

**DESIGN AND IMPLEMENTATION OF ELECTRONIC VOTING
SYSTEM**

BY

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CERTIFICATION

I certify that this project work was presented by OMOLE AYOMIKUN SAMUEL, of the Department of Computer science, Faculty of Science, Federal University Oye-Ekiti, Ekiti state, under the supervision of Miss. Comfort Akinribido. This is to certify that the work presented in the project titled "**DESIGN AND IMPLEMENTATION OF AN ONLINE VOTING SYSTEM**" submitted by the undersigned student of Final year B.Sc in **COMPUTER SCIENCE** in partial fulfillment for the award of degree of **Bachelor of Science {computer science}** record of my own work carried out by me under guidance and supervision of Miss. Comfort Akinribido of the Department of Computer science and that this work has not submitted elsewhere for award of any other degree.


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Date

DEDICATION

This project is dedicated first and foremost to my creator GOD, and to the Department of Computer Science, which happens to be the bedrock for my development through the years.

ACKNOWLEDGEMENTS

I give GOD the glory for making it possible for me to think about, plan and implement the project, E-Voting. I will be so ungrateful if I do not mention the name of that man that GOD has used to make the project a success, my supervisor Miss. Comfort Akinribido. My sincere appreciation and gratitude goes to for her guidance, constructive comments, valuable suggestions and inspirations. During making of my Project, she helped me a lot. My dedication also goes to Miss Arinola (Mzzie Jayda) and my family for being with me in the whole processes especially my dear daddy, mummy, sister and brothers who stood by me in all situations even at the times of financial need. Finally, I wish to say thanks to Bravotech Solution Information communication Technology (BSICT) for helping me. Finally, I dedicate this project work to God Almighty who has actually made it possible for me to witness this moment and to be a participant of session, and to the department of Computer Science, Federal University Oye Ekiti, Ekiti State.

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ABSTRACT

This project work involves the design and implementation of an Electronic Voting System that allows electorates/voters to cast and votes with higher convenience and efficiency with respect to security even make electoral procedures simple and reduce mistake rate of ballot examination. This technology to be developed (E-voting) solves problems associated with conventional way of casting and counting votes. This project was based on a combination of hardware and software platform i.e. physical component of the entire system (monitor, keyboard, mouse etc. and program which has been developed for the end users. The hardware used are PCs, Fingerprint scanners, Switches and Internet modems, while the software was implemented on a Windows operating system (Windows7 upward).

The actual configuration was done with the following packages: PHP - (used for server-side Interaction), MySQL – which is the Relational Database Management System, Web Browser (used for accessing the URL), Internet (used for connecting the remote systems) and HTTPS (used to provide additional security to avoid external interference on the system). The word “vote” means to choose from a list, to elect or to determine. The main goal of voting (in a scenario involving the citizens of a given country) is to come up with leaders of the people’s choice. Some of the problems involved include rigging votes during election, insecure or inaccessible polling stations, inadequate polling materials, inadequate facilities and also inexperienced personnel. It should be noted that with this system in place, users, citizens in this case shall be given ample time during the voting period. They shall also be trained or taught on how to vote online before election time. The aim of this project is to design an electronic voting system to ease electoral processes of nowadays.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Electronic voting is the means of voting using electronic devices. Electronic voting (also known as E-voting) is a term encompassing several different types of voting, embracing both electronic means of casting and counting votes. Online Voting System is a voting system by which any Voter can use his/her voting rights from anywhere in the country (Bessdaar P.V. 2009).

Electronic voting system (also known as e – voting) is an electronic system which uses electronic ballot that would allow voters to transmit their secure and secret voted ballot to election officials over the computer [Oostveen .A.M. and Bessdaar P.V. (2009).

In this system, people who are citizens of Nigeria and whose age is above 18 years and any sex can give his/her vote online without going to any physical polling station. There is a database which is maintained in which all the names of voters with complete information is stored. In “ONLINE VOTING SYSTEM” a voter can use his/her voting right online without any difficulty she/he has to be registered first for him/her to vote. Registration is mainly done by the system administrator for security reasons. The System Administrator registers voters on a special site of the system visited by him only by simply filling a registration form to register voter. Citizens seeking registration are expected to contact system administrator to submit their details. After a voter has been verified to be a citizen of Nigeria by system administrator by comparing their details submitted with those in existing databases such as those as the Registrar of Persons, the citizen is then registered as a voter. After registration, the voter is assigned a secret Voter ID

with which he can use to log into the system and enjoy services provided by the system such as voting. If invalid/wrong details are submitted, then the citizen is will not be eligible to the use of the system service.

The design of a “good” voting system, whether electronic or using traditional paper ballots or mechanical devices must satisfy a number of sometimes competing criteria. The anonymity of a voter’s ballot must be preserved, both to guarantee the voter’s safety when voting against an violent candidate, and to guarantee that voters have no evidence that proves which candidates received their votes. The existence of such evidence would allow votes to be purchased by a candidate. The voting system must also be tamper-resistant to thwart a wide range of attacks, including ballot stuffing by voters and incorrect tallying by insiders. Another factor is the importance of human factors.

A voting system must be comprehensible to and usable by the entire voting population, regardless of age, infirmity, or disability (Alvarez et- al 2010). There have been several studies on using computer technologies to improve elections. These studies caution against the risks of moving too quickly to adopt electronic voting machines because of the software engineering challenges, insider threats, network vulnerabilities, and the challenges of auditing. Voting schemes have evolved from counting hands in early days to systems that include paper, punch card, mechanical lever and optical-scan machines.

Electronic voting systems provide some characteristic different from the traditional voting technique, and also it provides improved features of voting system over traditional voting system such as accuracy, convenience, flexibility, privacy, verifiability and mobility. But it suffers from various drawbacks such as Time consuming , Consumes large volume of pare work , No direct role for the higher officials, Damage of machines due to lack of attention, Mass

update doesn't allow users to update and edit many items simultaneously. These drawbacks are overcome by Online Voting System.. We provide a detailed description of the functional and performance characteristics of online voting system. Voter can cast their votes from anywhere in the country without visiting to voting booths, in a highly secured way. That makes voting a fearless of violence and that increases the percentage of voting. The goal of any voting system is to establish the intent of each individual voter and translate those intents into a final tally. The paper-based voting system was introduced in election at Federal University Oye-Ekiti. This system is time consuming and can result in a number of problems including:

- Voters leaving without voting because of long queues can actually lead to a very discouraging thing to voters that might want to vote again.
- a very high intolerable percentage of lost, stolen, or miscounted ballots
- high number of unclear or invalid ballots
- limited or no accommodation for people with disabilities
- Bad weather might also cause people not to walk long distances to voting stations to cast their votes for any contestant they want to vote for.

The design of a good voting system, whether electronic or using traditional paper ballots or mechanical devices must satisfy a number of sometimes competing criteria. Electronic democracy is a necessity in this era of Communication and information technology. E -voting is one of the pillars of the e-democracy which refers to the use of computers or computerized voting equipment's to ease and to tabulate ballots in an election in a trustable manner.

Problems manifested in form of election malpractice in Nigeria includes multiple voting, stuffing of ballot box with ballot papers, absconding with ballot boxes, mutilation of election result sheets and falsification of election results and election violence.

The main aim and objectives of this study are tailored towards eliminating some of the identified problems and voting irregularities and foster a formidable structure for the Nigerian voting system by designing a comprehensible electronic voting system for the entire voting processes that eliminate election malpractices. This study is constrained to the design of software application to manage, control and monitor some of the activities of INEC that is, to register eligible voter, electoral parties and candidates.

1.2 PROBLEM DEFINITION

In recent years there are many challenges on voting system been used (paper based voting system) has been facing since the time it has started existing. The voting/polling process by registered voters in Nigeria is very cumbersome. So many cases of missing data in the voter registration files have been reported. There are also scenarios where unregistered voters flock in the polling centers as “Dead Voters” to participate in the voting process. Even after voting, malicious clerks and officers-in-charge of a polling station end up playing with the results Figurers. This results in the release of wrong results leading to cases of post-election violence such as the one that happened in early 2008 in Nigeria.

Such cases can be solved by insisting on voters exercising that task online using the Online Voting System. The voters can also vote from anywhere around the globe, they don't need to travel back to Kenya during election time in case they are abroad.

1.3 AIM OF THE PROJECT

The aim of this project is to design and implement an online voting system to create an atmosphere for conduction of free, fair and transparent elections at all levels.

1.3.1 RESEARCH OBJECTIVES

The main research objectives of project on an online voting system are shortlisted below:

- ❖ Reviewing existing/current voting process.
- ❖ Coming up with an automated voting system.
- ❖ Implementing a an automated/online voting system.
- ❖ Validating the system to ensure that only legible voters are allowed to vote.

1.4 SIGNIFICANCE OF STUDY

The main purposes of online voting system include:

- Provision of improved voting services to the voters through fast, timely and convenient voting.
- Reduction of the costs incurred by the Independent National Electoral Commission during voting time in paying many clerks employed for the sake of success of manual system.
- Check to ensure that members who are registered are only ones to vote. Cases of “Dead People” voting are also minimized.
- Online voting system will require being very precise or cost cutting to produce an effective election management system.

Therefore crucial points that these emphasizes on list below.

1. Require less number of staff during the election.
2. This system is a lot easier to independently moderate the elections and subsequently reinforce its transparency and fairness.
3. Less capital, less effort, and less labor intensive, as the primary cost and effort will focus primarily on creating, managing, and running a secure online portal.
4. Increased number of voters as individual will find it easier and more convenient to vote, especially those citizens of Nigeria to vote abroad (outside the country)

1.5 SCOPE OF STUDY

The scope of the work is that it will use the ID and password created by user to register him/her in the voting site, through this all the details of voter are saved in database. And it will act as the main security to the votes system.

Advanced technology: It is an advanced technology used now a day. It increases the internet knowledge of the users which is very necessary for current generation.

Internet: It is an online facility and hence very useful for the users. Voters can vote from anywhere at any time in India.

Image: Image is being captured through online and that image is being validated with the image on the database.

1.6 ACRONYMS

INEC	-	Independent Nigeria Electoral Commission
OVS	-	Online Voting System
OBS	-	Open Ballot System
DRE	-	Direct Recording Electronic
EVS	-	Electronic Voting System
EVR	-	Electronic Voter Register (EVR)
VC	-	Voting Centre

ICT - Information Communication Technology

FUOYE - Federal University Oye-Ekti

CHAPTER TWO

LITERATURE REVIEW

2.1 HISTORICAL OVERVIEW

This chapter describes literature review of an online voting system and its related work, a case study Of Fuoye Student Election (Computer Science Excros Election).

All computer scientists who have done work in or are interested in electronic voting seem to agree that online voting does not meet requirements for public elections and that current widely-deployed voting systems need improvement.

Voting on Internet has disadvantages based on areas of secrecy and protection against coercion and/or vote selling. It's such a truly bad idea that there seems to be no credible academic effort to deploy it at all. Nigerian General Elections of 2007 brought national attention to problems with current methods of casting and counting votes in public elections. Most people believe that the current system should be changed; there is much disagreement on how such changes should be made.

Nigerians in Diaspora have begun signing a petition in a fresh attempt to force electoral body to allow them vote online in next General Election. They advocate using OVS since it reduces cases of uncounted, unmarked, and spoiled ballots and cost of travelling to cite polling stations. They are opposed to use of High Commissions and embassies as polling stations and embassy officials as returning officers. This even proposes a framework for a new voting system with a decentralized, modular design.

