

Comparative Analysis of Students' Perception of E-Voting and Paper Ballot Voting Systems During SUG Elections in Federal University Otuoke, Bayelsa State, Nigeria

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Abstract

This paper examines students' perception of Students' Union Government elections at the Federal University Otuoke, drawing comparisons between paper ballot voting and electronic voting (e-voting) systems. Two research questions guided the study and one null hypothesis was tested at 0.05 level of significance. Descriptive survey research design was employed for the study. The population for this study comprised of all 7,907 students across the five faculties of the University. A total of 893 (11.3%) students were sampled using the stratified random sampling technique. The instruments for data collection was a questionnaire titled, "Students Percentage Preference of e-voting over Paper Balloting System (SPPEPBS)." A total of 893 questionnaires were administered to students across the five (5) faculties (Education, Engineering, Humanities, Management Science, and Science) of the institution. Of the 893 administered questionnaires, there was 1 representing 0.1% non-return, 11 representing 1.2%, were undecided while, 881 representing 98.7% returned and statistically analyzed. Frequency counts and simple percentage were used to analyze data related to research question 1 and 2 while Chi-square and t-Test statistics were used to test the null hypothesis at 0.05 level of significance. Results showed that 121 students representing 13.7% of the returned and analyzed questionnaires favoured Paper Ballot voting system over e-voting system, while 760 students representing 86.3% favoured e-voting system over Paper Ballot voting system. Results also showed that the number of students who favoured e-voting was statistically and significantly higher than those who favoured Paper Ballot voting system at the 95% significance level ($\alpha = 0.05$). The study concluded that students of Federal University Otuoke (FUO) preferred e-voting to paper balloting system during SUG elections adding that e-voting is transparent, the electoral process is easy to manage, it is cost effective, saves time, encourages voter participation, enhances accuracy and credibility as well as promoting electoral peace and security. The study recommended that the NUC should approve the use of e-voting system as a standard practice in all Universities in Nigeria, non-Governmental organizations, corporate bodies and the Federal Government of Nigeria via INEC should adopt and implement e-voting in our elections.

Keywords: *Paper Ballot, e-voting, SUG, Elections, F.U.O.*

Introduction

According to Aristotle, natural hierarchies are present throughout nature wherever a multitude of elements are combined into a unified whole. A natural distinction between ruling and subject elements, he thinks, can be found within animals (soul/body), the soul itself (reason/desire), the sublunary sphere (human beings/other animals) and most importantly, natural human communities. It follows that some humans will be natural rulers while others are natural subjects and they will have different functions or tasks, (Aristotle, 350BC cited in Cristian, 2016).

Deductively therefore, Man is known to be both a gregarious animal implying that he prefers living in groups for decision making and governance with the objective of fostering the development of human society and improving the quality of life. To achieve good governance, man organizes himself along hierarchical lines, assigns responsibilities to every member of the society. This attribute of man is evident at all levels of the society; family, school, workplace, even at the state and national levels. Thus, politics is therefore an intrinsic quality of man. For the purpose of governance, modern man has come up with positions/offices which individuals who possess certain qualities could occupy. The occupants of such positions/offices are entitled to certain benefits which attract people to vie for such positions/offices; they are also accountable to and have responsibilities to perform to the people over whom they govern. In the case of our national politics, politicians must be declared and returned elected only after satisfying all prescribed conditions as stipulated by the Independent National Electoral Commission (INEC) through an election.

Election represents the highest level of democracy where citizens choose their leaders and representatives. The integrity of the electoral process is fundamental to the integrity of democracy. It allows the general public to choose leaders directly or indirectly and express preferred ways on how they are governed (Nu'man, 2012). According to Masuku, (1994) cited in Aishatu, Abubakar, & Arthur, (2017), history has shown that most elections in Nigeria were manipulated in order to influence outcomes. There have been reported cases of delay in delivering election materials to the polling units as well as alteration of results while on transit to the collation centers. In fact, results have been reported to be written without elections been held. This has been attributed to poor and bad electoral system. It has also been reported that other possible factors contributing to the problems of election in Nigeria includes the confusion about the registration process, inability to get to a registration point, inadequate ballots papers, lack of proper identity documents, inadequate staff, and political intimidation. Furthermore, Long queues, breach of privacy, fear of intimidation, victimization and security are also challenges in Nigeria's electoral process. Evidently, these challenges are also affecting elections on campuses of the Nigerian university system usually organized by the Student Union Government.

