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CHILDREN ELECTRONIC CARE SYSTEM

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Abstract:

The use of information and communication technology (ICT) is increasingly rapidly. In the health sector ICT has been recognized internationally and by the Government to be of strategic importance as it facilitates the sharing of health data, information and resources between different stakeholders and the delivery of appropriate services to the Zambian population. ICT mainstreaming in health will facilitate health services delivery, coordination of health information for planning and decision making and effective allocation of resources. Currently, ICT initiatives and innovations are not altogether coordinated and thus not optimally used. There is also need to ensure integrity and confidentiality for patients in the gathering, storage and use of information.

The children care system in Zambia has been quite complex and very weak and completely manual, the current system is unable to keep track of the records and store the records for a long time. There are a lot of reported cases of mothers losing under five cards of their children and the clinics failing to give replicas of the lost under five cards, this has been as the results of the current system poor storage areas (cabinets), failure to search for the record as there a lot of files which are either misplaced or eaten by rats. And it has also brought about difficulty in the statistical analysis Under-5 Mortality, report generation, the ministry spending more money on notifying the public about the child health exercise, and centralization of the system.

Keywords: *under Five Card, Database, Centralization, storage, Records, Wampserver, HTML5, CSS4, JAVASCRIPT, PHP, and MySQL*

I. INTRODUCTION

The use of information and communication technology (ICT) is increasingly rapidly. In the health sector ICT has been recognized internationally and by the Government to be of strategic importance as it facilitates the sharing of health data, information and resources between different stakeholders and the delivery of appropriate services to the Zambian population. ICT mainstreaming in health will facilitate health services delivery, coordination of health information for planning and decision making and effective allocation of resources. Currently, ICT initiatives and innovations are not altogether coordinated and thus not optimally used. There is also need to ensure integrity and confidentiality for patients in the gathering, storage and use of information.

The children care system in Zambia has been quite complex and very weak and completely manual, the current system is unable to keep track of the records and store the records for a long time. There are a lot of reported cases of mothers losing under five cards of their children and the clinics failing to give replicas of the lost under five cards, this has been as the results of the current system poor storage areas (cabinets), failure to search for the record as there a lot of files which are either misplaced or eaten by rats. And it has also brought about difficulty in the statistical analysis Under-5 Mortality, report generation, the ministry spending more money on notifying the public about the child health exercise, and centralization of the system.

But the development of the Information Management System will get rid of all the above-mentioned problems caused by the current manual system. The system has been designed as a Relational Database Management System (RDBMS), the database architecture design has been guided by the physical Children under Five Card, and the database will store all information which will be manipulated by the system. The system is capable of generating a unique identifier number or child number which will be helping in the search of the records of the child in the system and create a relational record for each child. The system will also be able to generate reports and send SMS notifications to parents.

Now this will get rid of the mentioned problems which includes: poor storage, failure to retrieve and misplace of records, high costs on notifications of the public about the child health exercise, statistical analysis, report generation, giving replicas of the lost under five cards, and system centralization.

II. PROBLEM STATEMENT

The current manual children care system has so many problems which include: poor child record storage, clinics /hospitals failure to search and retrieve the records, clinics/hospitals failure to give replica of the lost under five cards, report generation, high costs on notifications of the public about the child health exercise, statistical analysis, and system centralization.

Maintaining the Integrity of the Specifications, the present cost of preparing children care system is too high because most of the children are taken to the clinic which is carried out in all the areas or region. The system has been developed to reduce the errors that are inculcate in child recording on the under-five card.

III. SPECIFIC OBJECTIVE

- To improve on record storage and easy retrieval of information.
- To provide security to the system
- To instantly update the under-five clinical cards
- To produce feedback of updates in form of a report
- To accept the children's details and compare them with the database and produce output on the report.
- To reduce the number of computer personnel.
- To produce the right weight figures of the children within the most convenient time period.

