50)
Client_phone_no	
return	int
Existing_ipno	Varchar(50)
status	boolean
Elisa_test	int
Date_of_test	date
dob	date
edd	date
lmp	date
parity	int
gravidae	int
gestation	int
haart	int
status	enum
Added_by	Var(FK_uSER_ID)
TCA_initiation_data	date

Tbl_hiv_management	
Hiv_man_id	Int(autoincrement)

Client_id	Int FK
Cd4_results	int
Cd4_test_Date	date
M_on_cotrimoxazole	Varchar(250)
M_on_multivitamins	Varchar(250)
M_on_arvs	Varchar(250)
Added_by	VarcharFK()USER_ID
Pwp_message_given	boolean
Pwp_codom_given	boolean

Tbl_sample_tested	
Sample_tested_id	PK(int- autoincrement)
M_client_id	Fkint
Added_by	FK(user_id)
Date_added	date
Creatinine_sample	Varchar(200)
Cd4_sample	Varchar(200)
Hepatitis_b_sample	Varchar(200)
Alt_sampel	Varchar(200)
Full_haemogram	Varchar(200)
Serum crag	Varchar(200)

Tbl_arv_prophhylaxis	
arv_prophhylaxis_id	PK, INT, AUTOINCREMENT
arv_prophhylaxis_name	Varchar(50)
arv_prophhylaxis_description	Varchar(100)
arv_prophhylaxis_mother_child	Enum(child,mother)

tbl_adherance_assessments	
Adherence_assement_id	PK int
m_client_id	FK int(user_id)
added_by	FK
Date_added	date
No_of _doses_missed	int
Reason_for_missing	
Home_visit_remark	Varchar(50)