Design and Development for Web Based Zambia Electronic Perinatal Record System: A Case Study of Kasenengwa District Health Centre Clinic in Chipata, Zambia.

(Paper ID: CFP/ 1756 /2020)

Author: Ndhlovu Jacob K.
jacsen26@gmail.com
*Dept. of ICT, School of Engineering,
Information and Communication University
Lusaka, Zambia.*

Supervisor: Mr Lameck Nsama
lamecknsama64@gmail.com
*Dept. of ICT, School of Engineering,
Information and Communication University
Lusaka, Zambia.*

ABSTRACT

This research focuses on bringing out to light the use and benefits of Web-Based Zambia Electronic Perinatal Record Systems (WBZEPRS) which is online birth registration system. There have been a lot of reforms in our country, Zambia, towards the implementation of ICTs and e-governance, but none of it seems to focus on digital culture for administration and management of Health sector in urban areas. According to various literatures, there also have been lots of development research concerning the same in the Education industry, but little concerning the Health sector, especially in rural areas which are far from rural health clinic during delivery for the expectant mothers. This paper discusses how a web-based e-system simulating the existing paper-file system for data and record of birth management in rural health centers was designed, and how the web-based e-system significantly benefits a rural health center as compared to the moving around with storage devise to transfer data and paper-file system from one to the other, as results birth records lack accuracy and efficient as is evident from the research findings. The research was conducted by use of questionnaires and interviews, which were given to the respondents from rural Health clinic centers in rural of kasenengwa district and urban Health centers, which are using the e-system (Zambia electronic perinatal record system), and other Health centers, which are still using the paper-file system. Data from the two distinct Health center systems was compared for variations in workload completion time, work accuracy, efficiency, and effectiveness ratings of the systems, the respondents need for change and acceptance for Web-based e-system, and how the respondents responded according to their degree of acceptance or rejection for the e-system. The findings from the research have established that the web-based Zambia electronic Perinatal records system brings about workflow automation, better knowledge management, efficient communications management, management of accuracy birth records in effective and efficient manner, quality assurance, better productivity management, better performance management, better cost-effectiveness, ease in accessibility, accountability with better audit trails and more integration of all departments and offices in health centers. Moreover, the web-based e-system does 90% and above the work for the health centers, personals whenever they are working seeing that most processes which involved human decisions, which are characterized with delays, have been automated and faster transferring of vital data for decision making to other civil registration offices.

Hence the study recommends that Government should enhance this process of the online birth registration system so that at national government should not just estimate birth rate in the country, and also when the government is planning for national budget.

Lastly, the study also recommends Ministry of Health (MoH) consider increasing its work force capacity in technology to ensure there is no rural and urban clinics or Hospitals who raging behind in online delivery of services in the country.

1. INTRODUCTION

Birth registration is a fundamental right that affords children the opportunity to be documented and establish their nationality. Unfortunately, this right is denied to many children, especially in less developed countries like Zambia, (Pais 2009; UNICEF 1989).

The registration of a child's birth is an important and a critical first step towards safeguarding lifelong protection. Promoting children's right to birth registration falls clearly within UNICEF's mandate. There has been some progress, albeit small in raising birth registration levels. Between 2000 and 2010 global birth registration levels rose only slightly, from 58 per cent to 65 percent. Certain trends in the international environment provide opportunities for rethinking approaches to birth registration. Birth registration is a continuous, permanent and universal recording, within the civil registry, of the occurrence and characteristics of births in accordance with the legal requirements of a country. Birth registration is the official recording of a child's birth by the State. It is a permanent and official record of a child's existence. Birth registration is part of an effective civil registration system that acknowledges the person's existence before the law, establishes family ties and tracks the major events of an individual's life, from live birth to marriage and death (UNICEF, 2013).

Although birth registration is almost complete in all developed countries, the lack of progress on civil registration in many developing countries means that global inequalities in birth registration are now extreme. The births of approximately 230 million children under the age of 5 have not been registered. Of these, around 85 million are in sub-Saharan Africa, 135 million in Asia (east and south Asia and the Pacific) and the remainder in the rest of the world. But does this matter in their lives? Birth registration may signify the beginning of the legal contract between the individual and the State known as citizenship. Birth registration serves as important proof of the place of birth and parentage, and while birth registration does not in itself confer citizenship upon the child, it is often essential for its acquisition based on each country's laws. Birth registration may also be vital for confirmation of nationality following tumultuous events such as armed conflict and situations of state succession. The registration of births and acquisition of citizenship are distinct processes; however, birth registration serves as important proof of the facts that form the basis for conferral of citizenship at birth. More specifically it establishes a legal record of where the child was born and who his or her parents are and thus whether the child can acquire citizenship on the basis of place of birth (jus soli) or descent (jus sanguinis). Children who are not registered are excluded from the benefits of citizenship in ways that vary between countries. A birth certificate may be required to obtain access to basic services such as health and education, and it can also help to protect children from situations of exploitation and violence, such as child marriage and child labour, and achieve convictions against those who have abused a child (UNICEF, 2013).

In adulthood, birth certificates may be needed for many purposes: to obtain social security or a job in the formal sector; to buy or prove the right to inherit property; to obtain identity cards; to vote; and to obtain a passport. The lack of a birth certificate can have a serious, cumulative, negative effect on people's life opportunities. As well as providing the individual with legal proof of identity, birth registration also plays a crucial role in the generation of vital statistics.

Birth registration is part of national civil registration systems that also record marriages and deaths. Civil registration provides the demographic data that are needed by governments to track the size, differentials and trends of their populations. When complete and accurate, civil registration facilitates democratic governance. It enables governments to develop policies and plans for basic service delivery and social and economic development that respond to the needs of different sectors of their

populations. Through these mechanisms, civil registration facilitates the access of both children and adults to protection under the law, to services and entitlements and to social and economic opportunities, and can improve their ability to exercise their civil rights (UNICEF, 2013).