IV. PROJECT JUSTIFICATION

The inability to produce under five cards within the most convenient time for the mothers is attributed to lack of speed in the children care system. Therefore, the improvement of speed and efficiency in the computerized operations cannot be overlooked if low cost is to be achieved.

ADVANTAGES

The advantages of the proposed system over the current system are; -

1) Those mothers who may have lost their cards may be checked directly from the system without fail.

2) The system would be able to show all child's related diseases.

3) Doctors , and Nurses would be able to make queries towards the under-five and other related staffs at any convenient time.

4) The proposed system has been easy to use by the nurses and Doctors and others staffs.

LITERATURE REVIEW

Zambia launched its national ICT policy in 2007. It has operated and controlled the direction and speed of the development of all the systems being developed and those that are yet to be developed. In a National Health Policy which was released on August 2012, it was also stated clearly the recognition of ICT in the Health sector. Zambia is also currently implementing a Health Information Systems Strategy (HISS) for 2009-2015.

According to the report in 2009 about Health Information Systems in Developing countries, it states that, the health challenges being faced by countries like Zambia is great and the health systems that are supposed to address these challenges have limited resources and capabilities. This then makes the need to find ways of improving these systems is urgent. It also states that Zambia Houses 3 HIS efforts, which are, Smart Care, the EU supported Health Management Information Systems (HMIS) and Zambia Electronic Perinatal System (ZEPRS) and by 2009 Zambia had 144 health posts, 1,533 Health Centers, 106 Hospitals and 81 Ministry of Health administrative facilities.

METHODOLOGY

The first step in system development life cycle is the identification of need of change to improve or enhance an existing system. An initial investigation on existing system has been carried out at Chigwele hospital, George Clinic and UTH. The design of the database has been guided by the physical Children under Five Card which will define the architecture of the database.

The Children Electronic Care System (CECS-IMS) has been a 2level system which has been divided in 2 sub-systems:

Internet Based Children Electronic Care System (IBCECS), and the Computer Based Children Electronic Care System (CBCECS)

IBCECS: This is the first level CECS-IMS that will provide web-based access to the system and enable the ministry of Health, Clinics, Hospitals, and people to access other functions of the system via the internet e.g. CECS portal. This part of the system has been designed based on a three-tier system architectural design technology.

CBCECS: This is the second level CECS-IMS that should be installed on computers within the Clinics and Hospitals, and is able to work only within the Clinics and Hospitals local intranet. This is an offline system that will not depend on the availability of internet connectivity. It will also act as an internal backup system. It has been designed based on a two-tier system architectural design technology.

All these sub-systems are able to provide access to the main CECS-IMS server and database for receipt, storage and management of information on children under five clinic card. Therefore, excluding all the problems stated by the manual children care system.

WORK PLAN

The Computer Based and Internet systems

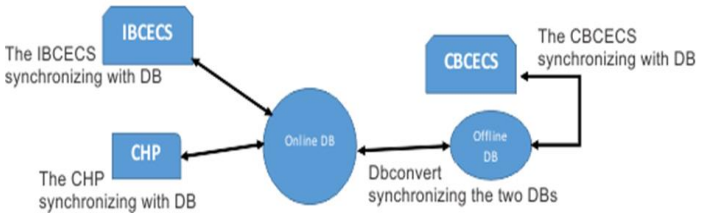
The internet based and the computer based systems are one and the same . The primary user interface that has been used is the system login interface, which show the entry for the username, password, and UserRole. The computer based system will serve as a backup in the absence of a reliable internet connection. The computer based system is a replica of the one online, it runs the same way as the internet based system with the help of wampserver which can be installed on the server. Wamp (Windows apache MySQL PHP) server is a software that allows the machine it is installed on to play the role of a local server. The database can be hosted locally with the help of Wamp server. The computer based system can be interacting with the local database and the online based system can also be interacting with the online database.

The local and online database is synchronized with the software (DBConvert: DBConvert line consists of cross database conversion tools for data migration between multiple databases. They are able to accomplish data import/ export in both directions) which is installed on the local computer running wampserver, the software will create a connection and constantly update the two databases immediately when internet is available. This will remove the problem of the system having to duplicate of records.