Other researchers have done work in electronic voting; while they may not explicitly mention voting from remote poll sites, their work is nonetheless relevant to any effort at designing or implementing a remote poll site voting system. Lorrie Cranor acknowledges problems inherent in each kind of voting apparatus, but doesn't make an overt recommendation on her site for one technology over rest. Some other academicians like Peter Neumann focus on immensity of problem one faces when trying to design and implement a truly secure voting system. They often remind us of Ken Thompson's Turing acceptance speech and the fact that we really can't trust any code which we did not create ourselves. Therefore, they tend to be extremely suspicious of proprietary voting machines and their makers who insist that we should "just trust them."

Neumann gives a list of suggestions for "generic voting criteria" which suggests that a voting system should be so hard to tamper with and so resistant to failure that no commercial system is likely to ever meet the requirements, and developing a suitable custom system would be extremely difficult and prohibitively expensive.

A voting machine must produce human-readable hardcopy paper results, which can be verified by voter before vote is cast, and manually recounted later if necessary.

David Chaum presents a very interesting scheme, whereby voters could get receipts for their votes. This receipt would allow them to know if their votes were included in final tally or not, and to prove that they voted without revealing any information about how they voted. The security of this scheme depends on visual cryptography developed by Naor and Shamir, and on voters randomly choosing one of two pieces of paper. Mercuri and Neumann advocate the use of this technique in electronic voting systems (Mercuri .R., "A Better Ballot Box" (2002).

Nigeria, one-third larger than Texas in area and most populous country in Africa, is located on gulf of Guinea in West Africa. The Nigeria Electoral system is single member constituency type with competitive multiparty (more than a party involved in the election) and first past post winner system. The method of voting used in four out of five past elections, that is, in 1979, 1983, 1999 and 2003 was the Open Ballot System (OBS) in which the prospective voter goes through a process of accreditation before the time of election by the means of verifying of the voters identity card been possessed by the voters, receives a ballot paper from the appropriate poll official ad thereafter makes the confidential thumbprint impression in favor of the political party or candidate of choice in a secret voting compartment before dropping the ballot in the box positioned in the open that seems to appear in the presence of each voters, in the full glare of officials, security and party agents.

The modified open ballot system was adopted in the year 1993 elections in which voters filled behind the party symbol or photograph of candidate of choice. Voters were physically counted at close of polls and results declared to officials, security and party agents. Although method is simple and produced what many in Nigeria have often described as fairest and most peaceful elections in country, election was unsuccessful. Independent National Electoral Commission (INEC) is a non –partisan Nigerian government agency charged with conduct and supervision of elections. In late 1990s, agency began modernizing its information technology infrastructure by migrating from an outdated legacy voting system heavily dependent on inaccurate paper records and polling cards to the newer Electronic Voting System (EVS) [Gritzalis, D. (2002) Secure electronic voting]. At the heart of EVS is the Electronic Voter Register (EVR), which, by capturing names of all eligible voters, eliminates duplication and thereby minimizes discrepancies in the electoral process. As such, EVR is viewed as a means of

ensuring free and fair elections in Nigeria. As part of the modernization process, INEC needed to inventory and spatially locate the agency's 120,000 polling locations scattered around the country. These locations and their attributes needed to be linked to EVR.

Since 1999, Nigerians have been voting in 120, 000 polling units with the voting population between 56 million and 62 million. About 56m Nigerians actually voted during the 2007 general elections which were rated as flawed by most foreign observers and Nigerians. The level of transparency and integrity in elections in Nigeria, peaked during the 1993 elections, but has since then been declining to such an extent that citizen fear that the 2011 elections could spell doom for democracy in the country. The controversies about zoning and consensus candidate are side issues. What Nigerians are more concerned about is the voting itself whether it will be free and fair and every votes will counts so that candidates of the choice will emerge victorious, to subsequently administer the country with a real mandate and genuine commitment to the promotion of public wellbeing.

One basic feature of democracy that cuts across all divides of people is the act of election which is actually to be commencing in every four years of the tenure. Democracy thus encourages individual freedom according to the rule of law, so that people may behave and express themselves as they choose. This not only gives people a chance to choose their leaders, but also to freely express their views on issues. In response to the 1948 Universal Declaration of Human Rights which puts import on the necessity of free elections, nations aim at new and improved voting procedures which are of relevance to elections in the 21st century (Salomonsen, 2005). With the passage of time, voting, which was mainly manual, has been influenced by Information Technology, with debates arising about the relevance or not, of computerized/online voting (Shamos, 2004; Cranor, 2011). Nevertheless, it is impossible to completely rule out the

need for technology and electronic voting, with the growing number of eligible voters and manual ballot papers involved (Hunter, 2001). Smith and Clark (2005) indicate that electronic voting is the next logical step in applying online information-gathering and retrieval technologies to e-government. The project for this paper evolved based on this theory. The project is to develop an Online Voting System (OVIS) based on current voting procedures in Nigeria.

In the past, people go to polling place and take the blank ballots during election period, then punch a hole or append seal. If the seal is not clear enough, or vote is damaged by soiling, it may bring some debate on the result. In order to resolve these situations, the technology of electronic voting (e-voting) comes into existence [Fujioka, A., Okamoto, T. and Ohta, K.(1992)]. By using information technology, E-voting system can cast and count votes with higher convenience, efficiency and security, even make electoral procedures simple and reduce mistake rate of ballot examination.

Recent years, a considerable number of countries has adopted E – voting for their official elections. In 1998, Brazil make use of E- voting. When voter reaches the polling place, he shows his identity card for authenticating. The Electoral officer issued ballot for E-voting if he is an eligible voter. Brazil's E-voting systems transmit votes to electrical center immediately so that count of votes can take place without wasting time while voting finished (Auerbach, et al (2005).

Japan adopted E-voting for local election in 2002, such as mayor and councilor election of Niimi city in Okayama prefecture in June 23, 2002; mayor election of Hiroshima city in February 02, 2003; and mayor election of Kyoto city in February 08, 2004. For example, let us considered mayor and counselor election of Niimi city electoral center surveyed voters' reliability when election finished. There are 83% of voters considered that E-voting system is trusted. 56% of them considered that results of E-voting and paper –based voting are same

therefore E-voting is sufficient for reliable [Mercuri .R., "A Better Ballot Box?" (2002) IEEE spectrum, 39, 10, 46-56]. The reasons why voters can't trust E-voting system are voters worried about abuses in E-voting system, and it cannot make sure their ballot are recorded correctly.

In Belgium, election for federal Parliament was held in May 18, 2003. In order to assist voters in being familiar with E-voting system, electoral center held short term training. Counting efficiency in election with E-voting systems was faster than convention [Schaupp C.C, and Carter L. (2005): "E-voting: from apathy to adoption"]. Belgium's compulsory voting system and E-voting complement each other, voters' satisfaction and attending willingness of join voting are improved obviously.

As a result of Florida 2000 presidential election, inadequacies of widely-used punch card voting systems have become well understood by general population. Despite opposition of computer scientists, this has led to increasingly widespread adoption of "direct recording electronic" (DRE) voting systems. DRE systems, generally speaking, completely eliminate paper ballots from the voting process. As with traditional elections, voters go to their home precinct and prove that are allowed to vote there, perhaps by presenting an ID card, although some states allow voters to cast votes without any identification at all. After this, voter is typically given a PIN, a smartcard, or some other token that allows them to approach a voting terminal, enter token, and then vote for their candidates of choice.

When voter's selection is complete, DRE systems will typically present a summary of voter's selections, giving them a final chance to make changes. Subsequent to this, ballot is "cast" and voter is free to leave. The most fundamental problem with such a voting system is that the entire election hinges on the correctness, robustness, and security of software within voting terminal. Should that code have security relevant flaws, they might be exploitable either by

unscrupulous voters or by malicious insiders. Such insiders include election officials, developers of the voting system, and developers of embedded operating system on which voting system runs. If any party introduces flaws into voting system software or takes advantage of pre-existing flaws, then results of election cannot be assured to accurately reflect votes legally cast by voters. Although there has been cryptographic research on electronic voting [D. Gritzalis, editor. *Secure Electronic Voting*. Springer-Verlag, Berlin Germany, 2003.].

Voting is one of the primary foundations of democracy (Electronic voting (2009), As it is generally known that there has been a very different types of voting system that has been existing that are been used in preceding elections that took place in Nigeria some years ago. The various types of voting system will be mentioned and explained vividly what has been derived from each voting system type.

2.2 VOTING TECHNOLOGIES

Voting is a method by which groups of people make decisions (Cranor., et al 2003). These decisions could be political, social or public. Voting can also be used to choose between difficult plans of actions or to decide who is best eligible to be awarded a prize. Voting can thus be defined as a process that allows a group of individuals to choose between a number of options (Amankona, E. and E. Paatey, 2009. Online Voting Systems).

2.2.1 TRADITIONAL PAPER BALLOT

This form of voting was first used in Australia in 1858. The Most basic form is using blank piece of paper upon which a voter writes his choice of candidates. The voter then seals his vote inside an envelope, places his ballot into a box, which when elections end, is opened and votes are counted. An election conducted using Australian secret ballot is only trustworthy, if every ballot is strictly accounted for and no blank ballots escape control of election officials.

Because we expect each official to have partisan interests, ballots must never be handled by one official without close supervision from someone representing an opposing political party. The greatest weakness in this scheme lies in the way that votes are counted (Alvarez et-al2010).

2.2.2 LEVER VOTING MACHINES

Mechanical voting machines were first introduced in 1892 in New York. This technology was soon after adopted by most urban centers across the US, as they were believed not to be subject to bias in counting, and secondly because they seemed to offer instant election results. With lever machines, votes are counted instantly when the voter exits the polling booth. Lever voting machines essentially suffer from two categories of weaknesses, firstly they maintain no backup record of votes cast; and secondly the machines themselves appear to be too complex. These machines can contain hundreds of moving parts/wheels, that require testing prior to elections, something rarely done.

2.2.3 PUNCH CARD VOTING

This system was first used in Georgia, United States in 1962, using IBM's Porta punch mechanism. The ballot is a form of traditional Australian ballot, designed to be tallied using standard punch card data processing equipment and with a mechanical aid. These systems (Votomatic system is most widely used), have several drawbacks, most critical being the way votes are punched. The system punches holes on a ballot to show voter intention. Unfortunately system does not always guarantee a clean cut (punch) and there is no Literature Review intuitive basis on how to judge voter intention when in doubt

2.2.4 OPTICAL MARK-SENSE VOTING

A voting system where voters mark paper ballots by hand or using a ballot marking device, then ballots are stored in a locked ballot box and run through a scanning device to count them (Voter Action, 2008). This technology was developed in 1950's to automate entrance examinations at the ACT College, soon after Westinghouse Learning Systems began exploring its application to elections. First generation optical scanners used infra-red light to scan voter intentions on ballot and were unable to reliably count marks made with anything but carbon black inks or graphite. Next generation systems use invisible light and generously accept single lines, check marks. The major problem with this technology is its accuracy. All optical sense ballot tabulators are computer based, which brings about issues of software security and trustworthiness.

