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## **DEVELOPMENT OF ELECTRONIC VOTING SYSTEM SOFTWARE FOR ELECTING LEADERS IN STUDENTS UNION GOVERNMENT OF NIGERIA TERTIARY INSTITUTIONS**

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### **ABSTRACT**

*This paper was centered on the development of electronic voting system software to conduct free and fair election in choosing leaders among students of tertiary institutions. The current voting process is discovered of being operated manually which had resulted to numerous problems like rigging and multiple voting. A computerized system was ventured into in order to check the problems identified after series of interviews and examination of past election exercises. Such problems are to protect the integrity of electorate vote by preventing voters from being able to vote multiple times which is the most common reason any organization moves to online voting. The new system was designed using Microsoft visual studio IDE 2019 (BASIC programming language) because it is syntactically easy to edit and modify with robust features for developing windows-based applications. The paper also suggested how to successfully implement the computerized procedure and to overcome the obstacles that would hinder the successful implementation of the system.*

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**Keywords:** *electronic, electorate, voting, syntactically, computerized and window-based*

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### **Introduction**

An Election is a formal decision-making process by which a population chooses an individual to hold public office. Elections have been the usual mechanism by which modern representative democracy operates since the 17th century.

Kohno et al., (2004) explained that elections allow the populace to choose their representatives and express their preferences for how they will be governed. Naturally the integrity of the election process is fundamental to the integrity of democracy itself. The election system must be sufficiently robust to withstand a variety of fraudulent behaviors and must be sufficiently transparent and comprehensible that voters and candidates can accept the results of an election. Unsurprisingly, history is littered with examples of elections being manipulated in order to influence their outcome.

Elections allow the populace to choose their representatives and express their preferences for how they will be governed. The election system must be sufficiently robust to withstand a variety of fraudulent behaviors and must be sufficiently transparent and comprehensible that voters and candidates can accept the results of an election. Unsurprisingly history is littered with examples of elections being manipulated in order to influence their outcome.

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 voting system must also be tamper resistant to thwart a wide range of attacks, including ballot stuffing by voters and incorrect tallying by insiders (Dill *et al*, 2003). Electoral reform describes the process of introducing fair electoral reform describes the process of introducing fair electoral systems where they are in place, or improving the fair electoral system where they are not in place, or improving the fairness or effectiveness of existing system.

Challenges of free fair elections in any society could best be viewed against the structural setting of such society. Elections in Nigeria are democratic forms of choosing representatives to Nigerian Federal Government. This is now introduced in our tertiary institutions to conduct free and fair elections. The various challenges to credible elections are; honest and credible electoral officers, shortness of the time frame of election conduct and negative politicking.

The voting principles according to Gritalis, (2002) should be that only eligible person vote, no person gets to vote more than once, the vote is secret, each correctly cast vote gets counted and the voters trust that their vote is counted.

Gritalis (2002) expressed an Electronic Voting (E-voting) System as a voting system in which the election data is recorded, stored and processed primarily as

digital information. E-voting refers to an election that involves the use of electronic means in at the casting of the vote for the purpose of choosing the right leaders. Kosmopoulos (2004) defined e-voting as the use of a digital or analogue device, within a secure, authenticated environment, to cast a vote during an election process. In another vein, electronic voting, is a form of computer-mediated voting in which voters make their selections with the aid of a computer. It is an election system that allows voters to record a secret ballot and have it tabulated electronically. This system can speed up election results and lower the cost of conducting an election by significantly reducing the number of people required to operate a polling place and tabulate results. As a digital platform, they eliminate the need to cast your votes using paper or having to gather in person. They also protect the integrity of your vote by preventing voters from being able to vote multiple times which is the most common reason organizations move to online voting.

The introduction of e-voting raises some of the same challenges as are faced when applying electronics to any other subject, for example e-government. Politicians or administrators may perhaps expect that a paper version of a certain service or process can simply be taken and put on the internet. Unfortunately, the reality is more complex, and nowhere more so than with e-voting.

The needs for an automated voting system are shortlisted by Caarls (2010) as follows:

- They could lead to increase voter turnout, thus supporting democratic process.
- They could give elections new potential (by providing ballots in multiple languages, accommodating lengthy ballots, facilitate early and absentee voting, etc.) thus enhancing democratic process.
- They could open a new market, thus supporting the commerce and the employment.