The internet based system is merged with a SMS notification system and it is also linked with a website (Children Health Portal CHP). The Children Health Portal is also for helping inform the public about what is happening about Child Health in the country.

Both systems has been developed using the following technology: HTML5, CSS4, JAVASCRIPT, PHP, and MySQL for both databases.

Logical Diagram



Requirements

- Each child will be given a unique number by the use of the system.
- The system has been able to print out the client's details.
- The system has been able to search and retrieve the information of the child by use of their unique number.
- The system will have the provision of deleting and updating the records.
- Generate reports
- Send via SMS notifications and website.

Brothers and sisters

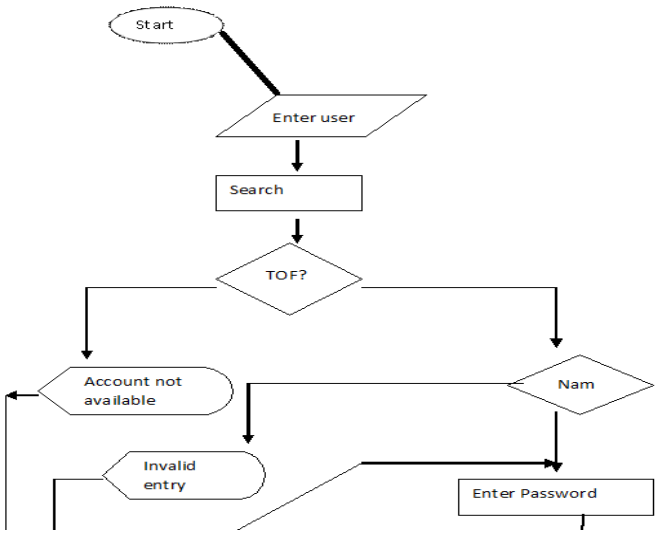
The system is able to enter the details of brothers and sisters where the year of birth has been used as a primary key.

Childs particulars

The system provides a unique number to each child and other particulars of the child would be keyed in the system. It is able reduce the time spent in recording the childs details.
The system will have immunization record, where all the details pertaining to a child has been displayed.
The system has been able to record the weight, data and the follow up date for that particular child.
The system will have the provision for remarks where the nurse in charge can comment.
The system will provide security so that unauthorized users cannot access the information in the system.

Process

The system is able to possess the data that is entered. A lot of process is involved in the system. For, example, the Childs particular details are entered and processed in order to store and from stored information to produce the report.
The following chart below are used to show the processing of user's details.



Data Design

The document describes the data design in terms of input to the system. The records structures and diagrams. This part of the documents describes how the separate sub-systems has been linked to each other and to the database.
This section of the document shows the entries of the proposed system, their attributes and the data structures represented in table form.

Entries

The following are entries of the developed system.

a) Brother and Sister
b) Child's particulars
c) Health Record
d) Immunization Record.

Inputs

The following are the inputs to the system in each entity
Brother and Sister

- Year of birth – will indicate the year that child was born.
- Sex – this specify the gender of the child and will act as a unique
- Remarks – will show the part were the doctor will put the remarks over the child diagnosis.

Childs Particulars

- Child number – a unique number assigned to each child
- Name of the clinic
- Gender
- Mother's name
- Mothers NRC
- Father's name
- First day seen
- Birthday
- Family Address

Health Record

- Date
- Weight
- Diagnosis
- Follow up date

Immunization Record

- Tuberculosis
- Polio
- Whooping cough
- Diphtheria
- Tetanus
- Other immunization

Security

The system has passwords to protect it from an authorized user. Only authorized users should have access to the system. The system has provision for password and username.