2.2.5 PAPER BASED VOTING SYSTEM

The paper based voting system has been so rampant in ages ago in sense that officials been chosen to handle each polling booth for election provides voter to gets a blank ballot and use a pen or a marker to indicate he wants to vote for which candidate. Paper based voting system is a Hand-counted ballots that is a time and labor consuming process, but it is easy to manufacture paper ballots and the ballots can be retained for verifying, this type is still most common way to vote till date. Appropriate training will have to be provided for staff members in charge of polling duty. During days of polling, concerned staff members are required to be present half hour prior to opening of polling booth/station to check that all arrangements have been done correctly. After voting, counting of ballots will be looked after by another group of officers. With all these steps, groups and procedures that are involved, process can prove to be tedious, error prone and costly. Some introduction of technology currently in the Jamaican

system, however, makes the process semi manual, but this is far from what could be really accomplished by a fully ICT driven process. The semi manual process only allows the government to store voters' information on a database, which can be retrieved on a computer on election date to facilitate faster searches.

2.2.6 DIRECT RECORDING ELECTRONIC VOTING

These systems were originally introduced in 1986 and emulated traditional lever voting machines, whilst replacing levers and mechanical parts with buttons and microelectronics. Direct-recording electronic (DRE) voting machines, record votes by means of displaying a ballot provided with mechanical or electro optical components, which can be activated by voter (typically buttons or a touch-screen); that processes data by means of a computer program; and records voting data and ballot images in memory components (Voter Action, 2008).

The first design essentially mimics interface of a lever machine. In a sense that, the entire displayed ballot is visible at once on screen. Where the voter makes a choice by touching name of the candidate on the DRE screen and casts the ballot by pressing a separate button. These systems are physically hardened machines, preventing access to typical PC connectors, e.g., USB ports (Weldemariam, 2010). This type, which is abbreviated to DRE, integrates with keyboard; touch screen, or buttons for voter press to poll. Some of them lay in voting records and counting votes is very quickly. But other DRE without keep voting records are doubted about its accuracy. A direct-recording electronic (DRE) voting machine records votes by means of a ballot display provided with mechanical or electro-optical components that can be activated by voter – typically buttons or a touch screen; that processes data with computer software; and that records voting data and ballot images in memory components. After election, it produces a tabulation of

voting data stored in a removable memory component and as printed copy. Also data processing is achieved by use of computer programs. DREs are particularly interesting because they solve a number of complex operational problems (Adida, 2006):

- Ballots can easily be offered in different languages,
- Voters with vision impairment can magnify screen or use a headset that provides auditory feedback.

In general, two types of e-voting can be identified (Buchsbaum, 2004):

E-voting supervised; by physical presence of representatives of governmental or independent electoral authorities, like electronic voting machines (DRE) at polling stations or municipal offices, or at diplomatic or consular missions abroad.

Remote e-voting; within the voter's sole influence, not physically supervised by representatives of governmental authorities, like voting from one's own or another person's computer via the internet (I-voting), by touch-tone telephones.

Electronic voting systems have been used to support legally binding federal elections, but also small scale unofficial elections such as student elections. Electronic voting is believed to have capacity to engage citizens in a wider spectrum, than what is currently available in a conventional electoral process, as it provides citizens with a means to express their timely opinion on civil affairs such as legislation, representatives and such. E-voting is believed to provide a macro economical cost efficient method for increasing election accuracy and efficiency (Hof, 2004), additionally, electronic voting has capacity to escalate usability and accessibility of voting process (EU Recommendation Rec (2004)11). These Information Systems, attempt to increase election turnout while benefiting transparency and openness in democracy.

Electronic voting is envisioned as having a number of advantages; these include:

- Facilitating participation in elections and referendums for all those who are entitled to vote, and particularly of citizens residing or staying abroad.
- widening access to voting process for voters with disabilities, or those having other difficulties in being physically present at a polling station and using the devices available there.
- increasing voter turnout by providing additional voting channels;
- reducing over time, overall cost to electoral authorities conducting an election
- Delivering voting results reliably and more quickly.
- Providing electorate with a better service.

2.2.7 OPTICAL VOTING MACHINE

After each voter fills a circle correspond to their favorite candidate on blank ballot, this machine selects darkest mark on each ballot for vote then computes total result. This kind of machine counts up ballots rapidly. However, if voter fills over circle, it will lead to the error result of optical-scan. An advantage of these systems is that voters don't have to learn to use a voting machine. Physically able voters can simply use pen and paper to mark their intent. Some disabled voters could use a machine to print a voted ballot, which can then be fed into optical scanner along with all other ballots, thus preserving secrecy of their ballot. Optical scan voting systems can allow for manual recounting of ballots (David Chaum, 2011).

2.2.8 SMART CARD VOTING

With use of the smart cards and kiosk there was a significant leap in voting technology, as persons were able to vote within their own comfort zone or that was the intension. The need for various human security bodies was eliminated. However, everyone who is eligible to vote would have to have a pre-program smart card. The voting Kiosk is where all action is located. To

start, voter must place voter token into slot. The voting kiosk will seize this token until voter has successfully voted. After token has been seized, kiosk will verify that this token is valid authentic, this is done by looking at the RV signed token, timestamp and the polling site id. This system however, has flaws on security aspect and voters could vote multiple times. In addition, persons may have to stand in long queue to cast their votes.

Recent years, a considerable number of countries has adopted E-voting for their official elections. These countries include; America, Belgium, Japan and Brazil.

2.3 CHARACTERISTICS OF A VOTING SYSTEM

Voting systems must be transparent and comprehensible (understandable) enough that voters and candidates can readily accept results due to what has been presented to them, (Kohno *et al.*, 2004). This means that veracity of a voting system is necessary for acceptance of results of that election. Shamos (2004) gives a comprehensive assessment of paper versus electronic voting systems. For a voting system to be considered transparent and comprehensible some important criteria must be met, otherwise it may lead to indecisive or inaccurate election results mostly some different kinds of indecent acts come up like rigging of election, making a chance for system to be hacked down by unauthorized users. First of all, the anonymity of a voter's ballot must be preserved, in order to ensure that voter is safe when voting against a candidate, and also to guarantee that voters have no evidence that proves which particular candidates received their votes. It is believed that existence of such evidence could allow votes to be bought (Kohno *et al.*, 2004). Secondly, voting system must be tamper-proof in order to prevent a wide range of attacks, including ballot stuffing by voters and incorrect tallying by insiders (poll officials). Thirdly, it should be user-friendly. This means that it should be easily comprehensible and usable by entire

voting population such that there will be a very good interaction with officers and voters in order to make a very easy use of voting system.

2.4 ADVANTAGES OF THE ELECTRONIC VOTING SYSTEM OVER THE BALLOT VOTING SYSTEM

1. Reduces or eliminates cases of rigging
2. More than one person can vote simultaneously
3. Faster time in delivery of result
4. Error during computing is not possible, computers have more computing and calculating power than an ordinary human being
5. Many types of useful reports can be generated for stakeholders to make decisions
6. Saving papers and trees
7. A more updated database of voters

2.5 WHY IS E-VOTING SO DIFFICULT?

Essentially, because electronic voting requires a public audit of a process that must remain secret. In elections, there is a conflict between core requirements of verifiability and secrecy. When I attempt to translate these requirements into design principles for electronic voting systems, conflict is apparent in contradicting principles. I require a voter to obtain enough information to be able to personally verify that his/her vote was recorded correctly, but not enough information that could lead to voter manipulation (coercion, vote buying, vote selling etc.). Often electronic voting is falsely compared with other successful safety critical IS such as e-commerce and e-banking applications. In its essence, trust in an e-commerce environment is

based on the belief that in event that system should fail, there are policies and guarantees in place, to protect customer. Evidently a customer puts his trust in Bank and not banks IS, having knowledge that in worst case scenario I will be able to verify the mishappening in an alternative method (visiting the local bank) and policies are at hand to protect him.

2.6 THE SECURITY ISSUES OF ONLINE VOTING

Foreign experience revealed security issues while online voting system is running. The origin of security voters and attackers but also insider (such as system developers and administrators), even just because inheritance of some objects in source code are unsuitable. These errors caused the voting system to crash.

The proposed solutions were correspondingly outlined to hold back these attacks. For example, to avoid hacker making incursion into voting system via network, we can design our system to transmit data without network. Another example is to limit voter to input particular data, so that we can prevent command injection from running

In recent years, it has become clear that e-voting system can only be introduced if voters have trust and confidence in their current electoral system. If such trust exists, voters are then very likely to have confidence in new e-enabled elections. Surveillance is required to enhance trust, as a disconnection occurs between voting process and voter. Digitalizing communications between governments and “people” is a process necessary to be viewed within a wider framework. It is crucial to view issues involving electronic democracy in clear perspective and bear light on their true nature. Electronic voting is a social and political project, much more than a simple technical project. It is seen as bringing a social improvement in it by widening circle of citizens involved in politics and political decision-making (Republique ET Canton De Geneve,

2009). As such, concerns are often voiced on security issues, but also sociological and political implications, that may be raised from introduction of this technology.

Taking into account impact of Internet on political life, it is crucial that ICT (including Internet) allow overcoming barriers connected with actual remoteness of voters to those who govern or represent the governing. Undoubtedly, application of electronic techniques into democracy is a revolution. However, it is worth having in mind that despite speedy development of ICT, technical problems and e.g. mental limitations may stretch process of intensification of ICT application to a dozen or so years (especially in less developed countries). What is more, the rapid development of the Internet influences contemporary civilization, hence changing character of interpersonal relationships, way of communication, going in for politics and contributes to creation of a new quality of social life. The Internet has become a tool for politics. The role of ICT gained such an importance that some theoreticians of democracy see the necessity of changing the paradigm of understanding the democratic system (Hague, Loader, 1999) and introducing a notion of electronic democracy.

According to Martin Hagen, "an Electronic Democracy is any democratic political system in which computers and computer networks are used to carry out crucial functions of the democratic process such as information and communication. Hagen distinguishes between three various concepts of electronic democracy: tele-democracy, cyber-democracy and electronic-democracy.

Tele-democracy is the oldest concept of electronic democracy developed in the 1970s. It was designed to introduce additional forms of direct democracy within the American political system and implement them through using new communication technologies. The main goal of tele-democracy is to establish more direct democratic forms within political system by using the

new communication technologies. Whereas the concept of tele-democracy emerged as a result of the cable television development.

Cyber-democracy based on the evolution of computer networks. Unlike tele-democracy and cyber-democracy, electronic democratization does not aim at establishing direct forms of democracy but at improving the representative democracy (Hagen, 1997).

Electronic democratization is defined as a form of development and reinforcement of democracy, which uses new communication technologies to strengthen political power of those who are often omitted in the most important political processes (Hacker, Toino, 1996).

Electronic democracy is understood as a set of processes that are realized through electronic media from the beginning of a civil concept and the formulation of suggestions until their final implementation. This set comprises researching activities, planning, implementation and management (making decisions, taking control, information, communication and more.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 METHODOLOGY

In this chapter, source of data collection, evaluation of existing system and organizational structure of system problem are presented. It includes specific methods which were used in order to achieve set objectives of the project, particular requirements for implementation of the project and a brief explanation of why such methods were used for implementing proposed system, also included is a brief description of current system of voting.

The software development lifecycle stages stated below were followed for the development and implementation of the project:

1. Conception
2. Requirements gathering/exploration/modeling
3. Design
4. Coding and debugging
5. Testing. Release (John Dooley (2011); "*Software Development and Professional practice*"; Pg 26).

At all the stages of the development, best tools and methods were adopted to achieve the best result. The developed E-voting portal would allow voters (i.e. students, citizens) to register by supplying each of their personal information (bio data) to the system in order for each voter to have their login details each and to vote from a particular VC (Voting Centre) and result displayed immediately after the election process is complete which has been fetched out of the database been prepared for such system.