This electronic election may be Direct Recording Electronic Computers (DREs) in which machines or computers are normally installed at a polling station, which record and simultaneously store the vote. Another one is voting via the Internet which can be done in a controlled area like a polling station or in a non-controlled area such as a kiosk or the home. At a polling station, medium may

be used to record the vote, which is then registered in a ballot box on another device.

Transparency about the e-voting system, the details of diverse electoral procedures and the reasons for introducing e-voting will contribute to voters' knowledge and understanding, thereby generating trust and confidence among the general public. If they are to have confidence in the electoral process, some voters need to rely on others who are in a position to understand the apparatus and the procedures. It is important to examine the reasons for introducing e-voting in order to decide which type of electronic means best suits the purpose.

### **Statement of the Problem**

Tertiary institutions are full of social vices which result to chaos most often. Each of these institutions has its own system of governance both at the management and students level. Students through the approval of the management embark on election to choose their leaders at the departmental, faculty and entire school level which is known as students' union government. In choosing their leaders, there always arises violence caused by factions among themselves before, during and after election. There is need to guide against the existing system which give room for violence due to lack of free and fair election because of the manual method of such election. Hence, electronic voting system is highly essential to choose their leaders without any biasness.

### **Aims and Objectives of the Study**

The aim is to develop electronic voting system for students in tertiary institution to choose their leaders. Objectives are to get the details of the types of election the students want to conduct and allow pre-registration to take place by the eligible voters and aspirants. The devices involved should be made available couples with electoral personnel. Election result should be monitored, counted and released without any delay. The voter on the screen would scroll to vote for his/her chosen candidate. The need to scroll down the screen should be avoided, because it would jeopardize the equality of the candidates: those whose names are only visible when a voter scrolls down would be disadvantaged. In particular in cases when electronic media are used alongside paper, one has to decide how to deal with any difference in design, since this could also have legal repercussions for the election (Kohno *et al*; 2004).

### Significance of the Study

Election in general allows the group of people to choose those that will be in the hem of affairs in that organization or society. E-voting makes it easier for eligible voters to participate in voting once through electronic devices. E-voting is highly significant because it enhances a free and credible election in the college, promote the image of the college in and outside, enhance adequate security and maintenance of election result, reduce the cost of conducting the election, reduce the time spent in conducting and counting of voting results and lastly, ensure accurate result with no aftermath petition.

### Purpose of the Study

This paper set on giving students that are eligible to vote once with free and fair election since there will be no avenue for rigging or manipulation of result. A suitable programming language preferably Visual Basic is used to develop the solution.

### Scope of the Study

The paper is set to execute an automated voting platform where students of tertiary institutions can vote electronically via the software developed. There are five broad classes of voting technologies in use today [1] throughout the world which are; Hand counted paper ballots, lever voting machines, punched card ballots, optical mark-sense ballots and direct-recording electronic voting machines. This paper is limited to direct recording electronic voting system.

### OUTPUT SCREENSHOT



Figure 1: Homepage Menu

**Election Schedule**

**Election Name :**

**Session :**

**Starting Time :**  **Ending Time :**

New  
Register  
Update  
Delete  
Close

Election Name	Session	Start Time	End Time
2020 EKSU NACOSS DEPARTMEN...	2019/2020	9:00:00 AM	12:00:00 PM