Record Structure

Brother and Sister

FIELD NAME	DESCRIPTION	DATA TYPE	FIELD LENTH
Year of birth	The year the child was born	VARCHAR	20
		VARCHAR	6
Remarks	The remarks weighed	VARCHAR	30

Child Particulars

FIELD NAME	DESCRIPTION	DATA TYPE	FIELD LENTH
Child number	Unique number	VARCHAR	10
Name of the clinic	Insert name of clinic	VARCHAR	20
Gender	Male or female	VARCHAR	15
Mother's name	Insert name of mother	VARCHAR	10
Mother's NRC	NRC number	VARCHAR	8
Father's name	The name of father	VARCHAR	20
First day seen	The day registered	VARCHAR	10
Birthday	Day of birth	VARCHAR	20
Family address	Home address	VARCHAR	25

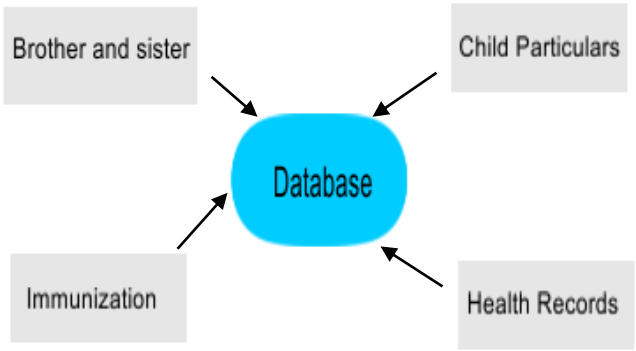
Health Record

FIELD NAME	DESCRIPTION	DATA TYPE	FIELD LENTH
Date	Today's date	DATETIME	10
Weight	Enter the weight	VARCHAR	20
Diagnosis	Disease diagnosed	VARCHAR	34
Follow up date	The proceeding date	VARCHAR	20

Immunization Record

FIELD NAME	DESCRIPTION	DATA TYPE	FIELD LENTH
Tuberculosis	Disease	VARCHAR	34
Polio	Disease	VARCHAR	5
Whooping cough	Disease	VARCHAR	10
Diphtheria	Disease	VARCHAR	34
Tetanus	Disease	VARCHAR	12
Other immunization	Disease	VARCHAR	25

Logical Diagram



System Interface

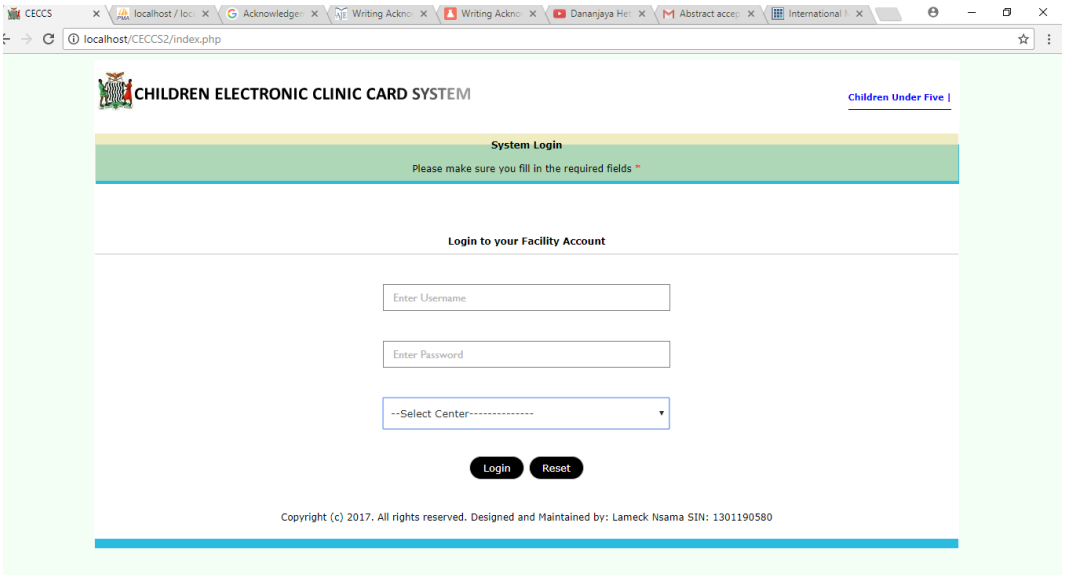


Figure 1: below shows the login part of the system with access levels.