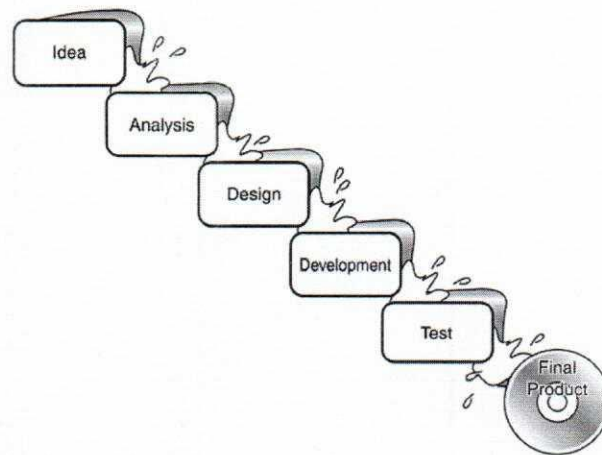
The features of the e-voting portal are:

- Improved security and validation of voter.
- Simultaneous voting of more than one person per time.

3.2 PROCESS MODEL

Process model for software engineering is chosen based on the nature of the project and application, the methods and tools to be used, and the controls and deliverables that are required.

The model is used to build the “ONLINE VOTING SYSTEM” software is “The Prototyping Model”. The prototyping paradigm is: - “Water fall model”



Water fall Model

The water fall model is a software development model in which a systems development is viewed as flowing downwards through phases of system development process. The waterfall

methodology is powerful, précised, and thorough. It has a number of phases that have to be implemented in a sequential manner.

The phases which come under the waterfall model are as follows:-

1. Requirement Analysis
2. Design
3. Implementation
4. Testing
5. Maintenance

3.2.1 ADVANTAGES OF WATERFALL MODEL:

1. Good for large projects
2. Waterfall suits a principled approach to design
3. Waterfall divides the project into manageable areas
4. Waterfall separates the logical and physical

3.2.2 REQUIREMENT ANALYSIS

The basic function of requirement analysis is that it translates the ideas in the mind of the clients into a formal document. Thus the output of this phase is a set of precisely specified requirements which are complete and consistent. This document is called Software Requirement Specification.

In order to provide the user with a feeling of community, the following requirement should be taken care:

- Each user will have to create their own profile that they can log into each time they visit

the site.

- If the user does not create or log in to an account they will only be able to browse questions on the site, they will not be able to use any of the sites other functionalities.
- In order to create an account the user must have a college email address (verified by server).
- Once they create an account the user will be able to Log in and out of the system, Upload a picture, and choose their status (i.e. Student, TA, Professor).
- Upload information about themselves (name, AIM, college email, hobbies, etc.)
- Select a college and area of study.
- View and send private messages to other users through a custom messaging client.

Questions and Answer functionality: Users will be able to post new questions, able to answer questions and post sources for their answers, search for questions containing key words, thumbs up and thumbs down questions and responses Users can bookmark questions, send questions to friends.

3.3 SYSTEM STUDY

This section explores the current voting system and problems associated with it.

3.3.1 DESCRIPTION OF EXISTING VOTER REGISTRATION SYSTEM

The existing system of voting in Nigeria is highly manual. The INEC has a laid out data capture form that is used to register residents in their areas and most people who are ready to vote for the capturing their bio data. A Period for registration is set to start and end on a particular day, such a period is announced to the public using the various mass communication medium including newspapers, radio, television and many social media sites. During such a

period potential voters are expected to report to these officers in order to be registered using paper and pen. Every potential voter fills out a form with details such as location, date of birth among others; such an individual must be verified to be residents of that particular area.

The INEC officers collect filled in Data capture forms from officials at the end of the registration period to be taken to the central INEC offices where data entry clerks are then employed to do entry into the central database from which a voter register is produced. At the end of this process, registration cards are produced to be issued to voters so as to ascertain each voter to be able to vote using the cards been given to them.

3.3.2 PROBLEMS WITH THE EXISTING VOTER REGISTRATION SYSTEM

The problems of existing manual system of voting among others include the following:

- 1. Expensive and Time consuming:** The process of collecting data and entering this data into database takes too much time and is expensive to conduct.
- 2. Too much paper work:** The process involves too much paper work and paper storage which is difficult as papers become bulky with the population size.
- 3. Errors during data entry:** Errors are part of all human beings; it is very unlikely for humans to be 100 percent efficient in data entry.
- 4. Loss of registration forms:** Some times, registration forms get lost after being filled in with voters' details, in most cases these are difficult to follow-up and therefore many remain unregistered even though they are voting age nationals and interested in exercising their right to vote.

5. **Short time provided to view the voter register:** This is a very big problem since not all people have free time during the given short period of time to check and update the voter register.
6. Above all, a number of voters end up being locked out from voting.

Hence there is great desire to reduce official procedure in the current voter registration process if general electoral process is to be improving.

3.4 SYSTEM IMPLEMENTATION TECHNOLOGIES

The web-based online voting system to offer users convenient access to voter who are willing to partake in the election to be able to register. Several tools used during implementation include the following:

- Software
- Hardware

3.4.1 ONLINE VOTING SYSTEM REQUIREMENT SOFTWARE

- i. **MYSQL DBMS** (database management system): it allows combination, extraction, manipulation and organization of data in voters' database. It is platform independent and therefore can be implemented and used across several such as Windows, Linux server, Ubuntu and is compatible with various hardware mainframes. It is fast in performance, stable and provides business value at a low cost.
- ii. **HTML** (Hypertext Markup Language): this is currently core of web world, it is a language used to makeup web page both static and dynamic webpage. It is glue that holds everything together. Although HTML was used for implementation of the online voting system (OVS), it is highly compatible with extensible HTML (XHTML) which is designed to be a replacement of HTML made to handle data and is also portable between

different browsers and platforms with little or no alterations in code. Macromedia Dreamweaver is a prefer tool for designing HTML pages and that is the tool used in coming up with this online voting system (OVS) system.

- iii. **PHP coding:** The voting system was implemented using php
- iv. **Testing** is done via WAMP SERVER.
- v. **Web browsers:** Mozilla Firefox, Google chrome, Opera and Internet Explorer
- vi. **Reporting Tool** i.e. through Data Report.

3.4.2 ONLINE VOTING HARDWARE REQUIREMENT

Desktop or laptop with at least 2.0 GHz Processor speed, At least 40 GB Hard Disk Capacity and 512 RAM and Printer.

The table below shows the materials (Hardware) used and their quantities:

S/N	Material	Quantity	Remark
0			
1	Computers (PC)	1	Complete set
2	Fingerprint Scanners	1	Secugen
3	Internet Modems	1	Swift

Table 3.1

The internet connection is to allow computer systems to access web server which houses database for collation of results.

3.5 ONLINE VOTING SYSTEM ARCHITECTURE

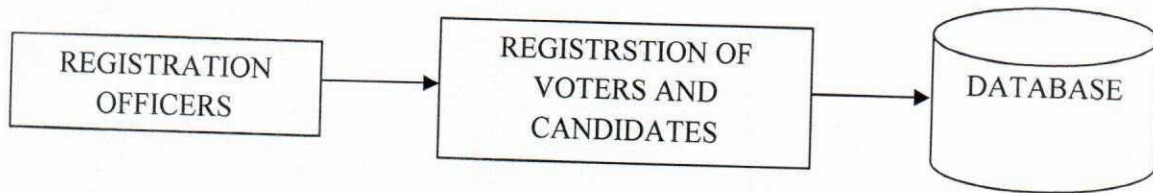


Figure 3.1a: Registration phase of the electronic voting system

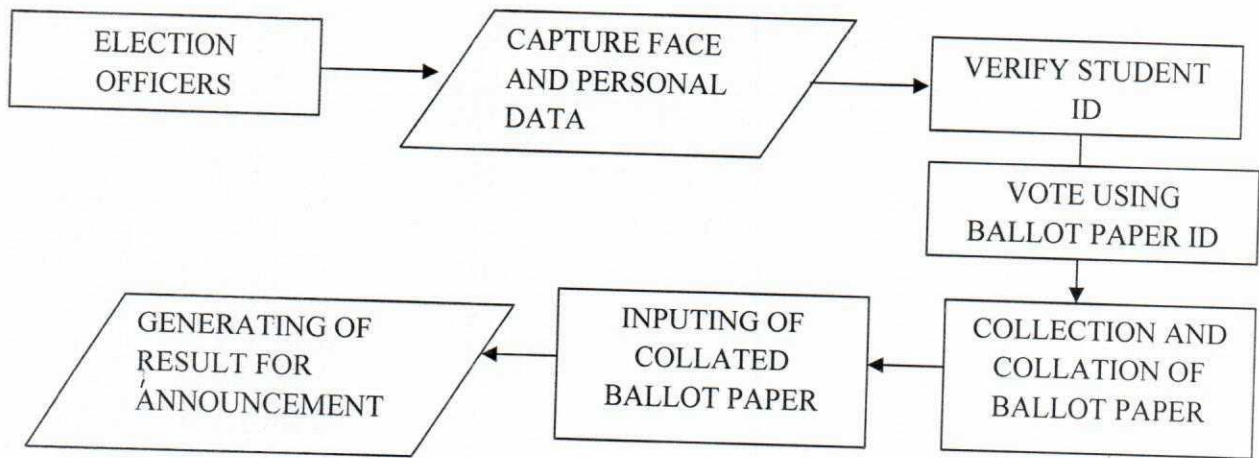


Figure 3.1b: Electoral process of voting system.

REGISTRATION OFFICERS: the operation that takes place in this phase is that the officers register voters and candidates that are ready to make vote and to be voted for and been stored in the database.

ELECTION OFFICERS: the election officers capture voters and candidate biodata and verify them before having ballot paper and must be in hidden place where the voting must take place, EO collects the ballot paper that the voters has already voted on and input it into the database for safety in case of any rigging or mismanagement votes. Then the result is been generated and announced who wins the election