Figure 2: Election Schedule Page

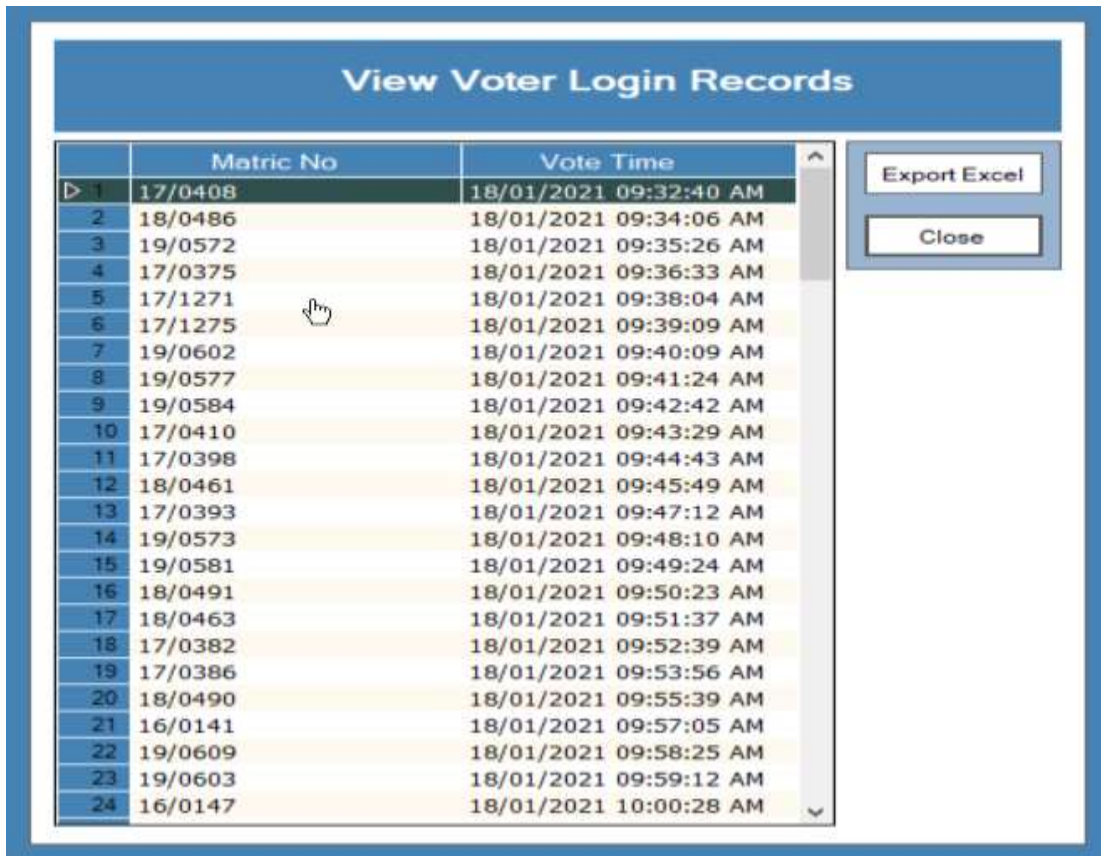
**Voter Login Details (Accreditation)**

By Voter Matric No.  By Voters' ID

Reset Close

Matric No.	User Type	Voter ID
17/0372	Voter	166718
17/0373	Voter	608098
17/0374	Voter	363084
17/0375	Voter	466719
17/0376	Voter	397875
17/0377	Voter	247538
17/0378	Voter	563863
17/0378	Voter	212249
17/0379	Voter	644158
17/0380	Voter	517486
17/0381	Voter	207388
17/0382	Voter	838085
17/0383	Voter	637263
17/0384	Voter	917520
17/0385	Voter	729671
17/0386	Voter	742603
17/0387	Voter	594370
17/0388	Voter	866399
17/0389	Voter	614855