Due to the benefits that accrue from using the computer system, it can be applied to solve numerous problems. Birth rate monitoring cannot be manually achieved. An automated software system is needed to enable instant monitoring of birth rate. This is only possible when there is a web based or online system to register births. As the births are being registered, a bar chart can be used to determine the rate of births in specific regions. To achieve this, computer programmers need to develop a software system that runs online. The benefit of the system is that it will enable those in charge of taking statistics of birth rate to get needed information easily and with minimal stress.

According to UNICEF. (2006), defined Birth as an official recording of the birth of a child by some administrative level of the state and is coordinated by a particular branch of government.

The birth and Deaths Registration Act Chapter 51 of the Laws of Zambia came into effect on 14 march, 1973, it's an Act that provides a uniform law for registration of all births and deaths in Zambia without distinction of origin or descent. Its registration is decentralized to all districts in the country. Births and deaths registration according to the Constitution of Zambia, (21 of 1973 13 of 1994), An act to provide for a uniform law for the registration of all births and deaths in Zambia, without distinction of origin or descent; and to provide for matters incidental thereto.

However, issuance of Birth and Death Certificates remains centralized to the office of the Registrar General in Lusaka due to certain security reasons although plans are under way to equally decentralize the operation. In Zambia this process of birth registration starts at clinic/hospital to civil registration offices that is under Ministry of Home affairs.

Birth registration is an inalienable right of every child no matter where they are, enshrined in the Convention of the Rights of the Child that is UNICEF (2006) and the constitution of Zambia 1996 acticle 5 [cap124], it states that a child born within the territory of Zambia shall be considered a citizen of Zambia. It is part of a system of civil registration, which is also referred to as the registration of vital events. Civil registration is a system where the occurrence and characteristics of vital events pertaining to the population like births, deaths, marriages and divorces are recorded in a continuous, permanent and universal manner. The purpose of civil registration is primarily for establishing the legal documents provided by the law. These records serve also as a primary source of vital statistics. Lack of birth registration may prevent a child from access to social and economic services including health, social assistance and education. Later in childhood, identity documents help protect children against early marriage, child labour, premature enlistment in the armed forces or, if accused of a crime, prosecution as an adult.

Governments are now trying to migrate their offices, slowly to e-offices, where the public can interact with them from far away using the internet (a system where computers are connected using data links like telephone lines, satellites, wireless connections, etc. so that they can store and share information and other resource to include). Today, we see the emergency of electronic governance (like the Examination Council of Zambia Internet Registration System on http://systems.exams-council.org.zm, that is how electronic birth registration should be conducted so that rural individuals must have access and input birth records), where citizens and government departments interact using the internet or any other possible electronic means. Most of these civic and private institutions see no necessity to adopt an e-office, especially in rural African areas including Zambia's remote areas such as Kasenengwa District, Eastern Province.

Motivation and Significance of the study

It is the right of every child to get an identity- his name and right to acquire a nationality. All this and more are gained by a child when his/her birth gets registered officially. To understand it more clearly, let's understand what Birth Certification exactly is, and how the process starts for one to have birth certificate. It all begins from birth records. Birth registration is the process by which a child's birth is recorded in the civil register by the government authority. It provides the first legal recognition of the child and is generally required for the child to obtain a birth certificate and as a result any other legal documents and rights. A recent study estimates that millions of babies are not registered at

3

birth especially in rural areas. This opens the door for early marriages and abuse of a child in a rural setup.

The aim of this study is to find ways of improving birth records so that the country can have accurate information of the population and have right in the development of the nation, no foreigners who have no heart for mother Zambia will be registered through the use of ICTs in order to reduce the cost of living and bring health services at the fingertips of citizens in the country to achieve 2030 ICTs goals by the government and also to reduce risks of losing vital information as a result of traveling long distances as in rural parts of Zambia. UNICEF (2010) includes the significance of the study is as follows:

a. It will help all citizens to have an access to the world of health care.
b. Effectively counters the problem of early marriage for girls before they are legally eligible.
c. It will help all citizens to have an access to all levels of education in the country of Zambia.
d. Assures the right to passport and right to vote and to be voted for, but also useful for opening of bank accounts or finding employment.
e. It will form the basis for development in the nation as the number of citizens will be known as the law makers are planning for future services.
f. Helps the enforcement of law relating to minimum age of employment, which supports efforts to prevent exploitation and child labour.
g. Secures the child's right to nationality at the time of birth or at a later stage.
h. Every government needs to know how many people are there in the country, and how it can plan to meet their needs.
i. It allows the analysis of fertility and mortality rates by age, and the development of projections of demographic change.
j. Without accurate population data, these areas may be overlooked and denied the necessary budgetary resources. The lack of such data may, therefore, lead to the further exclusion of people already marginalized from the social and economic life of the country.
k. The data provided by effective civil registration allow the accurate planning, development and implementation of development policies, particularly in health, education, housing, water and sanitation, employment, agricultural and industrial production and an effective electoral process.
l. They enhance a country's ability to monitor and evaluate the impact of policies and help governments allocate appropriate resources to those in greatest need, thereby narrowing disparities.

In many developing countries today like Zambia, the births of a substantial share of children go unregistered mostly in rural areas. Registration of vital events is essential for accurately calculating birth and death rates and for accessing the level of infant mortality. It has other advantages, for example, when linked with medical records, birth registration systems can alert health-care providers to the presence of children needing vaccination. Accurate information on births has been stressed as important for tracking progress towards the health-related Millennium Development Goals MDGs). Children whose births are not registered may not be able to avail the opportunities and protection due to them. They may not get good education and opportunities to even get a good job. Without a birth certificate a child may not get complete recognition of existence. People may see him with suspicious eyes when he/she will not have anything in support of his/her identity. The importance of birth registration has also been emphasized from a child rights perspective. In most of the countries, a health card is issued in the presence of a birth certificate.