The Student Union Government (SUG) is a central part of higher institution of learning, serving as an interface between the students and the Management in the administration of the university. The SUG serves as a platform for the students' community to express their views, communicate their desires and concerns to the university Management, and also pursue common goals on a unitary platform (Peter & Ebimobowei, 2015). Student Union politics and elections into the SUG is quite partisan and this could

be further intensified by various externally vested interests. SUG politics is a microcosm of the national politics, and more often than not, the SUG is a tool for politicians to rally voters during national elections. This implies that a lot of funding and resources for campaign and spread of propaganda could be made available to the SUG by some members of the university Management, politicians and political parties (Uche & Odey, 2017), thereby creating political groups within the SUG, as the students' arm of many political parties. This makes SUG electoral offices very juicy and attractive due to the benefits and opportunities that exists while in office and after graduation, as a result of the links established with politicians and prominent individuals in the society, while in the institution through the SUG platform (Munshi, 2014). It is believed that these are common practices that prevail on campuses of any average Nigerian university with a particular reference to the Federal University Otuoke.

At the Federal University Otuoke (FUO), Bayelsa State, Nigeria, SUG elections have been held since 2016. Nine (9) elective offices were contested for viz: President, Vice-President (VP), General Secretary, Assistant General Secretary, Treasurer, Provost, Public Relations Officer (PRO), Welfare Secretary, Director of Transport and Director of Social. Eligible students interested in running for any of the elective offices will pick up the nomination forms at a price set forth by the SUG-Electoral Committee, fill the form and submit same to the SUG Secretariat for processing. After the forms have been processed and the contestants screened to meet the conditions for the office vied for, an election date will be fixed by the SUG-ELECO under the approval of the Students' Affairs office of the University. Campaigns will commence and each contestant will make his/her manifesto. On the day of election, students with valid University-issued ID cards (means of accreditation) will be allowed to vote at the voting center secured by security operatives to avoid snatching of ballot boxes and other voting malpractices. The electorates are expected to fill the ballot paper by ticking the name of the contestant of their choice for an elective office and thereafter, drops the ballot paper into the ballot box. After voting, the ballot papers are collated and counted to ensure that the number of vote cast, does not exceed the number of accredited voters. This was to ensure that the voting was free, fair and credible.

Once it was certified that over-voting did not occur, the valid votes for each contestant is collated and published; the contestant with the highest number of votes is declared the winner for the various offices as having been elected by popular mandate (votes), the peoples' choice. The winners can then be sworn into office on a date determined by the Students' Affairs office. This of course, have been the traditional electoral process and practice in FUO until 2019 when the e-voting was introduced.

According to the Open Rights Group (2019), Electronic voting (e-voting) is defined as voting or counting of votes using computer technology. The United State Department of Labour broadly defined e-voting to include computerized voting systems, vote-by-phone systems and internet voting systems. E-voting could also be defined as any form of voting that uses modern technology to either cast or tally votes. However, e-voting in the context of this research will be narrowly defined as the application of computer and related gadgets for voting and counting of votes via the use of intranet or internet technologies.

It's a known fact that students' population in Nigerian universities increase annually, possibly due to increase in youths' population. This adds a great burden to the number of days left for academic work (lecturing, reading and conduct of practical classes, tests and examinations). This situation is even worse where votes will need recounting if the margin of win between leading contestants is small; credibility issues with stolen and/or vandalised pooling boxes, there may also be pre-election voting (which is very common in developing countries, the case of Nigeria's 2019 presidential election is a

case in history), or there may be human error involved in the counting of votes. In the view of the researcher, these factors could be simply be addressed by adopting e-voting strategies.

Statement of the Problem

Students' politics, campaign and voting can be very tensed and divided along ethnic and religious lines, just like the national politics. Several cases of SUG election violence has been recorded across the globe with a number of cases in Africa and Nigeria in particular. This is often due to various forms of election malpractices and rigging, (Uche & Odey, 2017). In Nigeria, on March 10, 2015 Student Union elections at the Yaba College of Technology turned violent after invasion by thugs during the election result counting process. Sporadic shots were fired and students had to flee the collation center for their safety. The post-election massacre of students at the Federal Polytechnic, Mubi is another critical case of student election violence resulting in the loss of lives, leaving several others severely injured in its wake. Also, on the 24th of May, 2015, Student Union elections went awry at the College of Education, Kangere, the resulting violence spilled from the institution to neighbouring communities with several innocent people injured. Meddling of external authorities in university student elections is not uncommon, this is usually geared at ensuring the victory of an 'anointed' candidate, and such can easily trigger student revolt and violence; an example of this is the June 2016 protest and violence at the Ladoke Akintola University of Technology in Nigeria (Adekitan, Matthews, John, and Uzairue, 2018).