3.5.3 DATAFLOW DIAGRAM OF ONLINE VOTING SYSTEM

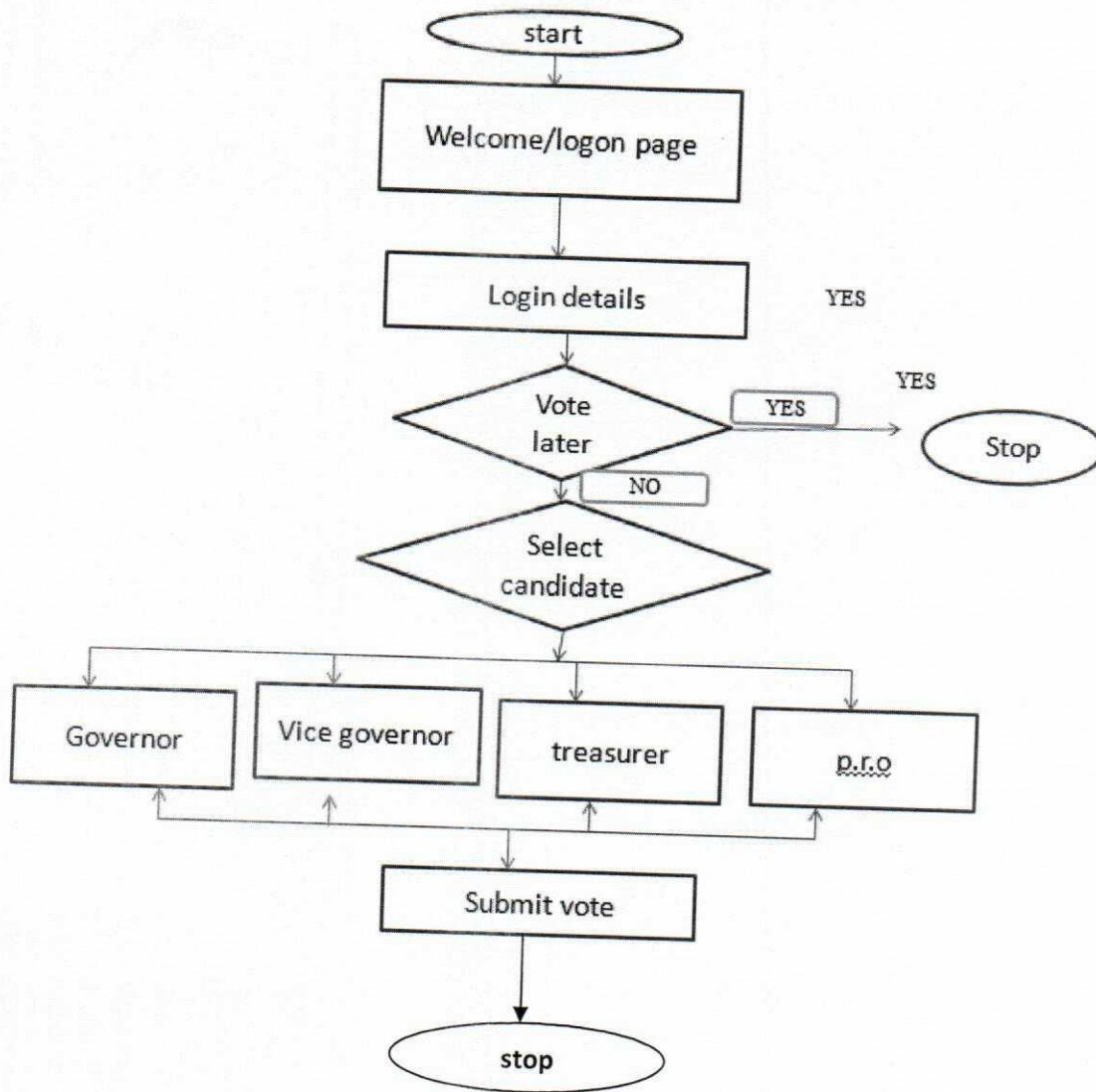


Figure 3.2: Dataflow Diagram Of Online Voting System

3.5.4 USE CASE DIAGRAM OF ONLINE VOTING SYSTEM

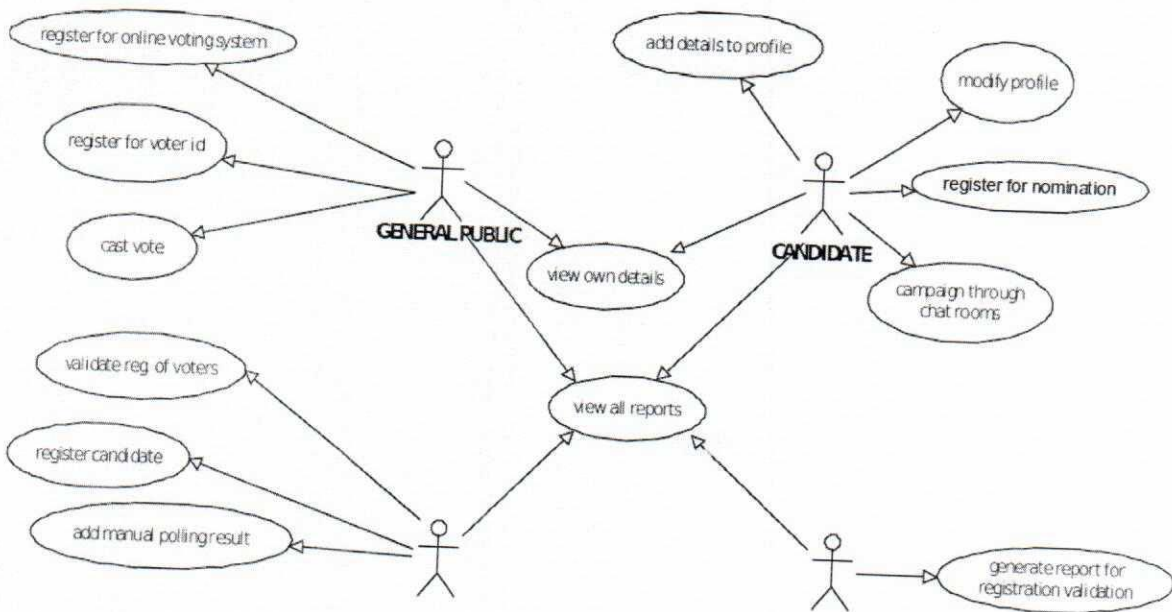


Figure 3.3: Use Case Diagram of Online Voting System

Note that for one to experience the system administrator's privilege, he/she must login as the system admin with the admin's password and username which is kept secret/confidential at all costs.

3.6 ELECTORAL PROCESS

The electoral officer primarily checks the voter in and confirms the validity of the voter coming in to exercise their constitutional duty.

The electoral officer once he/she logs in to the portal should be able to do the following:

- Search voter: once the voter presents matric number to the EO. The EO searches the portal for the voter details
- Acknowledge voter: once the details is checked and it corresponds to the voter, the EO acknowledges the voter, collect the fingerprints and writes the token generated then hands it over to the voter.
- Reject voter: if after checking the details of a particular voter, the EO can choose to reject a particular voter.

3.6.1 ADMINISTRATOR

The Administrator is the one in charge of the main server that collates the total result of each VC.

3.6.2 VOTER

Once the voter has been acknowledged and the token generated, the following action should takes place;

- The voter proceeds to the pc assigned.
- The voter clicks on "I want to vote" button.
- Then the voter has the opportunity to enter the token given.
- Once the token has been entered the voter, the voter is welcomed by the voting pc with his/her details.
- The voter clicks on next to continue.
- Then the voter gets the voting interface, where he/she has the opportunity to vote for the contestant.

The following action should take place if the normal flow doesn't go as planned:

Case 1: Once the voter tries to re-enter the token after completion of the vote, it should be disallowed

Case 2: The session of a voter expires once the submit button is clicked, so the back button won't work once the submit button has been hit for a particular voter.

Case 3: If a wrong token is entered by the voter, it should alert the voter that the wrong token has been entered and that the token should be checked and re-entered.

Case 4: If a voter mistakenly closes the window of the voting page and has not yet submitted, The token still remains valid and should only become invalid once submit button is clicked.

N.B: Voter pc should not be able to search and acknowledge voter.

3.7 DATA BASE TABLES

This project uses many tables:

❖ Admin

❖ Voter

❖ Candidate

3.7.1 Admin Table

Field Name	Data Type	Description
Username	Varchar	Login id for Admin.(Primary key)
Password	Varchar	Password for Login

Table 3.2: admin table

3.7.2 Voters Table

Field Name	Data Type	Description
VoterId	Integer	Login id for Voter(Primary key)
Name	Varchar	Name of the voter
Sex	Varchar	Sex of voter
Age	Integer	Age of voter
City	Varchar	City of voter
Security	Varchar	Security Question
Status	Boolean	Status of voter(he/she can vote or not)

Table 3.3: voters table

3.7.3 Candidate table

Field Name	Data Type	Description
Symbol	Varchar	Party Symbol (Primary key)

Name	Varchar	Name of the voter
Sex	Varchar	Sex of voter
Age	Integer	Age of voter
City	Varchar	City of voter
Count	Integer	Count the no of votes

Table 3.4: candidate table

CHAPTER FOUR

IMPLEMENTATION, RESULT AND DISCUSSION

4.1 DESIGN OF THE SYSTEM

The proposed system is designed in modules with each module working together to perform the goal of online voting system in order to enhance the performance of the existing system as earlier discussed in chapter three.

The ability to analyze and give focus to the system is explained in the following formats which are output design, input design, database design and procedure design.

4.1.1 OUTPUT DESIGN AND INPUT DESIGN

The output to be extracted from the proposed system are as shown below

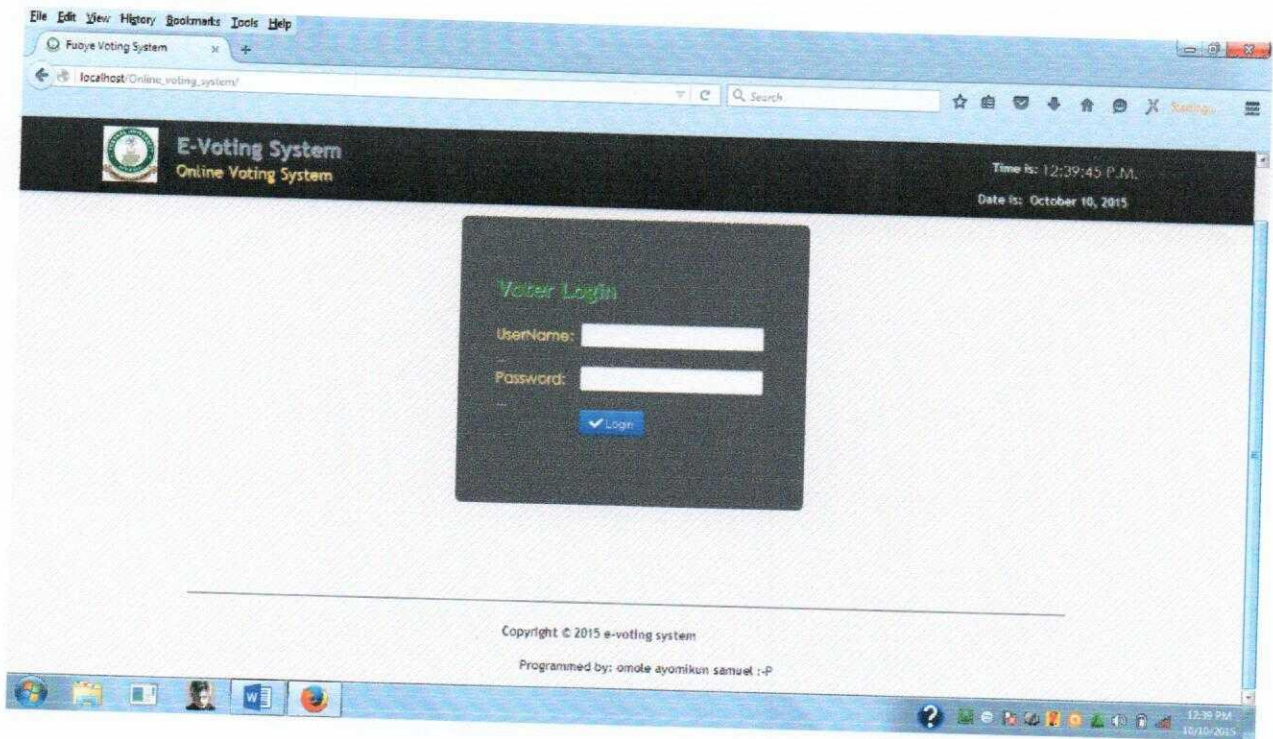


Figure 4.1: Electoral officer's login screen/homepage

The screen above shows the page for the electoral officer to log-in. Each electoral officer was given a unique username and password to enable them access the accreditation page. The page allows them accredit and enroll a voter.