This health card is used for a child's vaccination purposes and other health related problems. If this health card is not issued in the name of a particular child, that child will not be able to get proper health-care facilities and maybe exposed to harmful & dangerous diseases in the absence of proper vaccination. Lack of a birth certificate will limit a child to get an admission in schools and colleges and thus, forcing him to get into child-labor or many a times forcing him to join some dangerous illegal activities in a desire to earn the livelihood and status in the society which will only lead him to an ocean of disrespect and big problems. In most of the rural areas, the problem which is obtaining is the lack of awareness and information. There is need to make people aware of the benefits of a birth registration. They must be given proper information and education regarding this. For this purpose, in a certain rural or urban area, a small awareness meeting could be organized first, in which an informal discussion between

4

the people and the person who is holding that meeting must be done to solve the primary queries and clear the doubts of the parents regarding the birth registration. Secondly, people of the certain area could be invited for a small informative movie on birth registration, as they would be able to relate themselves with the audio/visual more and the audio must be in their local, understandable language.

Thirdly, a door-to-door awareness campaign could be another option to educate especially the mothers about this. Most of the time, the parents of a child take the registration process lightly and for granted, for which a child has to pay afterwards. It is in fact, the foremost duty of every father and every mother to go to the civil registration authority office first and get their child registered before distributing the sweets to the neighbors upon the birth of their child.

1. Statement of The Problem

Birth registration is not adequately covered especially in rural and remote areas where there is no formal system of registration. The birth of a child is one of the important events routinely recorded in a Civil Registration System (CRS) (United Nations 2001; World Health Organization 2008). According to the United Nations, civil registration is defined as the "universal, continuous, permanent and compulsory recording of vital events provided through decree or regulation in accordance with the legal requirements in a country" (World Health Organization and World Bank 2014).

However, compliance with birth registration is still below 50% in sub-Saharan Africa that include Zambia, 25 years after the Convention on the Rights of the Child (CRC) (Cappa et al. 2014; UNICEF 2014). The CRC is an international treaty comprising 54 articles developed in 1989 to recognize the rights of children. It is regarded as "the most widely and rapidly ratified human rights treaty in history" (UNICEF 2014). The right of children to have their births registered is the seventh article of the CRC below are highlighted areas this research is stressed upon.

1. A birth certificate is the most tangible proof that a Government legally recognizes a child as a member of society, a child who is not registered at birth is invisible in the eyes of the authorities.

2. Where the right to birth registration is not recognised, a child is virtually non-existent in the legal sense as proof of birth.

3. In the absence of birth records registration as proof of age and identity, a country cannot even answer the question 'who is a child?'

The proposed system will resolve the highlighted problems by providing the solutions that will be distributed in an ICT environment with accuracy, efficiency, fastness, consistence and reliability.

The following problems were identified in the existing system:

1. The manual system of registering birth records does not promote effectiveness.

2. It is time consuming to search and retrieve birth registration information.

3. Accumulation of birth registration paper files.

4. With the manual system it is difficult to query birth registration records based on defined criteria like place
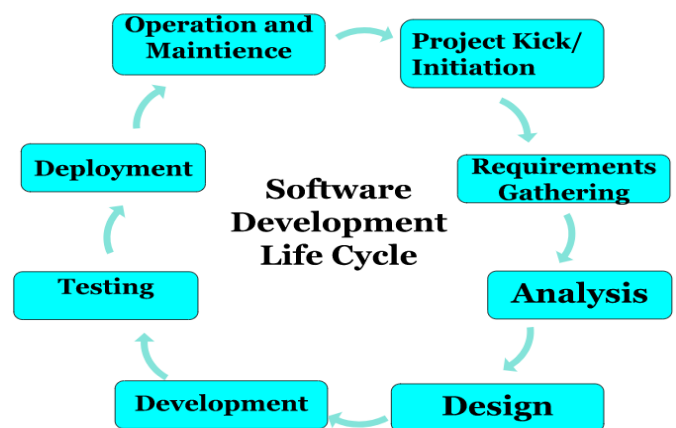
of birth, mothers' name, etc.

5. The existing system (ZEPRS) is also packed with a lot of modules which is a biggest challenge for the database personnel and they struggle to operate it.

2. REVIEW OF RELATED WORKS

Birth registration differs around the world depending on the laid down procedures in each country (Bequele, 2005). It facilitates full participation in the social order of children. In Peru, children's access to medical care requires one parent possessing a birth certificate. A caregiver who cannot produce his child's birth certificate in Columbia, cannot enroll his child in school (Mackenzie, 2009). A child who successfully completes

the eighth grade in Dominican Republic and does not have a birth certificate cannot enroll in high school. In each case, a child's welfare is negotiated for lack of a birth certificate. This provides a concise insight into the problem's Latin American children and their parents encounter when a child lacks birth certificate (Dunning, 2014; Brito et al, 2013).

India's birth registration increased drastically in (2009), when web-based system was introduced since it allowed the citizens to access, freely, to their birth certificates. Cambodia, in (2012), made available a web application to capture individual events of birth, death, print birth certificates, in order to produce monthly reports of statistics indicators.

Ghana was the first state in Sub-Saharan Africa to endorse the UN Convention on the Rights of the Child in February 1990. Since then, Ghana continues to follow its guidelines (Imoh, 2012). However, the Births and Deaths Registry in Ghana was founded by Act 301 of 1965, within the Ministry of Local Government and Rural Development, to provide accurate, reliable and timely data of all births and deaths taking place in Ghana (Fagernas & Odame, 2013). It was amended in 1968 by the National Liberation Council Decree (NLCD, 285) and further amended by the Local Government Act, 1993 (Act 462). It began in 1888 in Gold Coast as a Cemeteries Ordinance and was accountable for registration of deaths of the colonial masters. It was modified in 1819 and converted into the Births, Deaths and Burials Ordinance in 1912 and has experienced tremendous changes from the time it was set up (Dake & Fuseini, 2018; Peters & Mawson, 2015).

Section 8 of Act (301) stipulates "birth of every child in any district to which this Act applies must be registered by the Registrar in the district in which the child was born." Nonetheless, birth is surrounded by unforeseen circumstances such as doubtful paternity, incapacitated parents and deserted newborns, therefore, provisions are made in the Act (301) to cater for such situations. By the Act, birth must be registered within twenty-one days after date of birth; outside this period, payment of the prescribed fee is made (Act 301,1965). However, the period has been extended to one year to enable everyone register (Fagernas & Odame, 2013).

Egypt implemented a national warehouse with civil and health registration data for statistics production having passed the rate of coverage of birth record by 5% in 2004 to around 95% in 2011.