Losers of election where paper ballot system is used had always hinged on all these to decry the credibility of elections and the financial costs associated with paper ballot voting system. Students take different forms to express their displeasure with SUG election processes and results, this could be through demonstrations, property destruction, arson and other forms of violence. Although, requirements for preventing SUG election violence are multifaceted, a major solution can be achieved by ensuring a smooth and malpractice free electoral process. Against this backdrop and In view of the above limitations of the paper balloting system, electorates have canvassed for the e-voting system which is simpler in its approach, more credible, less expensive and secured in terms of human lives and properties. Against this backdrop, the current study was intended to examine, compare and analyze students' perception in electronic voting and paper ballot voting systems in SUG elections at the Federal University Otuoke, Bayelsa State, Nigeria.

Purpose of the Study

The major purpose of the study was to compare students' participation in e-voting over the traditional paper ballot voting system during SUG elections. Specifically, the study examined and compared:

1. Students' perception of e-voting system in FUG SUG elections.
2. Students' perception of paper ballot voting system in FUG SUG elections.

Research Questions

The following research questions guided the study:

1. What are the perception of students in FUG SUG elections on the use of e-voting system?
2. What is the perception of students in FUG SUG elections on the use of paper ballot voting system?

Hypothesis

The following null hypothesis was formulated by the researcher and was tested at 0.05 level of significance:

1. There's no statistically significant difference in students' perception of FUGO SUG elections on the use of e-voting over paper balloting system at Federal University Otuoke.

Method

As used during the 2019 and 2021 SUG elections in FUGO. The Directorate of Information and Communications Technology (ICT) of the University designed and developed the e-voting software and hosted it on the University website. The Database Administrator (DA) obtained the matriculation and contact phone numbers of all registered students of the institution from the student records in the various departments. The DA then auto-generated unique Personal Identification Numbers (PINs) for each student. Each PIN was then tied to the matriculation number of the individual student. The PIN was sent to each student's phone number as a text message less than 24 hours prior to the commencement of voting. This helped reduce the propensity for hacking and hijacking of PINs by illegal and unauthorized persons. A student who did not receive the PIN through text message for any reason, including a change in phone number or error due to phone setting, was able to get the PIN at the ICT helpdesk created for purposes of technical support. To obtain the PIN for the affected student, the student identified himself/herself by presenting his/her ID card to the DA who will match the photo on the ID card with the student's face. If a resemblance was established, the DA will log onto the university website e-voting account and typed in the student's matriculation number to validate the vote. The entire process is anchored online.

Prior to the day of elections, students are sensitized on the voting procedure, voting start-time and end-time since it was internet-based, once the voting portal was opened for voting, students were required to log into their voting portal accounts using their matriculation numbers and voting PINs. Names of contestants with their pictures and offices vied for will be displayed. To vote, students were required to select their candidate of choice for each elective office and click the 'Vote' button. Once the vote is cast for a candidate and office of choice, that particular student electorate cannot vote for another contestant for same elective office he/she has voted already except for other offices not voted. For those without internet or data-enabled phones, the ICT Directorate provided enough internet-enabled computer systems at the Support Helpdesk facility. The website was regularly monitored and the server room highly guarded against unauthorized access.

The e-voting platform was designed to be real-time, implying that students who visited the platform can access the number of votes cast for each contestants and the various elective offices. For purposes transparency and accountability, a Display Room was provided within the ICT center where observers, agents, and electoral officers monitoring the voting process could be accommodated. At the voting stop-time, voting ended. However, while new electorates cannot log into the system to cast their votes, those who are already logged in for voting are given up to 10 minutes to complete the process. This feature was built into the software. At the expiration of the 10-minutes grace, the Electoral Officer (Dean of Students' Affairs) announces the results of the election. The attribute of transparency of the e-voting system is applauded by students and the entire FUGO community.