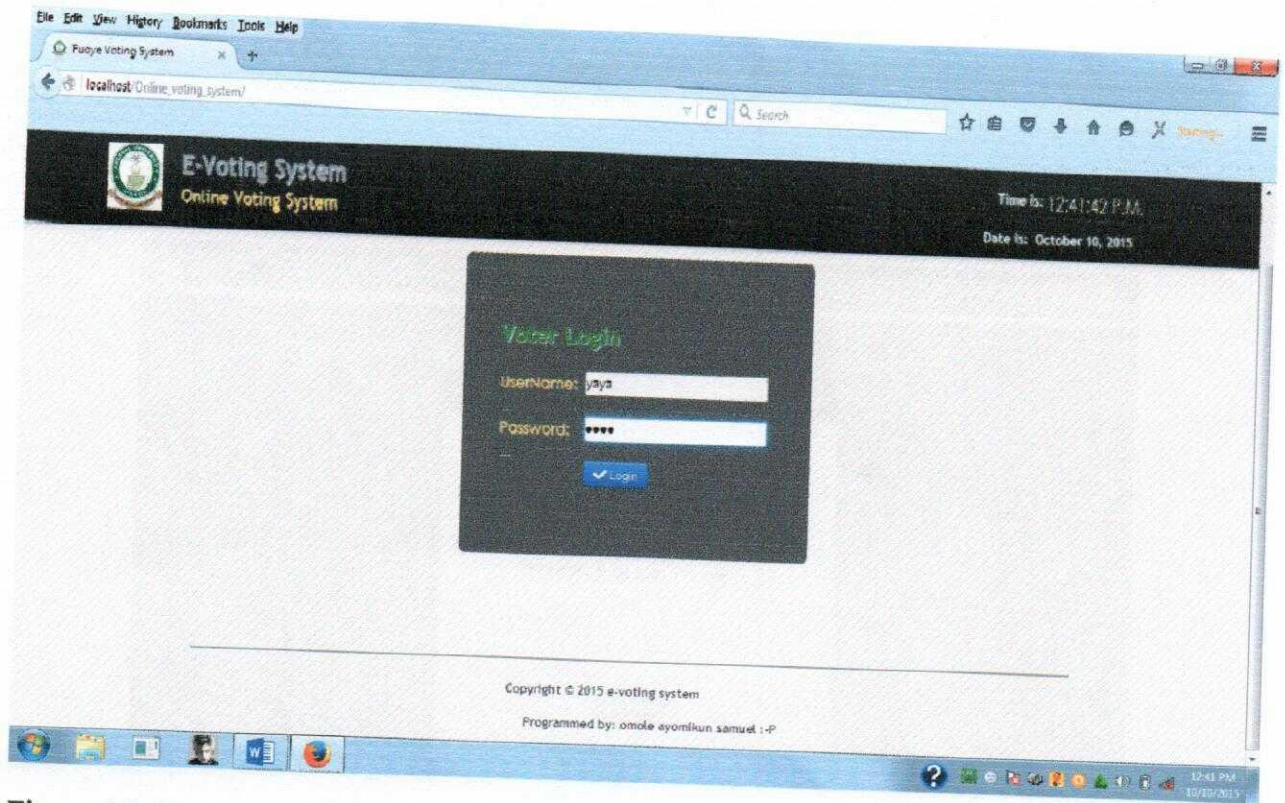


Figure 4.2: Voter's search page

The picture above shows the page for enrolment of a qualified voter i.e. who hasn't voted before or voting for the first time. The only information required by the Electoral Officer from voters is their login details to give their password and usernames.

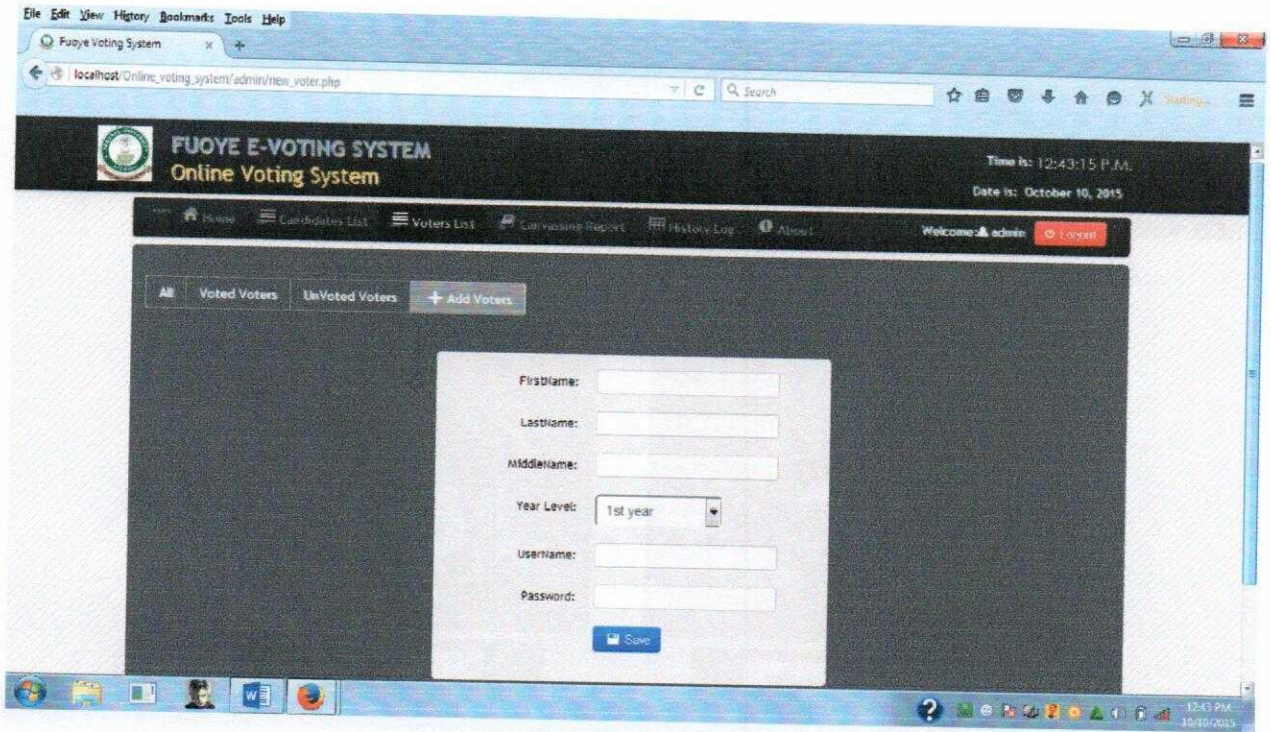


Figure 4.3: Registration page

This is a platform where voters are been enrolled to the system supplying voters bio data i.e. first name, last name, middle name, username and passwords,

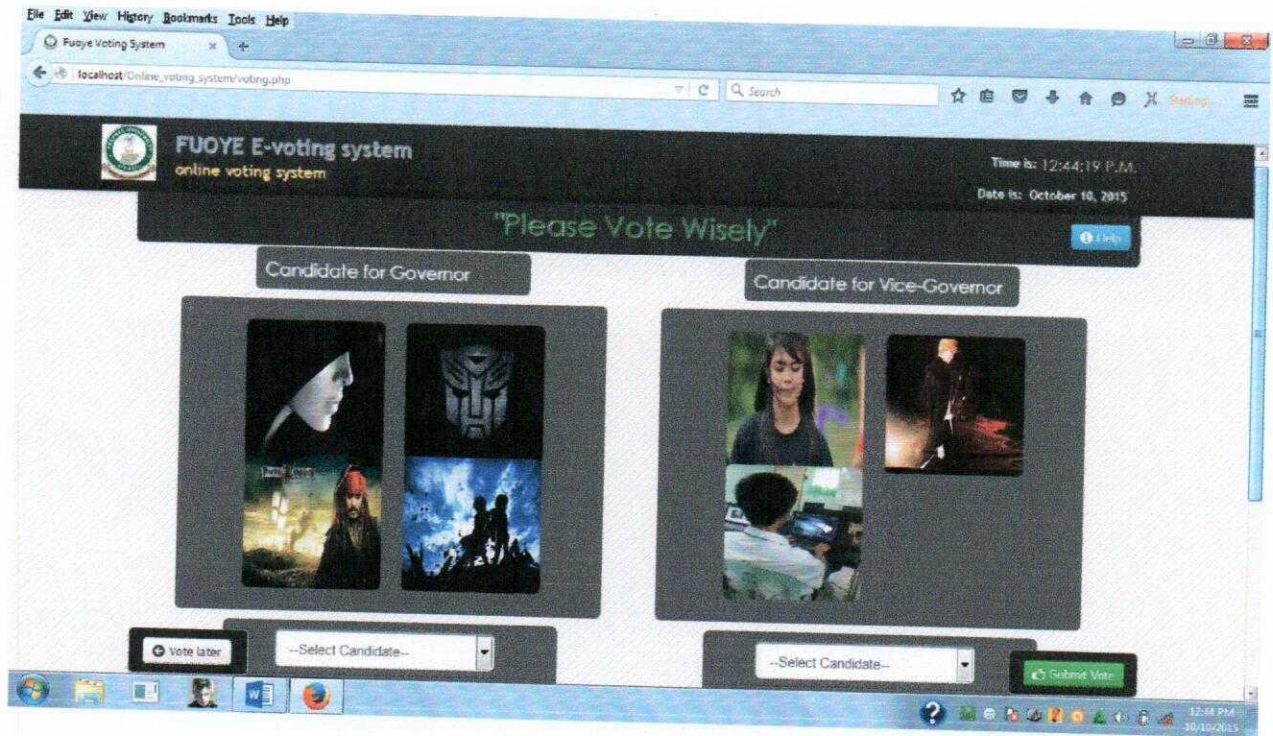


Figure 4.4: Voters page

This is an interface where voters make his/her decision to vote for his/her desire.

4.1.2 DATABASE DESIGN

This refers to the tables used in the proposed system. The database design for the proposed system is as shown below.