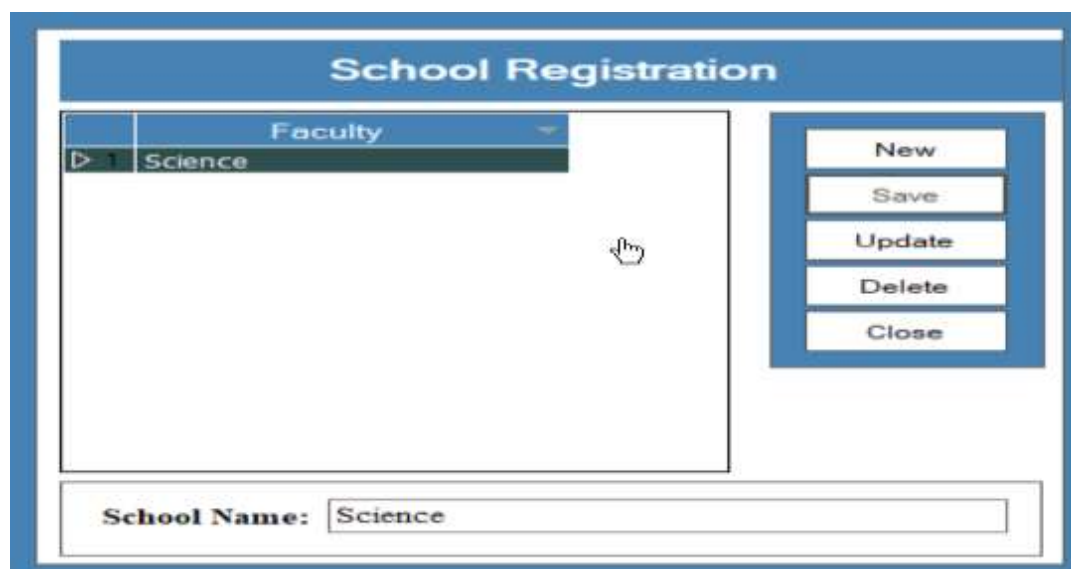
Figure 3: Voters' Accreditation Page



The screenshot shows a web application interface titled "View Voter Login Records". It features a table with two columns: "Matric No" and "Vote Time". The table contains 24 rows of data. To the right of the table, there are two buttons: "Export Excel" and "Close". A mouse cursor is visible over the table.

	Matric No	Vote Time
▶ 1	17/0408	18/01/2021 09:32:40 AM
2	18/0486	18/01/2021 09:34:06 AM
3	19/0572	18/01/2021 09:35:26 AM
4	17/0375	18/01/2021 09:36:33 AM
5	17/1271	18/01/2021 09:38:04 AM
6	17/1275	18/01/2021 09:39:09 AM
7	19/0602	18/01/2021 09:40:09 AM
8	19/0577	18/01/2021 09:41:24 AM
9	19/0584	18/01/2021 09:42:42 AM
10	17/0410	18/01/2021 09:43:29 AM
11	17/0398	18/01/2021 09:44:43 AM
12	18/0461	18/01/2021 09:45:49 AM
13	17/0393	18/01/2021 09:47:12 AM
14	19/0573	18/01/2021 09:48:10 AM
15	19/0581	18/01/2021 09:49:24 AM
16	18/0491	18/01/2021 09:50:23 AM
17	18/0463	18/01/2021 09:51:37 AM
18	17/0382	18/01/2021 09:52:39 AM
19	17/0386	18/01/2021 09:53:56 AM
20	18/0490	18/01/2021 09:55:39 AM
21	16/0141	18/01/2021 09:57:05 AM
22	19/0609	18/01/2021 09:58:25 AM
23	19/0603	18/01/2021 09:59:12 AM
24	16/0147	18/01/2021 10:00:28 AM

Figure 4: voters' login records page



The screenshot shows a web application interface titled "School Registration". It features a dropdown menu labeled "Faculty" with "Science" selected. Below the dropdown is a large empty text area. To the right, there is a vertical stack of five buttons: "New", "Save", "Update", "Delete", and "Close". At the bottom, there is a text input field labeled "School Name:" with "Science" entered.