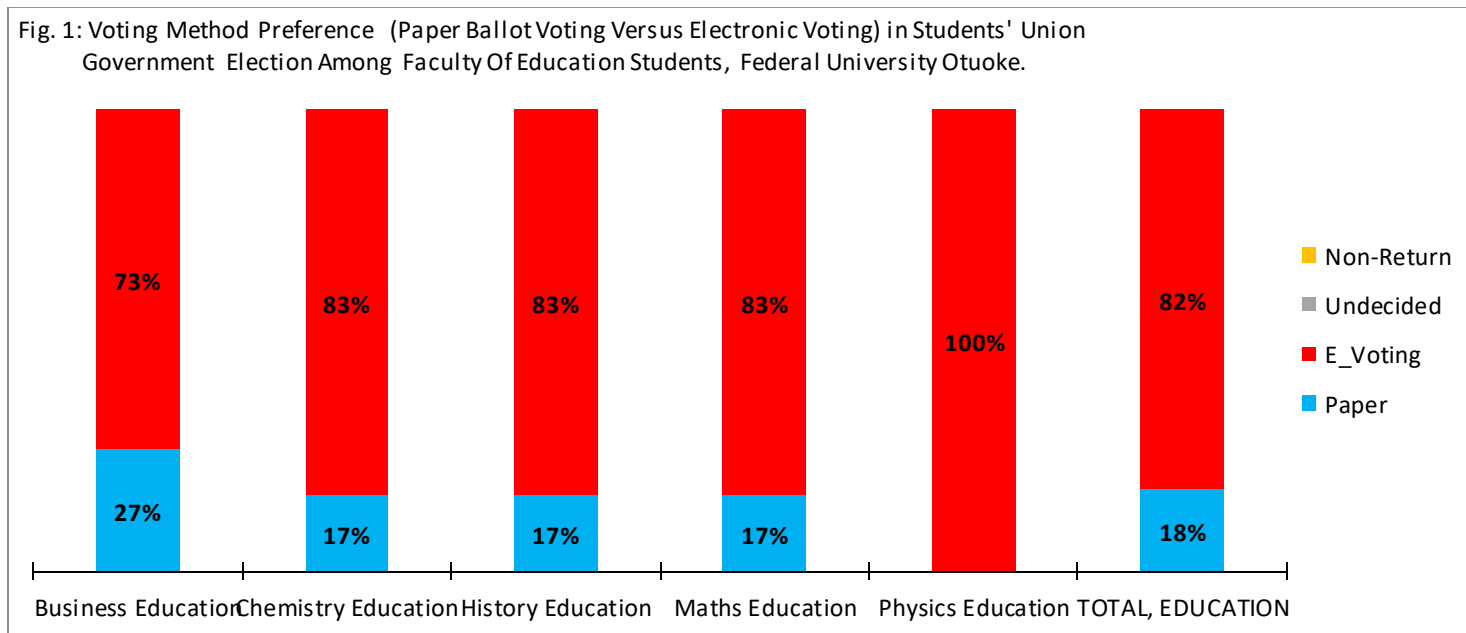
For the purpose of this study, a list of FUGO students according to department was obtained and used as the population frame of 5,953 used for this study. Each student per department was assigned a 3-digit numeric code starting with 000 for the first student in the departmental list. A 3-digit table of random numbers was used to select the students to be included for analysis on departmental basis. 15% of the number of students per department was selected; a sum total of 893 was selected for the study in the entire University which constituted the study sample, using the stratified sampling technique. Structured

questionnaires bothering on students' extent of their preferences between paper ballot voting system and e-voting system were administered to the 893 selected students. The students were given 2 weeks to respond to the questionnaire. The questionnaires were collected from the students, the contents were statistically analyzed using simple percentage according to departments and faculties across the University. The hypothesis was tested using Chi-square and t-test statistical tools. The results of the analysis are discussed according to faculties and on departmental basis as shown below.