ADMIN TABLE

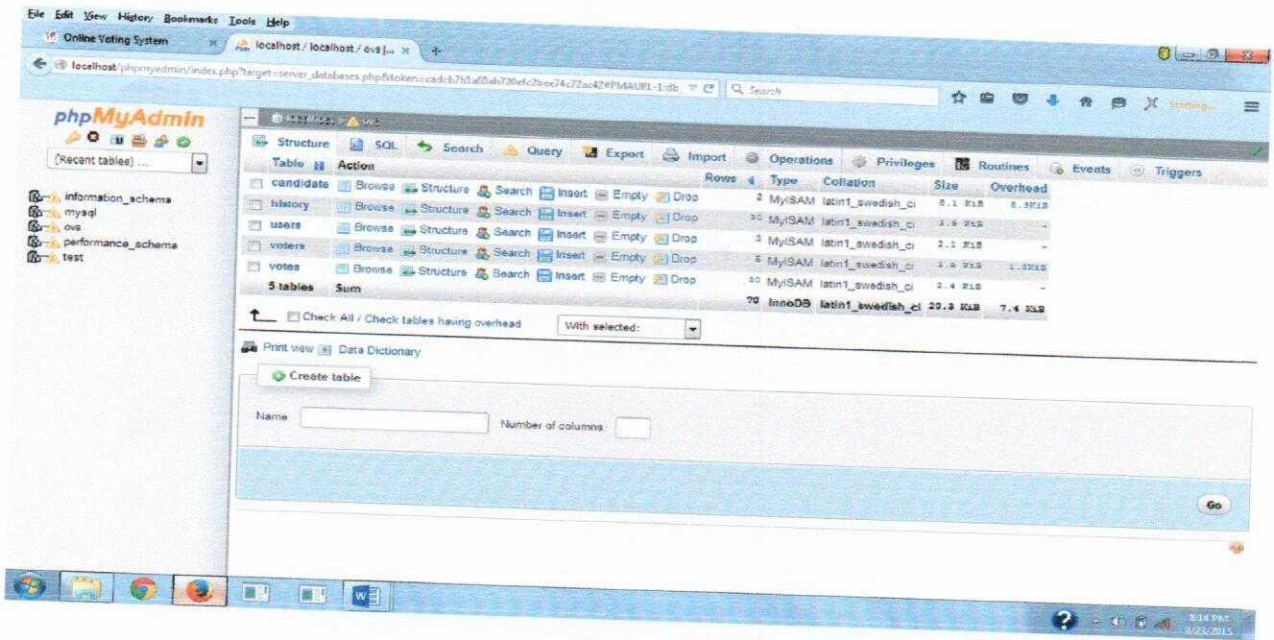


Figure 4.6: Admin Table

CANDIDATE TABLE

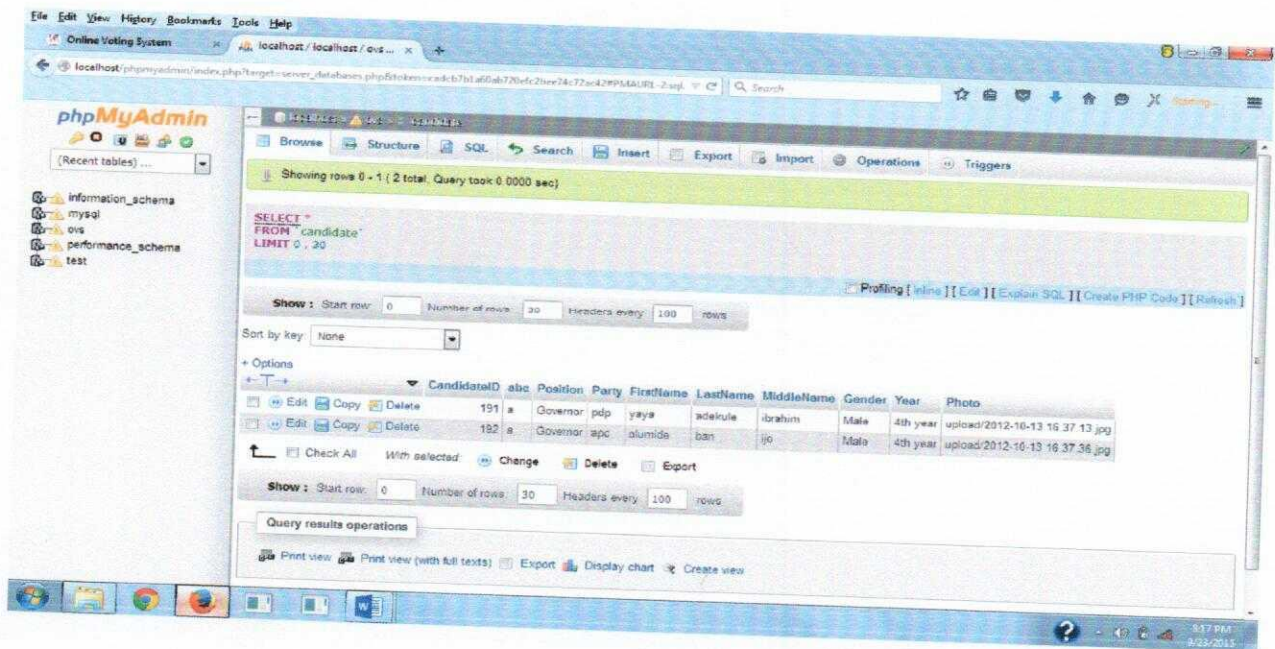
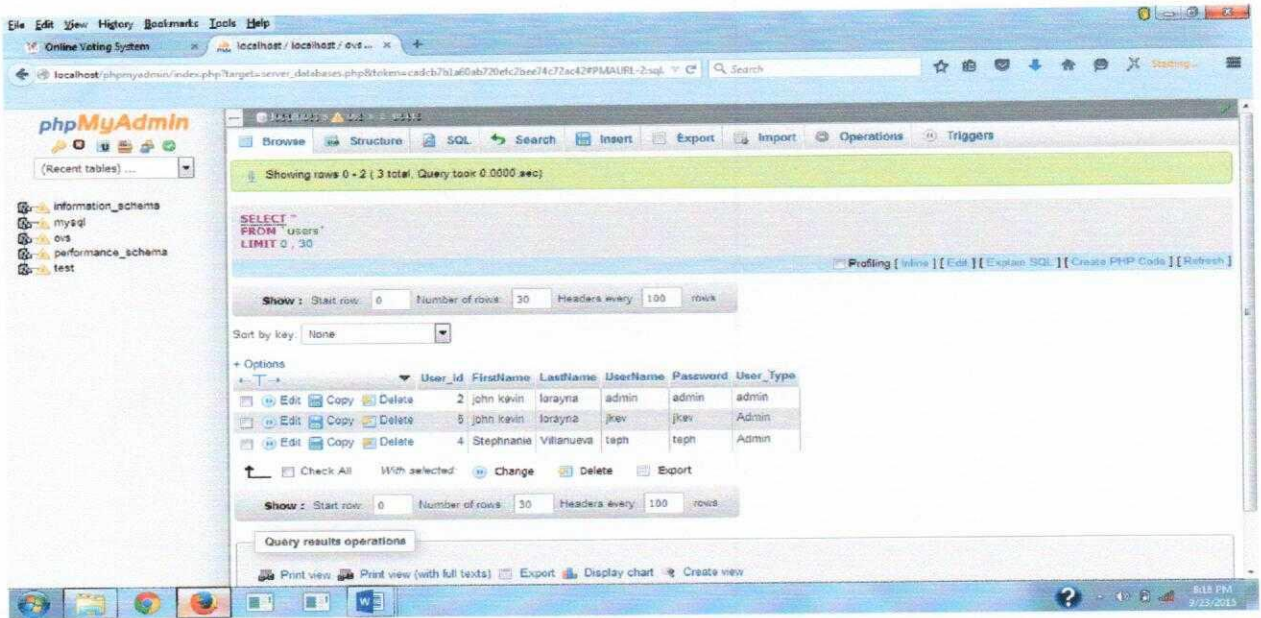


Figure 4.7: Candidate Table

USERS TABLE



Showing rows 0 - 2 (3 total. Query took 0.0000 sec)

```
SELECT * FROM `users` LIMIT 0, 30
```

Show : Start row: 0 Number of rows: 30 Headers every: 100 rows

Sort by key: None

+ Options

	User_id	FirstName	LastName	Username	Password	User_Type
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	2	john kevin	lorayna	admin	admin	admin
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	5	john kevin	lorayna	jkev	jkev	Admin
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	4	Stephanie	Villanueva	taph	taph	Admin

Check All With selected: Change Delete Export

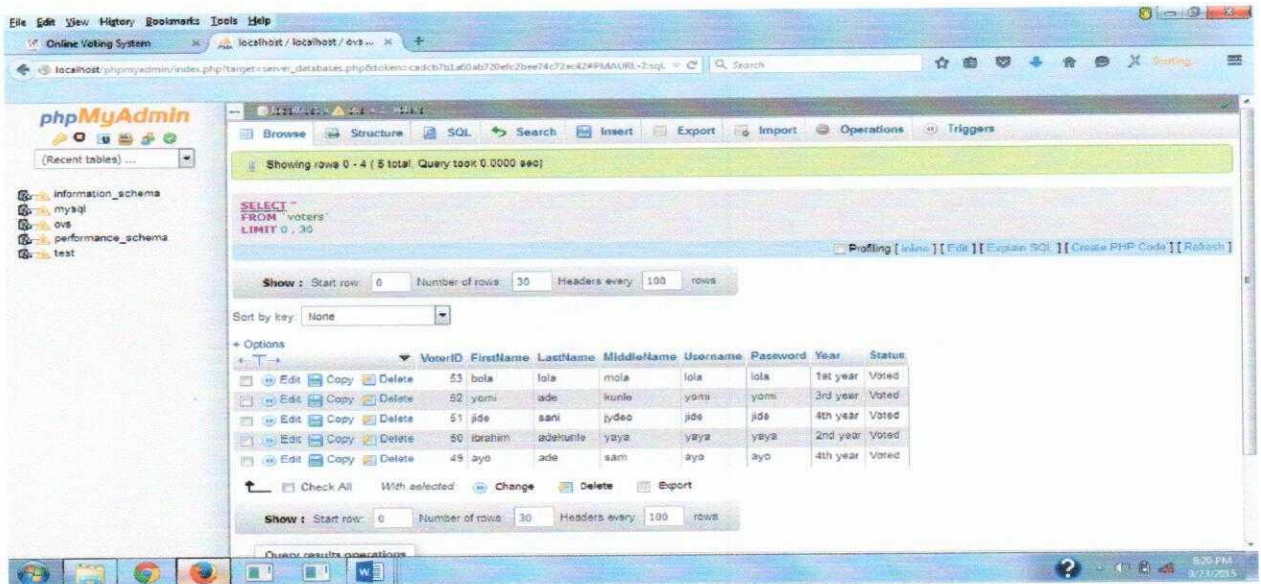
Show : Start row: 0 Number of rows: 30 Headers every: 100 rows

Query results operations

Print view Print view (with full texts) Export Display chart Create view

Figure 4.8: Users Table

VOTERS



Showing rows 0 - 4 (5 total. Query took 0.0000 sec)

```
SELECT * FROM `voters` LIMIT 0, 30
```

Show : Start row: 0 Number of rows: 30 Headers every: 100 rows

Sort by key: None

+ Options

	VoterID	FirstName	LastName	MiddleName	Username	Password	Year	Status
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	53	bola	lola	mola	lola	lola	1st year	Voted
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	52	yomi	ade	kunle	yomi	yomi	3rd year	Voted
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	51	jde	sani	iyede	jde	jde	4th year	Voted
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	50	ibrahim	adelunle	yaya	yaya	yaya	2nd year	Voted
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	49	ayo	ade	sam	ayo	ayo	4th year	Voted

Check All With selected: Change Delete Export

Show : Start row: 0 Number of rows: 30 Headers every: 100 rows

Query results operations

Print view Print view (with full texts) Export Display chart Create view

Figure 4.9: Voters

VOTES TABLE

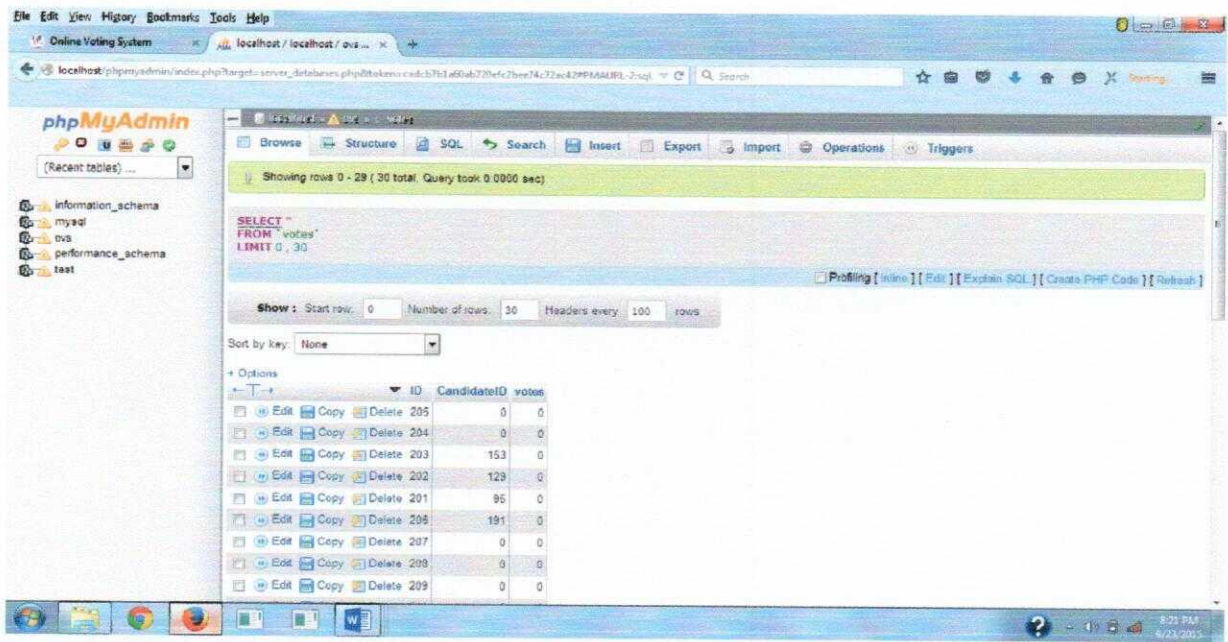


Figure 4.10: Votes Table

4.2 PROCEDURE DESIGN

This refers to the step by step method of using the proposed system. The proposed system comprises of Administrator and the general user environment. The steps to use the proposed system are as follows