Figure 5: school registration menu

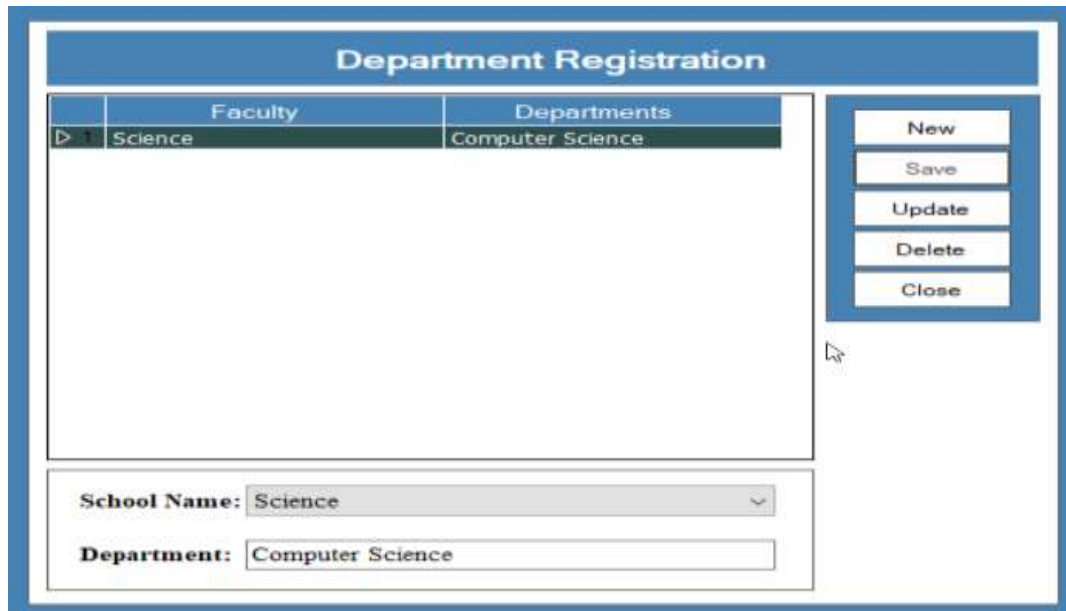
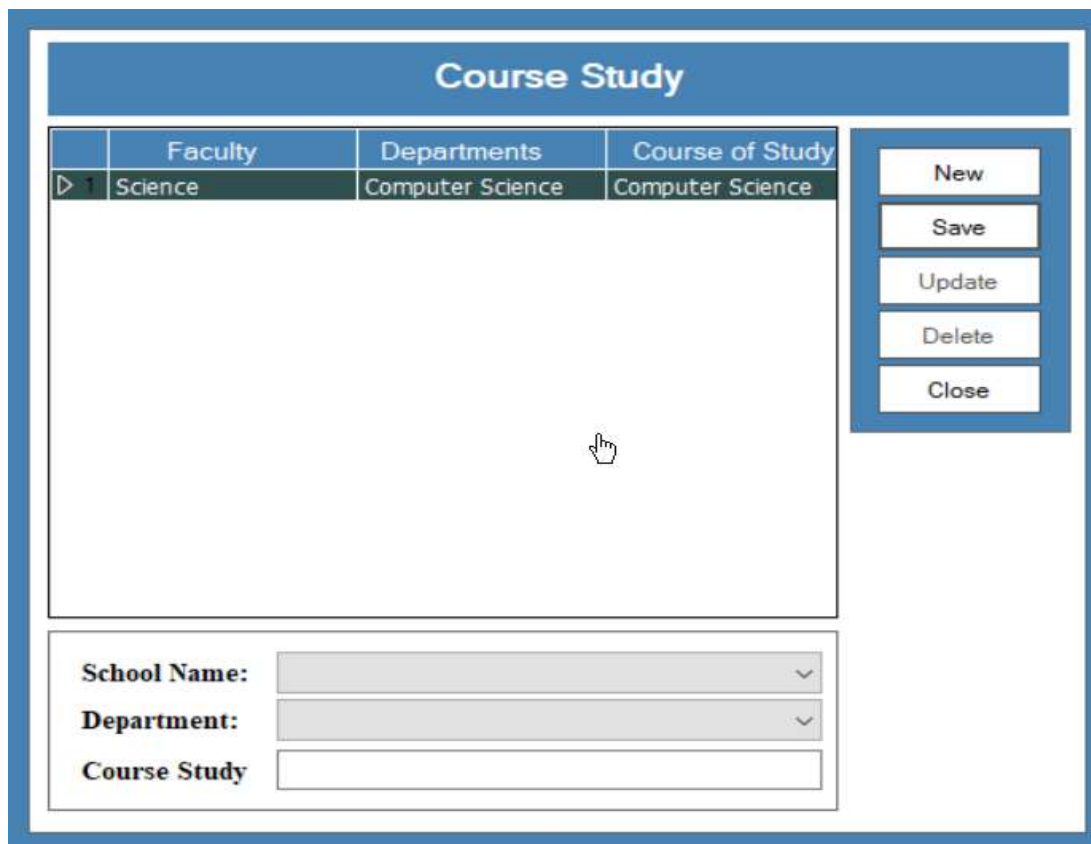