Results

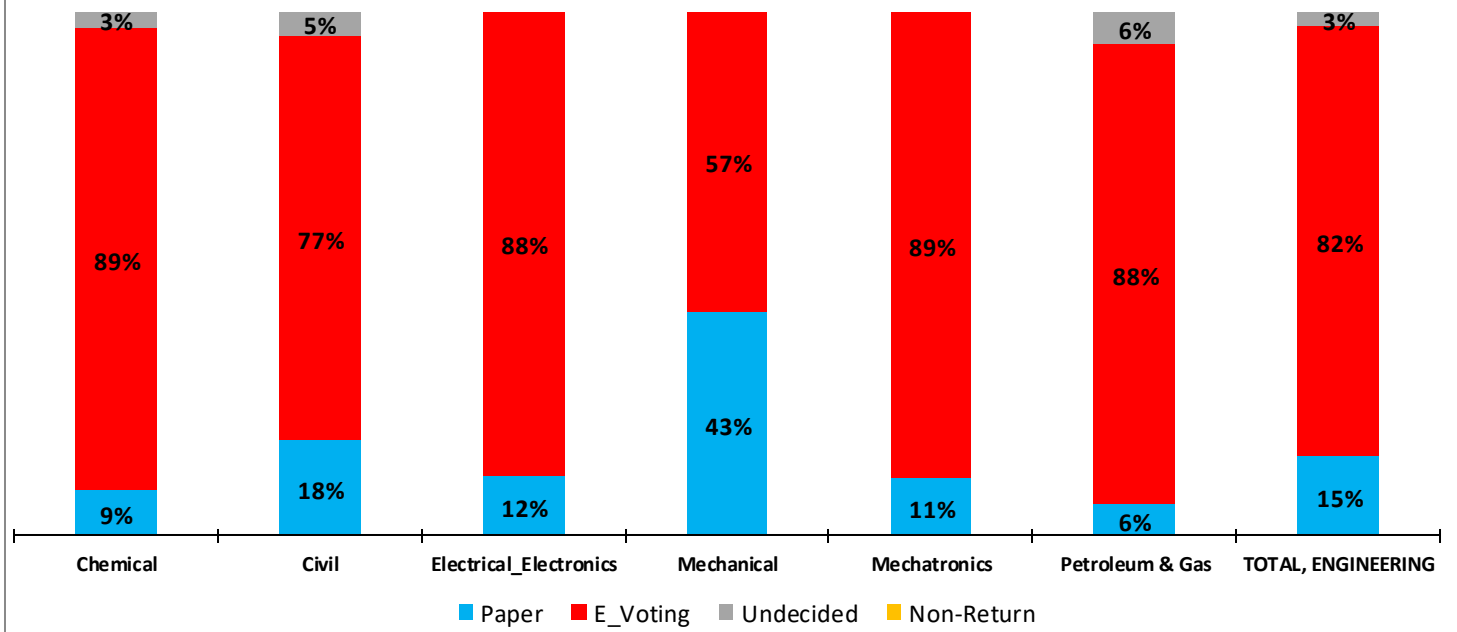
Faculty of Education: Results showed that of the 15 administered questionnaires in the Department of Business Education, 4 representing 26.7% was in favour of paper ballot, while 11 representing 73.3% was in favour of e-voting (Fig. 1). In Chemistry Education, 2 representing 16.7% of the 12 administered questionnaires favoured paper ballot voting with the remaining 10 favouring e-voting system (Fig. 1). In the Department of History Education, 15 questionnaires were administered with 3 representing 16.7% being in favour of paper ballot voting, while the remaining 12 representing 83.3% favoured e-voting system (Fig. 1). In Mathematics Education, of the 6 administered questionnaires, 1 representing 16.7% was in favour of paper ballot voting system, while the remaining 5, representing 83.3% favoured e-voting system (Fig. 1). In Physics Education, all the 4 representing 100% administered questionnaires favoured e-voting (Fig. 1).

In the Faculty of Education as a whole, a total of 52 questionnaires were administered, 9 representing 17.9% favoured paper ballot voting system, while the remaining 43 (82.1%) was in favour of e-voting. Consequently, majority (over four-fifth) of the students in the Faculty of Education preferred e-voting system to paper ballot voting system (Fig. 1).