- 1 On the address bar of any browser type http://localhost/Online_voting_system/index.php
- 2 You are prompted to supply the username and password this verifies that you are a registered user and has the privileged to use the voting system otherwise you can only view the books without inability to read the document or download any material.
- 3 If the username and password supplied are correct as that of a user you are prompted with the home page only if the use has not casted his/her voter.
- 4 The username and password are in two formats as an administrator as well as a user.
- 5 As an administrator you are to type http://localhost/Online_voting_system/admin/index.php on the address bar.
- 6 As an administrator you are prompted with the administrator page where the back end of the voting exercise is carried out.

4.3 IMPLEMENTATION OF THE SYSTEM

4.3.1 HARDWARE SUPPORT

The hardware that is required in the successful completion of this project include monitor, CPU, keyboard, mouse, printer and an uninterrupted power supply (UPS).

4.3.2 SOFTWARE SUPPORT

The software support for the design of the proposed system involves operating system, Macromedia Dreamweaver, WAMP server and an internet access as well as anti-virus software which prevents the system from being infected by virus.

4.4 DOCUMENTATION OF THE SYSTEM

4.4.1 PROGRAM DOCUMENTATION

In order for the proposed system to be used on any computer system it takes the following ways

1. Boot the system
2. Copy the folder to www inside WAMP folder of the drive C: after WAMP server is installed onto the system.
3. Open any browser on the system (Microsoft internet Explorer, Mozilla Firefox)
4. Type `http://localhost/Online_voting_system/admin/index.php` on the address bar.

4.4.2 OPERATING THE SYSTEM

In order for the proposed system to be used on any computer system it takes the following ways

1. Boot the system
2. Copy the folder to www inside WAMP folder of the drive C: after WAMP server is installed onto the system.
3. Open any browser on the system (Microsoft internet Explorer, Mozilla Firefox.)

4.4.3 MAINTAINING THE SYSTEM

The system is flexible enough to entertain any future amendment which might be required when the need arise.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

The main aspect behind OVS is that it enabled us to bring out the new ideas that were sustained within us for many for many days. This project offers the voters to cast easily through internet. Vote counting is also made easy by the OVS since it's just a matter of querying the database. OVS is used by a number of countries today. Developing a good system is critical to the success of the system to prevent system failures and to gain wide acceptance as the best method available. A good OVS system requires ten characteristics which this system already has. These are:

Accuracy	Convenience	Reliability
Verifiability	Flexibility	Consistency
Democracy	Mobility	Social Acceptance
Privacy		

It helps curb the issues related with conventional Electoral processes. Issues like Limited number of voters, Waste of time for the whole process, mobility and convenience of voters, efficient and quick release of results, zero tolerance to electoral malpractices, detailed analysis of the whole process among others.

5.2 RECOMMENDATIONS

I will recommend that the E-Voting system discussed in this project should be adopted by the Independent National Electoral Commission (INEC) for their subsequent elections. There is

still room for improvement and it is basically in the area of configuration, integration and logistics. With all the challenges mentioned above, the system was used to conduct a peaceful, free and fair election and to GOD be the glory, because without HIM, it wouldn't have been possible.

After my research and my finalization of this project, I highly recommend that the online voting system (OVS) serves to be the best to be put in use especially in the 21st century where human beings are embracing technology and where there is malicious struggle for power by leaders all over the world. This struggle for power has resulted in the use of all approaches by the leaders in power to remain in their positions at whatever costs even if it means applying vote rigging to win elections.

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APPENDIX

PROGRAM CODE

```
<link rel="stylesheet" type="text/css" href="admin/css/style.css" />
<?php include('dbcon.php');
Include ('header.php');
?>
</head>
<body>
    <div class="navbar navbar-fixed-top">
        <div class="navbar-inner">
            <div class="container">
                <a class="brand">
                    
                </a>
                <a class="brand">
                    <h2>E-Voting System</h2>
                    <div class="chmsc_nav"><font size="4" color="gold">Online Voting
System</font></div>
                </a>
                <?php include('head.php'); ?>
            </div>
        </div>
    </div>
</div>
<div class="wrapper_admin">
</br>
</br>
```


</br>

<div id="element" class="hero-body-index">

<p><h2>Voter Login</h2></p>

<form method="POST" >

<table>

<tr><td>UserName: </td><td><input type="text" name="UserName" class="UserName_hover"></td></tr>

<tr><td>...<td></tr>

<tr><td>Password: </td><td><input type="Password" name="Password" class="Password_hover"></td></tr>

<tr><td>...<td></tr>

<tr><td></td><td> <button class="btn btn-primary" name="Login"><i class="icon-ok icon-large"></i> Login</button>

</td></tr>

<tr><td>

</td><tr>

</form>

</table>

</br>

<div class="error">

<?php

if (isset(\$_POST['Login'])){

\$UserName=\$_POST['UserName'];

\$Password=\$_POST['Password'];

\$login_query=mysql_query("select * from voters where Username='\$UserName' and Password='\$Password' and Status='Unvoted' and Year='1st year'") or die(mysql_error());

\$login_query3=mysql_query("select * from voters where Username='\$UserName' and Password='\$Password' and Status='Unvoted' and Year='2nd year'") or die(mysql_error());

\$login_query4=mysql_query("select * from voters where Username='\$UserName' and Password='\$Password' and Status='Unvoted' and Year='3rd year'") or die(mysql_error());

```

$login_query5=mysql_query("select * from voters where Username='$UserName' and
Password='$Password' and Status='Unvoted' and Year='4th year'") or die(mysql_error());
//
$login_query1=mysql_query("select * from voters where Username='$UserName' and
Password='$Password' and Status='Voted'");
$login_query2=mysql_query("select * from voters where Username='$UserName' and
Password='$Password' and Status='Voted'");
$count=mysql_num_rows($login_query);
$count1=mysql_num_rows($login_query1);
$count3=mysql_num_rows($login_query3);
$count4=mysql_num_rows($login_query4);
$count5=mysql_num_rows($login_query5);
$row=mysql_fetch_array($login_query);
$row3=mysql_fetch_array($login_query3);
$row4=mysql_fetch_array($login_query4);
$row5=mysql_fetch_array($login_query5);
$id=$row['VoterID'];
?>
<?php
if($count == 1){
session_start();
$_SESSION['id']=$row['VoterID'];
header('location:voting.php');
}
if($count3 == 1){
session_start();
$_SESSION['id']=$row3['VoterID'];
header('location:voting2.php');
}

```

```

}
if($count4 == 1){
    session_start();
    $_SESSION['id']=$row4['VoterID'];
    header('location:voting3.php');
}
if($count5 == 1){
    session_start();
    $_SESSION['id']=$row5['VoterID'];
    header('location:voting4.php');
}
if($count1 == 1){ ?>
    <div class="alert alert-error">
<button class="close" data-dismiss="alert">×</button>
    You Can Only Vote Once
</div>
<?php
}else{ ?>
<div class="alert alert-error">
<button class="close" data-dismiss="alert">×</button>
    Please check your username and password
</div>
    <?php
    }
?>
<?php
}

```

```
?>
</div>
</div>
</br>
</br>
</br>
</br>
</br>
</br>
```

```
<?php include('footer.php')?>
```

```
</div>
```

```
</body>
```

```
</html>
```

```
<?php
```

```
include('header.php');
```

```
include('dbcon.php');
```

```
include('session.php');
```

```
?>
```

```
</head>
```

```
<body>
```

```
<?php include('nav_top.php'); ?>
```

```
<div class="wrapper">
```

```
<div class="home_body">
```

```
<div class="navbar">
```

```
<div class="navbar-inner">
```

```
<div class="container">
```

```
<ul class="nav nav-pills">
```

```
<li>....</li>
```

```

    <li class="active"><a href="home.php"><i class="icon-home icon-
large"></i>Home</a></li>

    <li><a href="candidate_list.php"><i class="icon-align-justify icon-
large"></i>Candidates List</a></li>

    <li class=""><a href="voter_list.php"><i class="icon-align-justify icon-
large"></i>Voters List</a></li>

    <li><a href="canvassing_report.php"><i class="icon-book icon-
large"></i>Canvassing Report</a></li>

    <li><a href="History.php"><i class="icon-table icon-large"></i>History
Log</a>

    <li><a data-toggle="modal" href="#about"><i class="icon-exclamation-sign
icon-large"></i>About</a></li>

    <div class="modal hide fade" id="about">
        <div class="modal-header">
            <button type="button" class="close" data-dismiss="modal">×</button>
            <h3> </h3>
        </div>
        <div class="modal-body">
            <?php include('about.php') ?>
        <div class="modal-footer_about">
            <a href="#" class="btn" data-dismiss="modal">Close</a>
        </div>
        </div>
        <li>....</li>
    </ul>

    <form class="navbar-form pull-right">
        <?php $result=mysql_query("select * from users where User_id='$id_session'");
        $row=mysql_fetch_array($result);
        ?>

```

```
<font color="white">Welcome omole:<i class="icon-user-md"></i><?php echo $row['User_Type']; ?></font>
```

```
<a class="btn btn-danger" id="logout" data-toggle="modal" href="#myModal"><i class="icon-off"></i>&nbsp;Logout</a>
```

```
<div class="modal hide fade" id="myModal">
```

```
<div class="modal-header">
```

```
<button type="button" class="close" data-dismiss="modal">×</button>
```

```
<h3> </h3>
```

```
</div>
```

```
<div class="modal-body">
```

```
<p><font color="gray">Are You Sure you Want to LogOut?</font></p>
```

```
</div>
```

```
more...</font></p>
```

```
<p><font color="red">Click the image to view
```

```
<div id="myGallery" class="spacegallery">
```

```
src="images/c2.jpg" alt="" />
```

```

```

```

```

```

```

```

```

```

```

```

```

```
</div>
```

```
</div>
```

```
<div class="thumbnail_mission">
```

```
<h2>Mission</h2>
```

```
<p>programming School wly serving as a training ground for education students, seeks to develop in excellence
```

and with quality, the total personality of children and youth become worthy members of society.

</p>

</div>

</div>

</div>

<?php include('footer.php')?>

</div>

</div>

</body>

</html>