Namibia and Botswana have been making progress in the resolution/mitigation of this problem.

To fill the gap of the territory, it implemented videoconference systems and the decentralization of registration centers with web-based registration systems and interoperable with other national systems.

African perspectives

In the pursuit to prevent statelessness, the UNHCR launched a campaign, 'I belong.' Birth registration system was indicated as a major factor to achieve their goals. Their aim was to achieve legal identity using birth registration (retrieved from www.unhcr.org). The African Board on the Rights and Welfare of Children, responsible for the monitoring and execution of international law on nationality, sensitizes African Ministers in charge of Civil Registration, on Article 6 of the African Children's Charter, which states the right to a name and registration in order to acquire nationality immediately after birth (Kidane, 2014).

The African Charter on the Rights and Welfare of the Child (ACERWC) held a conference for ECOWAS members in Cote d'Ivoire to make sure their constitutional legislation recognizes the principles of

conferring a child the nationality of the state in which the child is born, if at the time of the child's birth he is not granted nationality by any other state in conformity with its laws (Lloyd, 2016). Also, the African Union, African development bank and UN Economic Commission for Africa teamed up with other international organization on the initiative to improve birth registration in Africa (retrieved from www.citizenshiprightsafrica.org)

Nevertheless, a recent study conducted by the Committee of Experts of the African Commission on Human and Peoples' Right reveals only a few African countries have incorporated this in their national constitutions and laws. For example, The Gambia expressly provides right to nationality either for "everyone" or for all children in their constitution, whereas countries such as Cape Verde is yet to do so (Manby, 2016).

Zambia perspective

Reviewing literature of existing studies assists in better understanding of the concept on birth registration. UNICEF and other researchers have published papers on birth registration in the world as well as on country basis, comparing within countries based on different factors using data from Multiple Indicator Cluster Survey (MICS), Demographic and Health Survey (DHS), and other sources. For example, Bhatia et al, (2017) published a paper comparing 94 countries with the help of MICS and DHS of these countries. Studies have been conducted on the socio-economic or socio-demographic factors of birth registration, but few studies have researched into details considering each factor that affect birth registration in order to confirm the extent of importance of each factor and adopt strategies to assist registration of birth.

In Zambia, there is insufficient literature on desktop-based birth registration systems. However, Zambia Demographic and Health Survey report and the 2015 SAVVY Baseline Census report (CSO/DNRPC, 2016) conducted a study on Birth registration and access to health care: an assessment of Zambia's campaign success, in which they spelt out the successes of Zambia and the strategies adopted. Also, WHO, (2015) study, *Socio-economic determinants of birth registration in Zambia,* whereas (DNRPC, 2018) examined levels and differentials in registration and certification of births in Zambia, but my study seeks to find the relationship between maternal education and birth registration, as indicated in literature as one of the major influences on birth registration, and to contribute to the growing literature on birth registration.

In these Rules, (as amended by Act No. 13 of 1994 of the laws of Zambia) unless the context otherwise requires-Interpretation "Assistant Registrar" means the registration officer designated as such at a Health sub - centre to register new-born babies.

According to Bill Gluck (2014), the remote data entry (RDE) systems were developed to assist health personnel to directly capture data. Bill Gluck (2014) states that the RDE systems "allowed the doctor or clinical site staff to enter the data directly into the computer, eliminating the need for a third party to enter/transpose data from the paper forms.

The right to be registered at birth is enshrined under Article 7 of the United Nations (UN) Convention on the Rights of the Child (CRC) which states that: "the child should be registered immediately after birth and shall have the right from birth to a name (and) to acquire a nationality." yet, UNICEF estimate that 36 per cent or

48 million children are not annually registered at birth in remote rural areas, Zambia's rural areas inclusive. Walther et al (2011), captured some literature as to why electronic data capture and record management systems' use has become wide spread, in the literature, the wide spread use was attributed to the technological advances and considerable reduction in prices for portable computers. According to Carina King et al (2014) literature, all electronic data capture systems can submit data using an Internet connection which is faster and in real time, than when paper is used as show below figure by UNICEF, (2019).

Figure 4: Registration of Birth and Certificate records in computer era.

According to Chelsea Bailey (2013), 'Most clinics in Lusaka, Zambia have embraced the "Smart Care Card," a thin plastic card that is revolutionizing the way clinicians and health care workers manage a patient's medical records but birth records in paper registration. This technological advancement was introduced according to Chelsea Bailey (2013) "in 2010, by the Zambia's Ministry of Health in conjunction with the Untied State Centers for Disease Control and Prevention (CDC)". The smart card was meant to replace the paper "exercise books" that have been in use to document medical records for some time now. The introduced smart card, despite its small size is able to store details of individuals' diagnoses and treatments. It is also computer-based meaning one needs to move to a clinic or hospital where such a facility is readily available or else it will not be used.

3. METHODOLOGY

The systems development methodology is used to describe the process for building systems, in a very deliberate, structured and methodical way. Web-based Zambia Electronic Perinatal Records system built to manage Birth registration at Kasenengwa Rural Health Center Clinic has a set of organized components which interacts with each other in order to achieve this approach, it has to be developed, a system development methodology was used. System Development method is referred to as the framework that is used to structure, plan, and control the process of developing an

8

information system. The series of task which were followed in SDLC were predefined in Life cycle according to manner (Sami, 2019).

As one of the designing models, the researcher used the waterfall model of SDLC and its stages are illustrated in the diagram below.

Data Collection

Application development is the process of creating a computer program or a set of programs to perform the different tasks that a business requires. From the SDLC when building up a system the following are the steps to be followed: gathering requirements, system analysis, requirement analysis designing prototypes, testing, implementation, and integration. That the system analysis has been done, in this section the analyst will focus on system requirement analysis, (Ashi, 2019)

System requirement analysis

Requirement analysis in systems can be defined as activities that help to determine the needs or conditions to meet for a new or altered product or project, taking account of the possibly conflicting requirements of the various stakeholders, analyzing, documenting, validating and managing software or system requirements. It is sometimes known as A System Requirements Specification (SRS) or Software Requirements Specification. (Ashi, 2019)

There are two main groups of specific requirements which were considered. Functional and non-functional requirements.