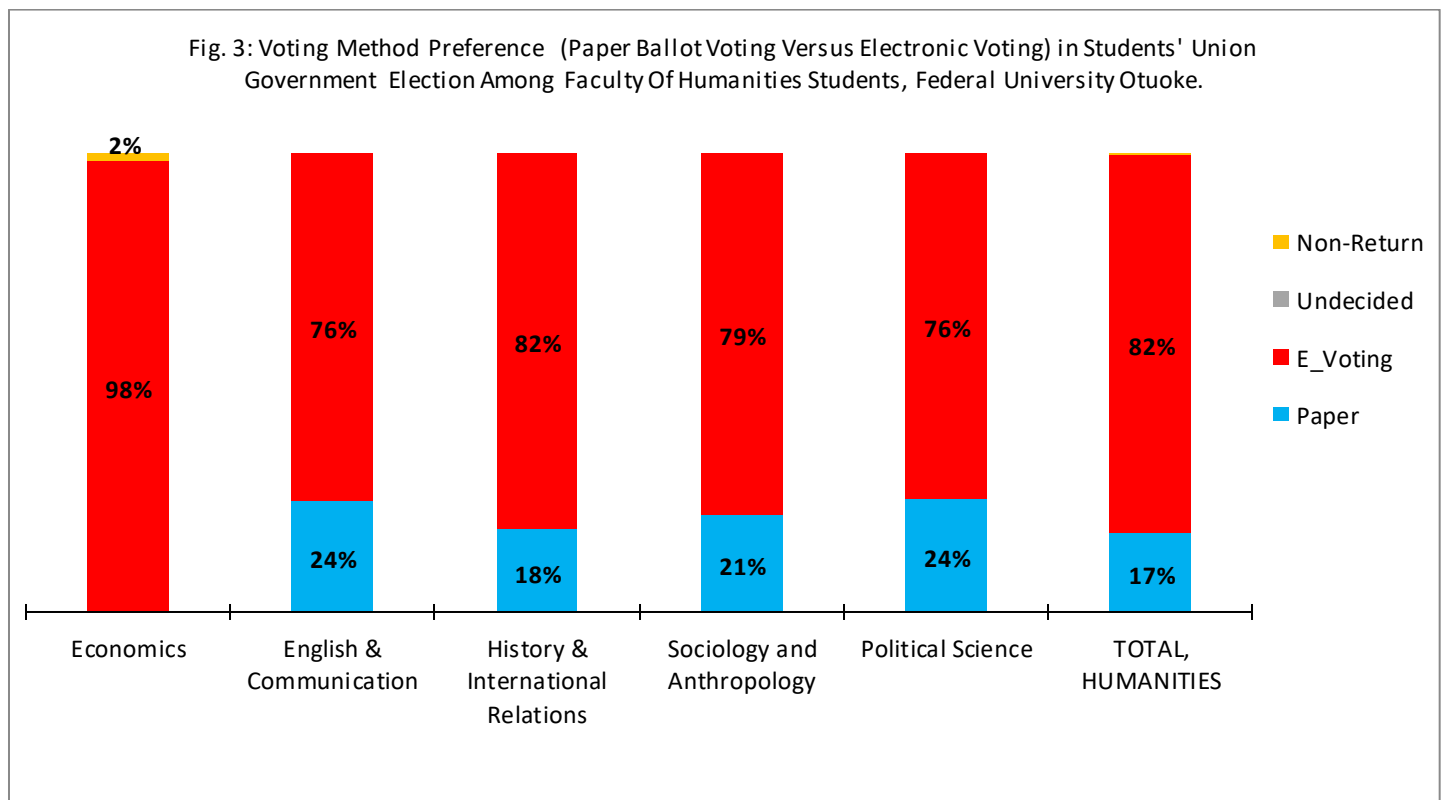
Faculty of Engineering: Study results showed that 3 (8.6%) out of the 35 administered questionnaires in the Department of Chemical Engineering favoured paper voting, while 31 (88.5%) favoured e-voting. There was 1 undecided, representing 2.9% of the administered questionnaires in the department (Fig. 2). In the Department of Civil Engineering, a total of 22 questionnaires were administered out of which 4 representing 18.0% favoured paper ballot voting system, 17 (77.0%) favoured e-voting system, while 1 (5%) was undecided (Fig. 2). There were 26 questionnaires administered in the Department of Electrical and Electronics out of which 3 (11.5%) preferred paper ballot voting to e-voting, while the remaining 23 (88.5%) preferred e-voting to paper ballot voting system (Fig. 2). The preference between paper ballot voting system and e-voting system among students in the Department of Mechanical Engineering was close with 9 (42.9%) out of the 21 administered questionnaires preferring paper ballot voting, while 12 (57.1%) preferred e-voting (Fig. 2). The preference between paper ballot voting system and e-voting system among students in the Department of Mechatronics was different from that of the Department of Mechanical Engineering. Only 1 representing 11.1% of the 9 administered questionnaires in the department favoured paper ballot voting, while the remaining 8 (88.9%) preferred e-voting system (Fig. 2). Voting preference among students in the Department of Petroleum and Gas Engineering was akin to that in other departments except the Department of Mechatronics; only 2 representing 6.2% out of the 32 administered questionnaires preferred paper ballot voting. 28, representing 87.5% preferred e-voting, while 2 (6.3%) was undecided. Overall, in the Faculty of Engineering, 22 representing 15.2% of the administered 145 questionnaires preferred paper ballot voting system, while 119 (82.0%) preferred e-voting and 4 (2.8%) was undecided. Consequently, majority (over four-fifth) of the students in the Faculty of Engineering preferred e-voting to paper ballot voting system (Fig. 2).

Fig. 2: Voting Method Preference (Paper Ballot Voting and Electronic Voting) in Students' Union Government Election Among Students Of Faculty Of Engineering, Federal University Otuoke.