Figure 6: Department Registration Menu





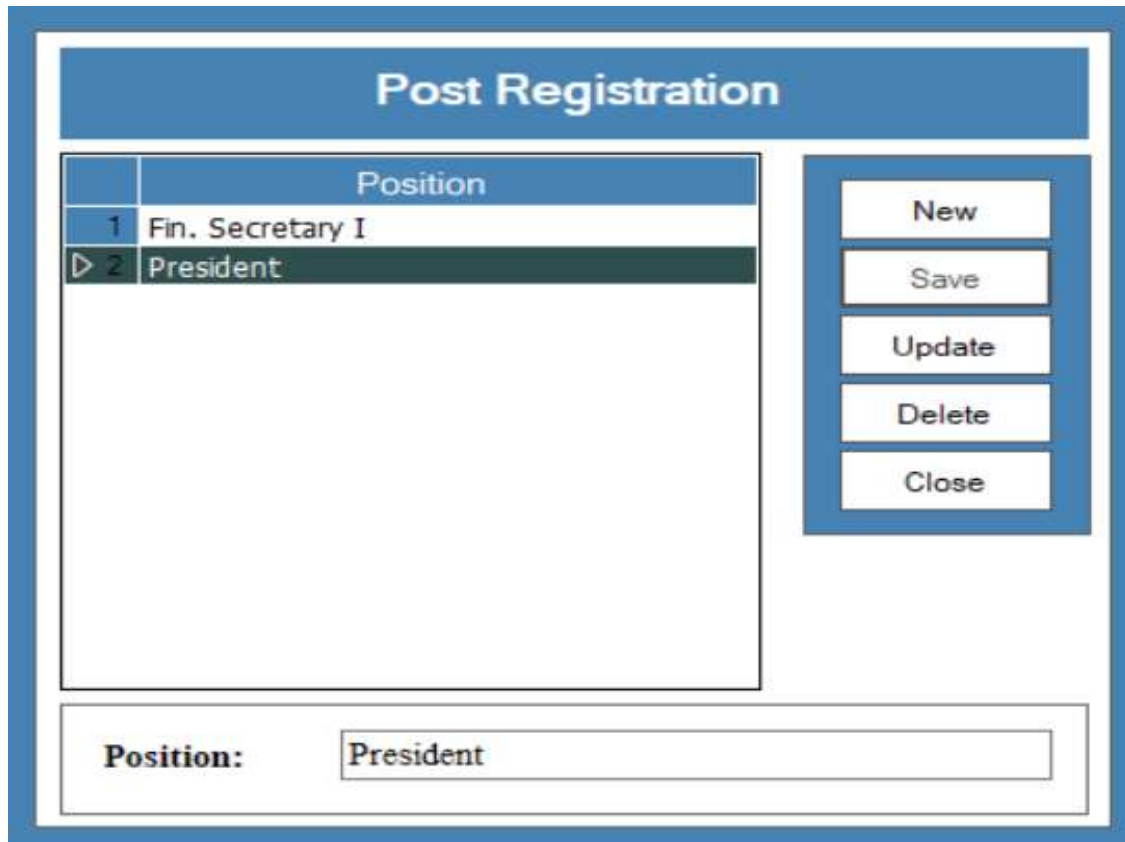
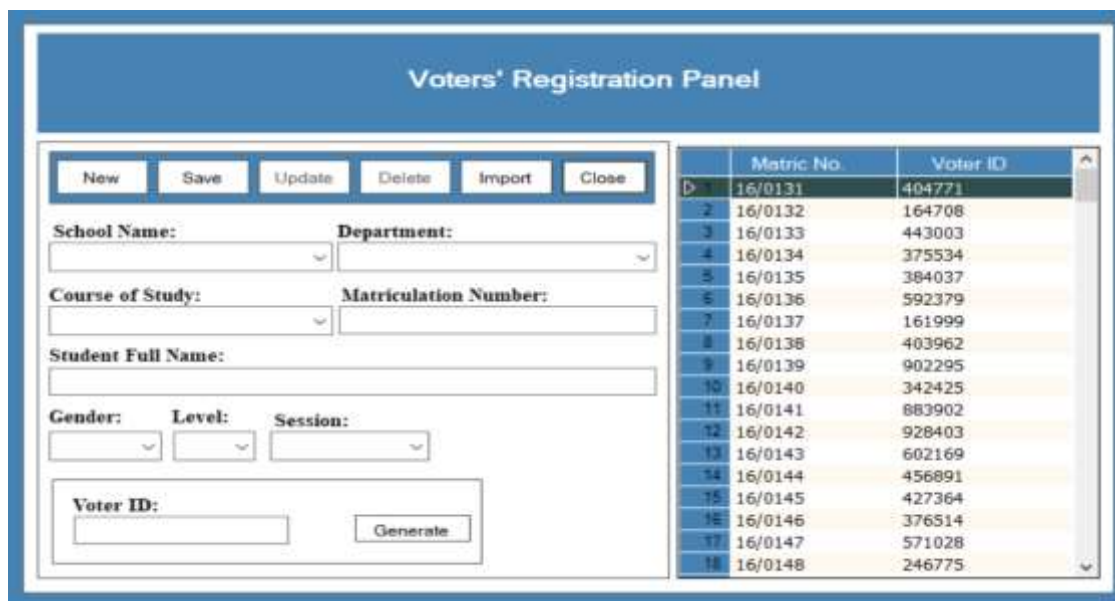
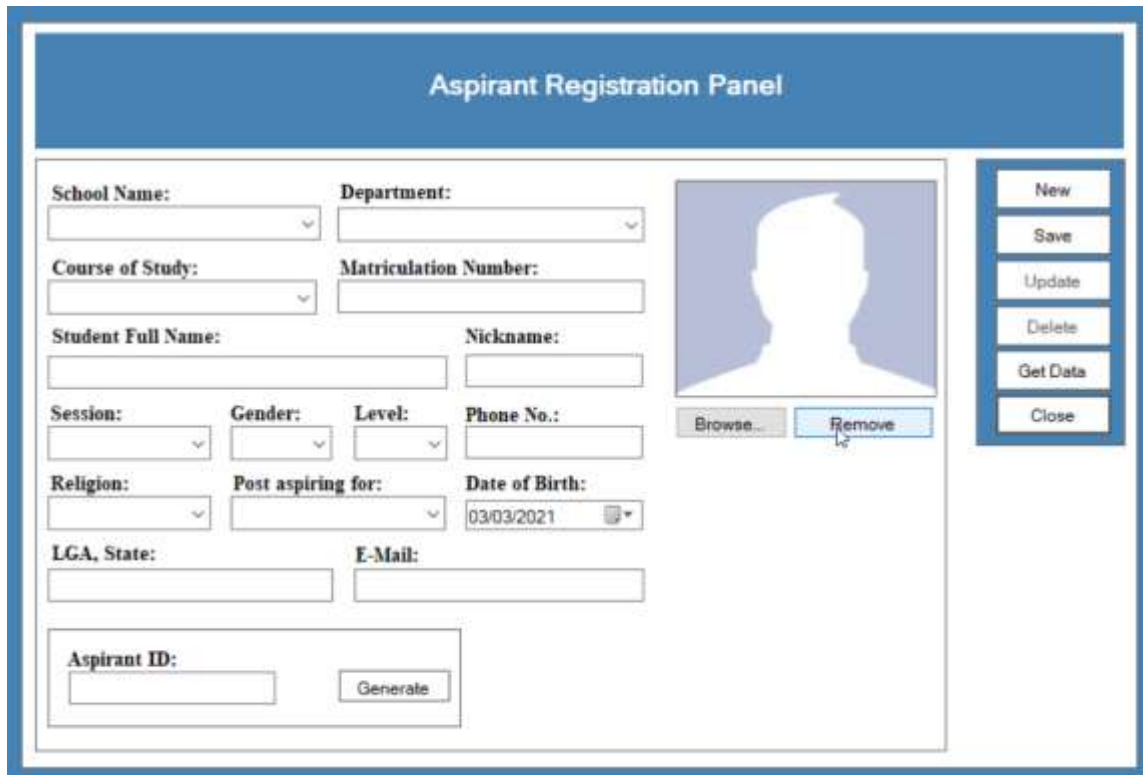