Functional requirements.

Functional requirements are the product features or its functions that are designed directly for the users and their convenience. They define the functionality of the system. Users can easily perform their tasks up to the needs, (Ashi, 2019). This document records and provides information about the operations and activities that a system

must perform and acts as the brain of documents that defines how everything works together in the software. Details that are included in the functional specifications are categorized as follows:

a. Output specification
b. Input specification
c. Data/files
d. Hardware and software requirements.
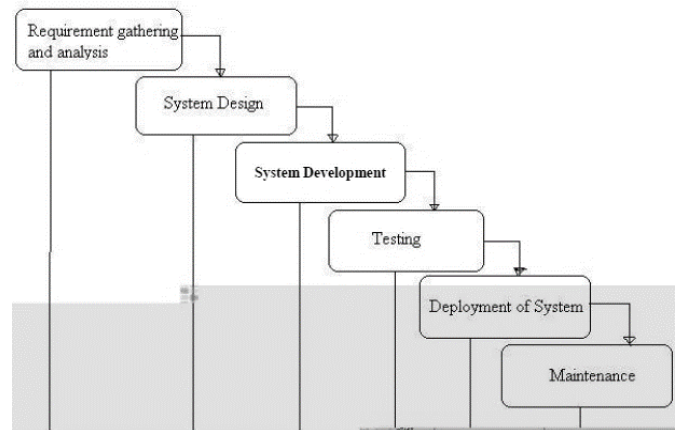
System Design

Designing is the process of synthesizing or putting together the system components that will address the system requirements. The requirements stated above are arranged in logical order at this stage. The system design is decomposed into subsystems because it too large. On the other hand, the approach will make the system design simplified and efficiency, (Mirriam, 2019).

That the specific requirements have been identified, above, it is possible now to make use of tools like algorithms and flowcharts to develop the design of Web Based Zambia Electronic Perinatal Record system for Rural and Urban Clinics for easily transmission of birth records.

Algorithm:

An algorithm represents the logic of the processing to be performed. It is a sequence of instructions which are designed in such a way that if they are executed in the specified sequence, the desired goal is achieved. It is imperative that the result be obtained after execution of affinity number of steps, (Mirriam, 2019).

The following is the flow algorithm designed for the WBZEPRS;

Start

1. Administration management system

    i. If you are admin, login

    ii. If you are not admin then you are a user,

    iii. If none of the above you have to be registered

    iv. Or else you will not use the system.

    v. If you are logged in have the privileges to control the following;

    vi. IT Administrator management system.

    vii. User

    viii. Parents

    ix. survey

2. IT Administrator management system

    i. Start

    ii. If you are a teacher login as user

    iii. If not stop

    iv. If you login you can control the following by adding, viewing and deleting;

    v. Enter Daily attendance of learners

    vi. Content adding, deleting and update

    vii. Add /edit exams

    viii. Enter /update/delete results

    ix. Enter /edit and delete offences learners commit.

    x. Content management

    xi. Create content, edit and publish

3. User

Start

If you have credentials login if not stop and wait to be registered

If you have entered enter online only your records.

4. Survey

Check the records

Flowchart:

The algorithm above is going to be represented in a pictorial form.it shows the procedure and the logical sequence of processing using boxes of different shapes. The instruction to be executed is mentioned in the

boxes. These boxes are connected together by solid lines with arrows, which indicate the flow of operation.
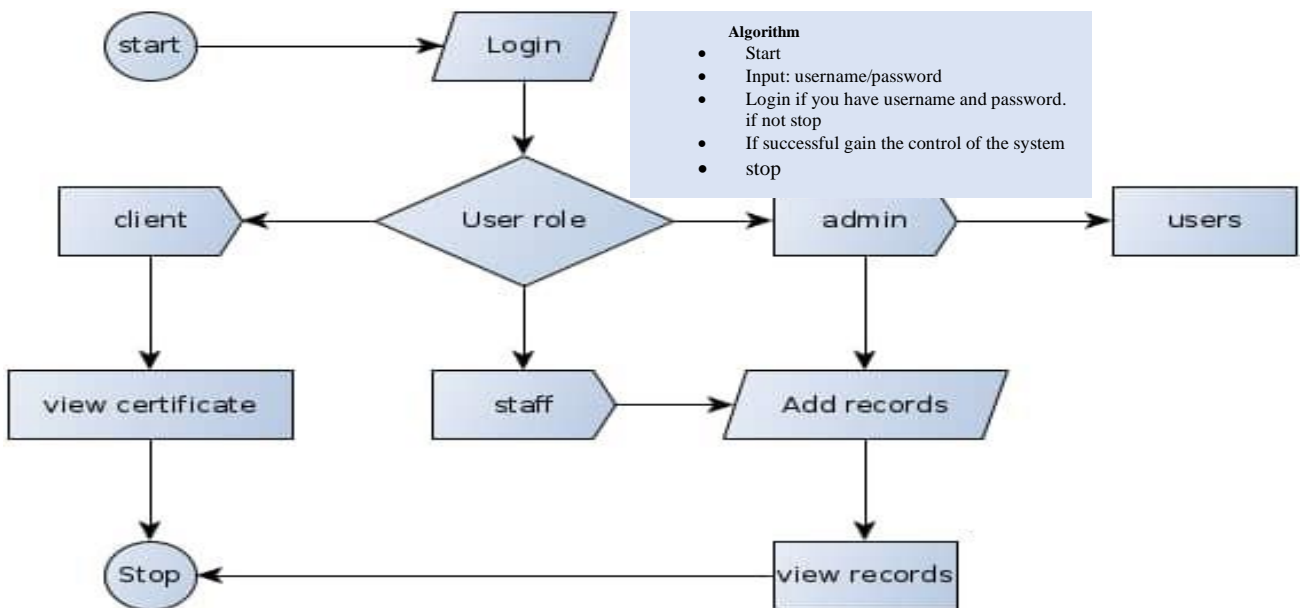
4. RESULTS