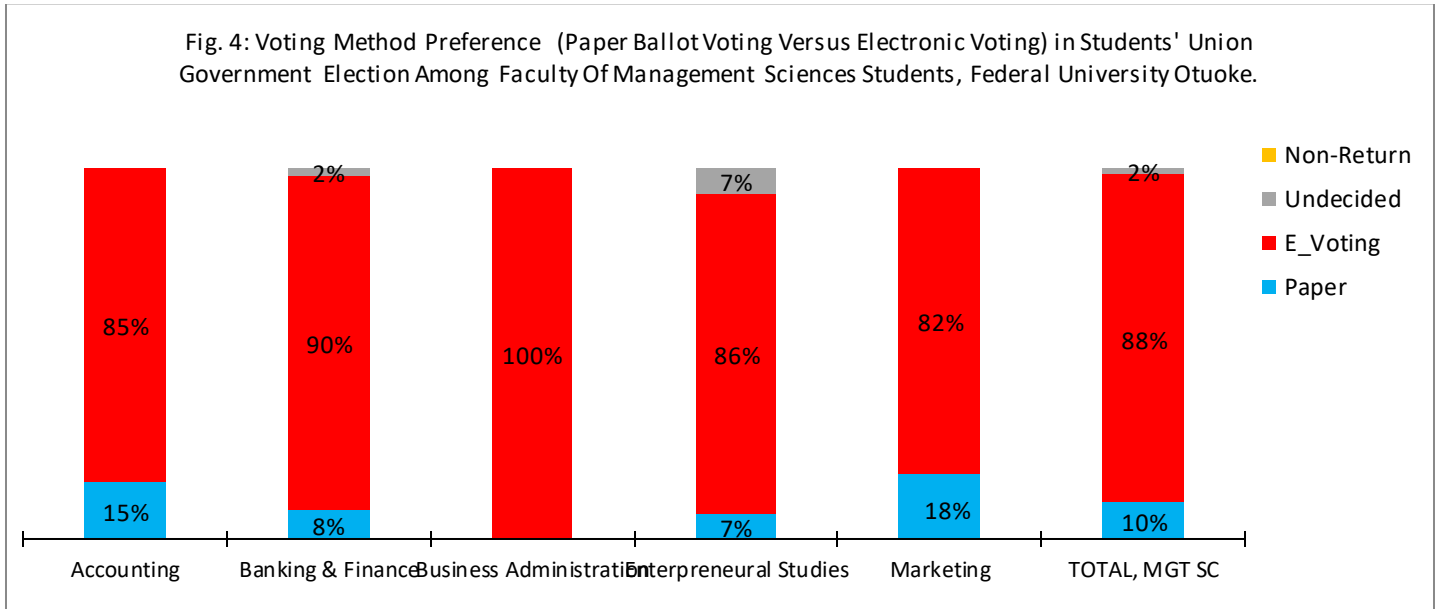
Faculty of Humanities: Study results showed that 46 representing 97.9% of the 47 administered questionnaires in Economics and Developmental Studies Department preferred e-voting system, none had preference for paper ballot voting. Non-return was 1 representing 2.1% of administered questionnaires. In the Department of English and Communications, 29 questionnaires were administered

out of which 7 (24.1%) preferred paper ballot voting, while the remaining 22 (75.9%) preferred e-voting. The trend in the Department of History and International Relations is not different. Out of the 56 questionnaires administered, 10 representing 17.9% preferred paper ballot voting system, while the remaining 46 (82.1%) preferred e-voting system. In the Department of Sociology and Anthropology, 13 representing 21.0% of the 62 administered questionnaires preferred paper ballot voting, while 49 (79.0%) preferred e-voting system. In the Department of Political Science, 11 representing 24.4% of the 45 administered questionnaires in the department favoured paper balloting, while 34 (75.6%) favoured e-voting. Overall, in the Faculty of Humanities, 41 students (17.2% of the 239 administered questionnaires) preferred paper balloting, while 197 (82.8%) preferred e-voting. One questionnaire was not returned representing 0.4% of administered questionnaires in the departments. Consequently, majority (more than four-fifth) of the students in the Faculty of Humanities preferred e-voting to paper ballot voting system (Fig. 3).