Figure 7: Post Registration Menu





The Aspirant Registration Panel is a web form with a blue header. It contains several input fields: School Name (dropdown), Department (dropdown), Course of Study (dropdown), Matriculation Number (text), Student Full Name (text), Nickname (text), Session (dropdown), Gender (dropdown), Level (dropdown), Phone No. (text), Religion (dropdown), Post aspiring for (dropdown), Date of Birth (text with calendar icon), LGA, State (text), and E-Mail (text). There is a profile picture placeholder with 'Browse...' and 'Remove' buttons. A 'Generate' button is next to the 'Aspirant ID' field. A vertical menu on the right contains buttons for New, Save, Update, Delete, Get Data, and Close.

Figure 7: Aspirant Registration Menu



The Add New User page features a blue header and a table with columns for User ID, User Type, and Password. The table contains one row with 'Admin', 'Admin', and 'abbey'. Below the table are input fields for User ID (text), User Type (dropdown), and Password (text). A vertical menu on the right contains buttons for New, Register, Update, Delete, and Close.

User ID	User Type	Password
Admin	Admin	abbey

Figure8: Add New User Page

The screenshot shows a web application window titled "View Voter Login Details". It contains a table with the following columns: Matric No, User Type, and Voter ID. The table lists 24 rows of voter data. A "Close" button is located in the top right corner of the window.