The results clearly show that successful records of birth online registration unlike manual register a birth using paper, pen and handwritten but system generate Record of birth automatically as shown below:

The Home login page where expectant mothers should make an appointment with the health personal for the particularly clinic or hospital then the system administrator will approval them and send more details on how to login the system as shown below:
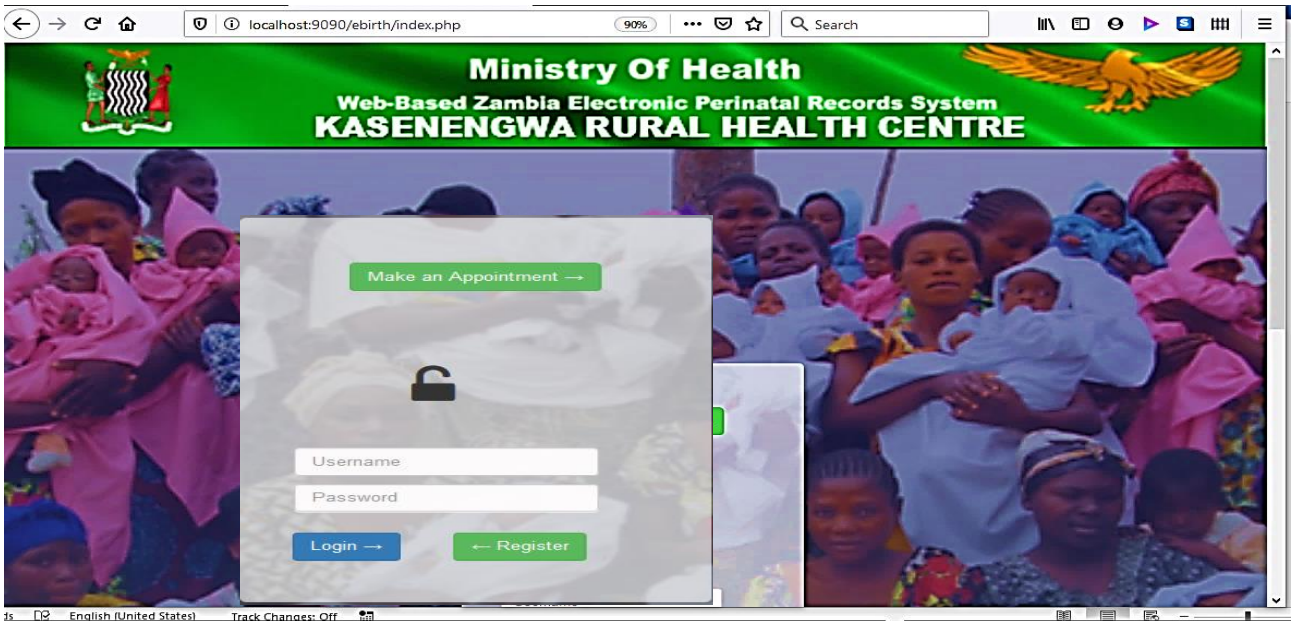
The expectant mothers, login their details and login details are as easy so that all expectant mothers can login using phone numbers as shown below:
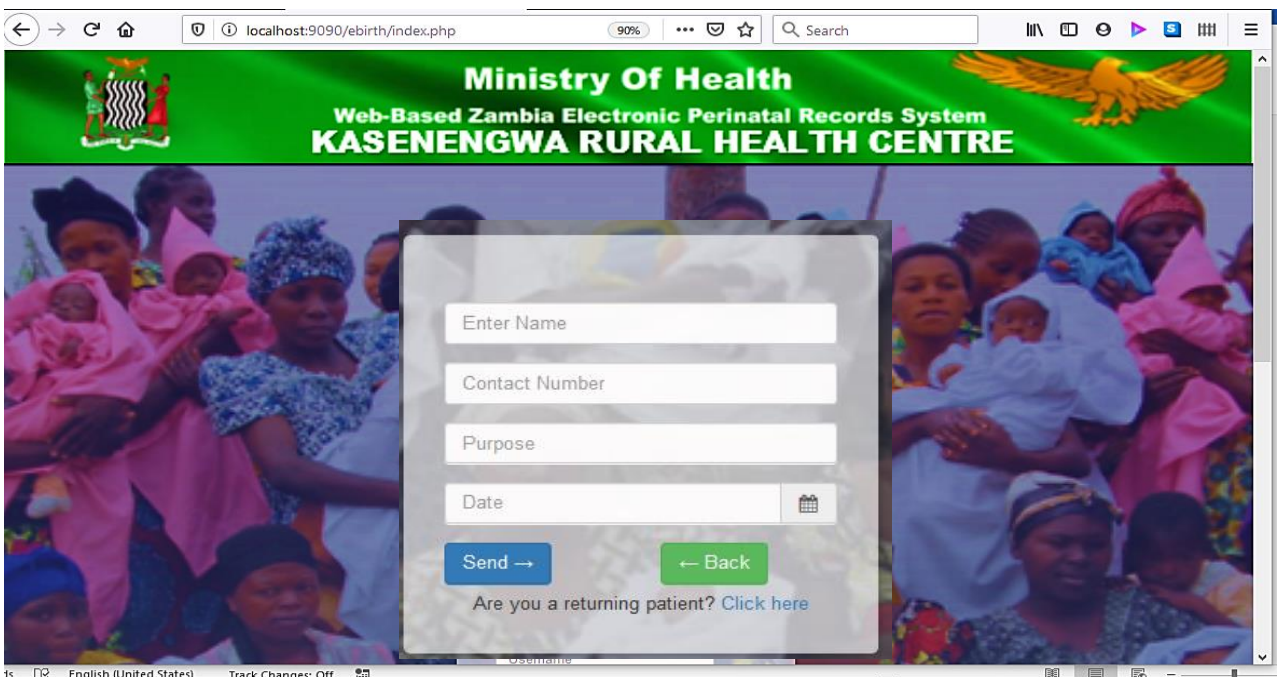
Figure 22: Make appointment (expectant mother)

Birth Records added by the parent from Home

The following module pops up where the details of the child is entered by the parents of the child, then the administrator confirms the details and the unique certificate number is automatically generated by the system itself. The administrator sends this number the parent for them to view the certificate and print out which should be taken physically to the clinic/ hospital for it to be validated by the officials in-charge by the use of official date stamp.