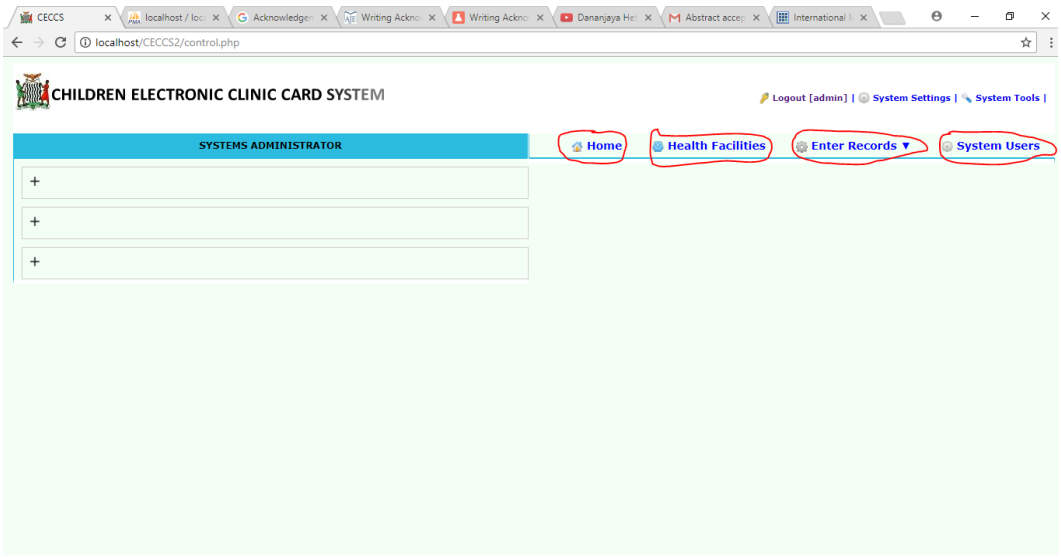


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Figure 2: shows the admin part of the admin account of the system

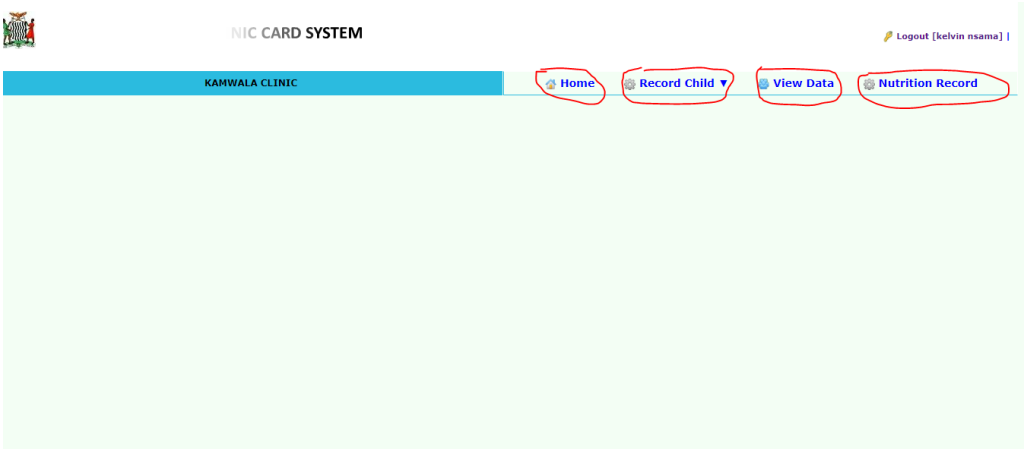

Figure 3: shows the health facility account

Acknowledgment

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