	Matric No	User Type	Voter ID
1	16/0131	Voter	404771
2	16/0132	Voter	164708
3	16/0133	Voter	443003
4	16/0134	Voter	375534
5	16/0135	Voter	384037
6	16/0136	Voter	592379
7	16/0137	Voter	161999
8	16/0138	Voter	403962
9	16/0139	Voter	902295
10	16/0140	Voter	342425
11	16/0141	Voter	883902
12	16/0142	Voter	928403
13	16/0143	Voter	602169
14	16/0144	Voter	456891
15	16/0145	Voter	427364
16	16/0146	Voter	376514
17	16/0147	Voter	571028
18	16/0148	Voter	246775
19	16/0149	Voter	550212
20	16/0150	Voter	495252
21	16/0151	Voter	518989
22	17/0362	Voter	530003
23	17/0363	Voter	286960
24	17/0364	Voter	144314

Figure 9: Voter Login Details Page

The screenshot shows a web application window titled "View Election Result". It features a sidebar on the left with a "Position" dropdown menu currently set to "President". The main area contains two tables. The top table shows the results for the President position, with ADESOYE PELUMI as the winner (98 votes) and LAMBIA TOYEED as the runner-up (36 votes). The bottom table shows a detailed view for the winner, ADESOYE PELUMI.

Position
President

Candidate Name	Matric No	Post	Nickname	Votes	Status
ADESOYE PELUMI	17/0367	President	DUTIFUL	98	Winner
LAMBIA TOYEED	17/0396	President	AL-HAMEEN	36	Runner-Up

Candidate Name	Matric No	Post	Nickname	Votes	Status
ADESOYE PELUMI	17/0367	President	DUTIFUL	98	Winner

Figure 10: Election Result Page

<b>EKITI STATE UNIVERSITY, ADO EKITI</b> Emmanuel Alayande College of Education, Oyo (In Affiliation with Ekiti State University)						
<b>Election Name</b>		2020 EKSU NACOSS DEPARTMENTAL ELECTION				
<b>Session</b>		2019/2020				
<b>Starting Time</b>		9:00:00 AM	<b>Ending Time</b>	12:00:00 PM		
3/3/2021						
SN.	Matric No.	Aspirant Full Name	Post	Nickname	Votes	Status
1	17/0402	OGUNTUNDE ISREAL	Fin. Secretary I	SHOLAY	92	Winner
2	17/0413	OMILEYE FESTUS	Fin. Secretary I	FECUND	42	Runner-Up
3	17/0367	ADESOYE PELLUMI	President	DUTIFUL	98	Winner
4	17/0396	LAMINA TOYEGB	President	AL-HAMEEN	36	Runner-Up
CHAIRMAN NAME AND SIGN		H.O.D / DEAN SIGN/DATE		MODERATOR'S NAME AND SIGN		

Figure 11: Election Result Printing Page

**Summary**

The paper was on the computer system implementation of the electronic voting system which is the implementation for computerizing the mode of voting in education sector. The operating producer of the traditional voting system in educational sector, its problems and the requirement of developing a system for computerization of electronic voting system in the college sector were

discussed. This serves as requirement statement for drawing the system specification. The software was developed based on the requirement and specification statement gathered with the software, user can register both voters and aspirant record. This knowledge is therefore transformed into computer code using Visual Basic Programming Language. The program was tested with student data and found to be highly efficient. Results/Output was generated as samples for the running of the program.

### **Conclusion**

Base on this paper, the researchers conclude that the development of a computerized system for electronic voting system will help to provide greater efficiency, increase detection rates and reduce losses. The design system was based on output design, input design and file design which are going to ensure actual computerization of all possible voting processes; it will encourage our college to proceed in using indigenous developers in their operations. This work will serve as a medium for detection of fraud and forgery activities performed in our voting processes.

### **Recommendations**

This work is hoped to open the eyes of individual to the computerized way of registering, accrediting, voting and counting of election results within the school sector. It is therefore recommended that all tertiary institutions in Nigeria should adopt this new mode of election process within the school system. This can be achieved by adopting these recommendations:

1. Release of enough money for its proper implementation.
2. The college should take all the advantages of the electronic voting system into consideration and develop ways of harnessing them to eliminate all the setbacks of manual ballot-paper system which has been causing series of students' turmoil.
3. Further development strategy to acquaint with concept of data security and encryption to the developed system should be applied.

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<https://www.civiciiti.info/7-benefits-of-electronic-voting/>