REPUBLIC OF ZAMBIA

RECORD OF BIRTH

Certification No. CT0309200010

Place of Birth:	Chipata General hospital		
Surname of Child:	~~SIMENDA~~	Sex:	Male
Other Names:	~~Duncan~~		
Date of birth:	2018-02-26	Time:	11:32 AM
Father's name:	~~Simenda Chris Mate~~		
Father's Occupation:	Teacher		
Father's present address:	Kasenengwa Boarding Secondary School		
Mother's name:	Nachilima Pauline		

Officer-In-Charge: Ndhlovu Jacob K

Date: 2018-02-26

The Record of Death

The system is designed in such a way that if the child was a still born then it automatically records of Death as show below a print preview.

System Implementation

1-direct cutover

Summary

The importance of birth registration cannot be underestimated since it bestows a legal identity on children for life. Without a birth certificate, children may be excluded from education as well as health and social services. The article examines the gaps in birth registration in different regions, and calls attention to the danger incurred by unregistered children in difficult circumstances. Birth registration is an internationally recognized right of every child that also allows governments to know the size and needs of their populations, and to provide the necessary structures and services for their citizens' well-being.

5. DISCUSSION

The role of Web Based Zambia Electronic Perinatal Records system in Health Centres is making a big difference in the lives of patients (expectant mother), parents and the data entry administrators. It is also helping in improving the security and safety of vital information by a better monitoring system. Kasenengwa Rural Health Centre administration is realizing the importance of using such software and thus the competition is also increasing among the manufacturers to come up with all-inclusive management systems helping Health center to do everything with the help of technology

In this Web Based Zambia Electronic Perinatal Records System for Kasenengwa Rural Health Centre and Urban Health Centre the developer converted the design of the system into various interfaces which interacts with the database so that the system is more interactive with the users.

Conclusion

Before beginning the actual coding, you should spend some time on selecting development tool, which will be suitable for your debugging, coding, modification and designing needs.

Before actual writing code, some standard should be defined, as multiple developers going to use the same file for coding.

During development developer should write appropriate comments so that other developers will come to know the logic behind the code. Last but most important point. There should be a regular review meeting need to conduct in this stage. It helps to identify the prospective defects in an early stage. Helps to improve product and coding quality. The role of Web Based Zambia Electronic Perinatal Records system in Health centers is making a big difference in the lives of patients (expectant mother), parents and the data entry administrators. It is also helping in improving the security and safety of vital information by a better monitoring system. Kasenengwa Rural Health Centre administration is realizing the importance of using such software and thus the competition is also increasing among the manufacturers to come up with all-inclusive management systems helping Health center to do everything with the help of technology, (Clever,2019).

This has increased opportunity for this project to expand. Some of the functionalities intended to be included in this package is the SMS alert to the parents and staff, (Clever, 2019).

The SMS alert is a solution that does cheap and SMS alerts costs have proven in-call management at the Health centre and the clients (patients).

The SMS alert helps prevent responsible for any malfunctions of all types: computer, gab, etc., automated power supplies, production line, warning SMS is used to inform on sometimes very sensitive areas, (Clever,2019). The SMS alert participates in securing an information system. The SMS alert to alert people to a major risk. In case of failure, SMS alert is automatically sent by mini message to the person concerned, (Clever, 2019)

REFERENCE

[1] Abbas, A.M. (2014). Effects of distance and population on birth registration coverage: An Analysis of Gombe State Situation, Nigeria. *International Journal of Innovative Research and Studies.*

[2] AbouZahr, C. (2007). *A scandal of invisibility: Making everyone count by counting everyone. The Lancet* 370(9598): 1569–1577. doi:10.1016/S0140-6736 (07)61307-5.

[3] Adedini, S.A., et al. (2015). *Regional variations in infant and child mortality in Nigeria: A multilevel analysis.*

[4] Adi, A.E et al, (2015). Understanding whose births get registered: A cross sectional study in Bauchi and Cross River states, Nigeria. BMC Research Notes8: 79. doi:10.1186/s13104-015-1026-y.

[5] Akande, T.M. and Sekoni, O.O. (2005). A survey on birth and death registration in a semi-urban settlement in Middle-Belt Nigeria. European Journal of Scientific Research.

[6] Akesode, F.A. (1980). Registration of births and deaths in Lagos, Nigeria. Journal of Tropical Pediatrics 26(4): 150–155. doi:10.1093/tropej/26.4.150.

[7] Alarcón, D. and Robles, M. (2007). The challenges of measuring child mortality when birth registration is incomplete. Global Forum on Gender Statistics.

[8] Antai, D. (2011). Regional inequalities in under-5 mortality in Nigeria*: A population-based analysis of individual- and community-level determinants. Population Health Metrics* 9(1): 6. doi:10.1186/1478-7954-9-6.

[9] Arun Serrao and Sujatha B.R. (2004) *Birth Registration: A Background Note, Community Development Foundation,* Bangalore.

[10] Ashi, (2019). *Software Requirements* (3rd ed.). Redmond, WA: Microsoft Press.

[11] Ayeni, O. and Olayinka, A. (1979). An evaluation of a special-type vital statistics registration system in a rural area of Nigeria. *International Journal of Epidemiology* 8(1): 61–68. doi:10.1093/ije/8.1.61.

[12] Bambas, L. (2005). Integrating equity into health information systems: A human rights approach to health and information. *PLoS Med 2*(4):

[13] Bequele, A. (2005). *Universal birth registration: The challenge in Africa.*

[14] Bhatia, A., et al (2017). Who and where are the uncounted children? Inequalities in birth certificate coverage among children under five years in 94

[15] Bill Gluck (2014), Statutes, Regulation, and Interpretation: Legislation & Administration in the Republic of Statutes 1st Edition

[16] Cappa et al. (2014) & UNICEF (2014). Birth registration: A child's passport to protection. The Lancet Global Health2(2): e67–e68. doi:10.1016/S2214-109X (13)70180-3.

[17] Cappa, C., Gregson, K., Wardlaw, T., and Bissell, S. (2014). Birth registration: A child's passport to protection. *The Lancet Global Health2*(2): e67–e68. doi:10.1016/S2214-109X(13)70180-3.

[18] Carina King et al (2014) *"The protection of information in computer systems," 2014.* [Online]. Available: https://www.acsac.org/secshelf/papers/protection_information.pdf.

[19] Central Statistical Office [Zambia], Central Board of Health [Zambia], ORC Macro. Zambia Demographic and Health Survey 2001–2002. www.afro.who.int.

[20] Chelsea Bailey, 2013. Zambia: Making the "SmartCare" Transition to Electronic Healthcare Records. Washington, D.C: Elizabeth Glaser Pediatric AIDS Foundation.

[21] Christian W Dawson (2005),'Project in Computer and Information System,' Pearson Education.

[22] Clever. T. (2019), 'Warn People with SMS alerts System**.** [online] Available: https://www.clever.fr/other-links/sms-alert-system/ [Accessed:1st August 2019].

[23] Constitution of Zambia Chapter 51 (cap 51), Births and deaths registration 21 of 1973 and 13 of 1994 of the laws of Zambia.

[24] Corbacho, A., Brito, S., and Rivas, R.O. (2012). Birth registration and the impact on educational attainment. Documento de trabajo Nro. IDB-WP-345. Washington, DC: BID.

[25] Dake, F. A., & Fuseini, K. (2018). Registered or unregistered? Levels and differentials in registration and certification of births in Ghana. *BMC International Health and Human Rights*, *18*(1), 25.

[26] Dunning, (2014). Emotionally unskilled, unaware, and uninterested in learning more: Reactions to feedback about deficits in emotional intelligence. *Journal of Applied Psychology, 99*(1), 125–137. https://doi.org/10.1037/a0034138

[27] Fagernas & Odame, (2013). *Ghana demographic and health survey of the Registration of Births and Deaths Act, 1965 (Amendment) Decree*, 1968 (N.L.C.D. 285)

[28] Hill, K., Lopez, A.D., Shibuya, K., and Jha, P. (2007). Interim measures for meeting need for

health sector data: Births, deaths, and causes of death. The Lancet370(9600): 1726–1735

[29] Idris, S.H., Hassan, S.S., Tambaya, A.M., and Sabitu, K. (2006). Documentation of births: *A community approach in Tashar – Shari Giwa lga of Kaduna state, Nigeria. Annals of Nigerian Medicine 2*(2): 25–28.

[30] Imoh, A. T. D. (2012). The Convention on the Rights of the Child: A Product and Facilitator of a Global Childhood. In *Childhoods at the Intersection of the Local and the Global* (pp. 17-33). Palgrave Macmillan, London.

[31] International Finance Corporation (2007). *The business of health in Africa: Partnering with private sector to improve people's lives.*

[32] Kathy Schwalbe (2007) *"Information Technology Project Management", (*Fifth Edition), Thomson Course Technology.

[33] Kidane, M. (2014). *Birth Registration in Africa: inching forwards or sliding backwards*. Conference material. Leiden Law School. Leiden University. Kirby, T. (2015). Alan Lopez: making everyone count. *The Lancet*, *386*(10001), 1331.

[34] Lloyd, A. (2016). The African regional system for the protection of children's rights. In *Children's Rights in Africa* (pp. 43-62). Routledge.

[35] Mackenzie, Y. (2008). The Campaign for Universal Birth Registration in Latin America: Ensuring All Latin American Children's Inherent Right to Life and Survival by First Guaranteeing Their Right to a Legal Identity. *Ga. J. Int'l & Comp. L.*, *37*, 519.

[36] Manby, B. (2016). *Citizenship Law in Africa*. African Minds. Merton, R. C. (1973). Theory of rational option pricing. *The Bell Journal of Economics and Management science*, 141-183.

[37] Michael Chawe (2018) *Zambia exams halted over cheating*. The Citizen TZ online. Available : news@tz.nationmedia.com [17/11/2018].

[38] Mirriam. Algorithm', (2019), [online] Available: https://www.merriam webster.com/dictionary/algorithm#other-words [11th June 2019]

[39] MoH and US aid (2017) *Health* www.usaid.gov/zambia/health [12/11/2017]

[40] National Population Commission (2008) *Reports on Live Births, Deaths, and Stillbirth Registration in Nigeria* (1994 – 2007).

[41] National Population Commission (2009) Nigerian Demographic and Health Survey 2008, ICF Macro Calverton, Maryland USA.

[42] Pais, M.S. (2009). *Birth registration: Right from the start.* UNICEF Innocent Dig 18:

[43] Salawu B. (2009) Strengthening Vital Registration Systems as Source of Demographic Data in Niger

[44] Sami, (2019). "Threat analysis of software systems: A systematic literature review*," Journal of Systems and Software,* vol. 144, 06 2018.

[45] Thomas Connoly (2002), *"A Practical Approach to Design, Implementation and Management"*, (Database System), Third Edition, Pearson Education.

[46] UNICEF (1989). *Convention on the rights of the Child.* [electronic resource]

[47] UNICEF (2006). *The State of the World's Children*, UNICEF House press, 3 UN Plaza, New York, NY 10017, USA.

[48] UNICEF (2010). *Using Rapid SMS for birth registration* | Stories of UNICEF Innovation. [electronic resource]

[49] UNICEF (2013). *Every Child's Birth Right: Inequities and Trends in Birth Registration*. [electronic resource].

[50] UNICEF (2019). *Electronics data capture, Multiple Indicator Cluster Survey* (MICS) [electronic resource].

[51] United Nations (2001); World Health Organization (2008). *Framework and standards for country health information systems*. http://apps.who.int/iris/handle/10665/43872.

[52] Walther, B. et al., 2011 Sep 23. *Comparison of Electronic Data Capture (EDC) with the Standard Data Capture Met*

[53] World Bank and World Health Organization (2014). *Global civil registration and vital statistics: Scaling up investment plan* 2015-2024. The World Bank.

.