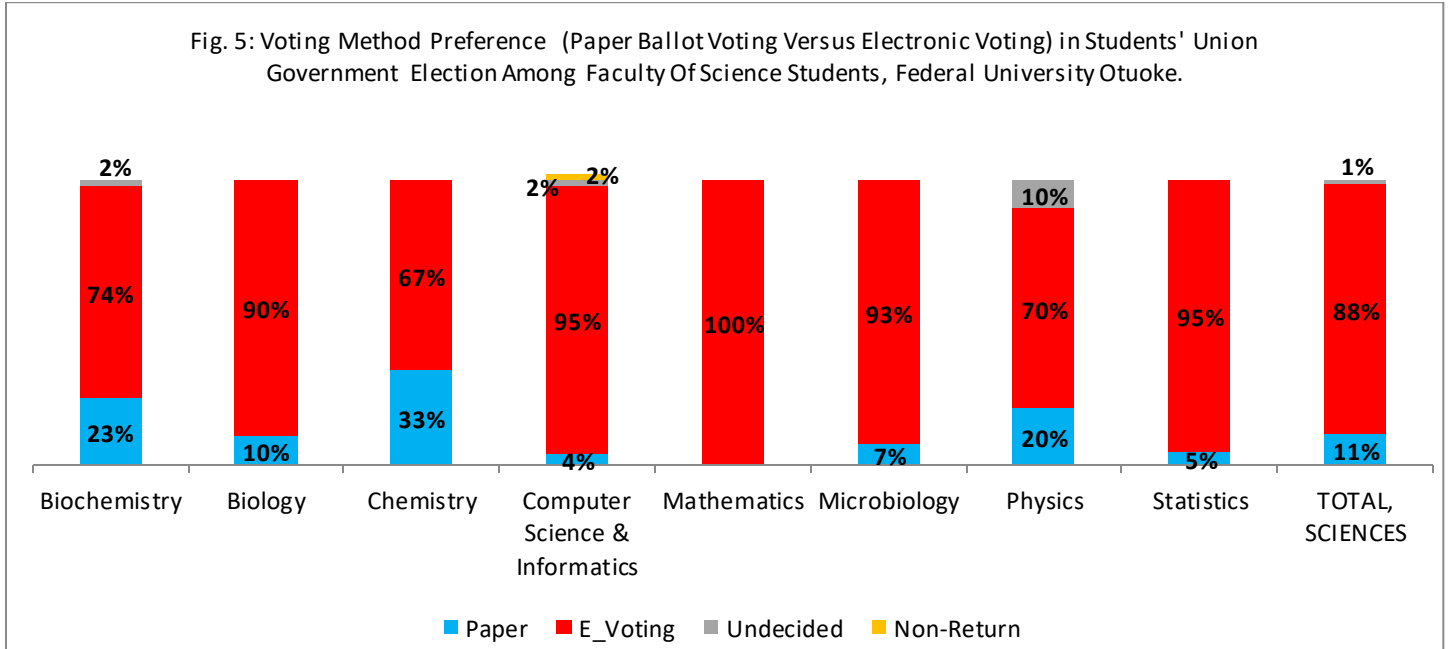
Faculty of Management Science: 39 questionnaires were administered in the Department of Accounting out of which 6 representing 15.4% of administered questionnaires preferred paper ballot voting method, while the remaining 33 (84.6%) preferred the e-voting system (Fig. 4). The same trend was apparent in the Department of Banking and Finance with 4 (8.0%) of the 50 administered questionnaires favouring paper ballot voting system, while 45 (90.0%) favoured the e-voting system. There was 1 (2.0%) non-return. 38 questionnaires were administered in the Department of Business Administration, all were returned and all 38 (100%) favoured e-voting. 43 questionnaires were administered in the Department of Entrepreneurial Studies, 3 (7.0%) were not returned, the remaining 40 were returned and analyzed. Out of the 40 returned questionnaires, 3 (7.0%) favoured paper ballot voting, while 37 (86.0%) favoured the e-voting system (Fig. 4). The situation in the Department of Marketing is similar to that of the Department of Entrepreneurial Studies. In the former, all the 51

administered questionnaires were returned. 9 (17.6%) favoured paper ballot voting system, while the remaining 42 (82.4%) favoured e-voting. Overall, in the Faculty of Management Science, 221 questionnaires were administered, all were returned with 4 representing 1.8% of the administered questionnaires showing undecided, while 22 (10.0%) of the remaining preferred paper ballot voting system. This number represented about one-tenth of administered and decided students. The remaining 195 (88.2%), representing approximately nine-tenth of the decided students favoured e-voting system (Fig. 4). Consequently, in the Faculty of Management Science, majority (almost nine-tenth) preferred e-voting to paper ballot voting system.



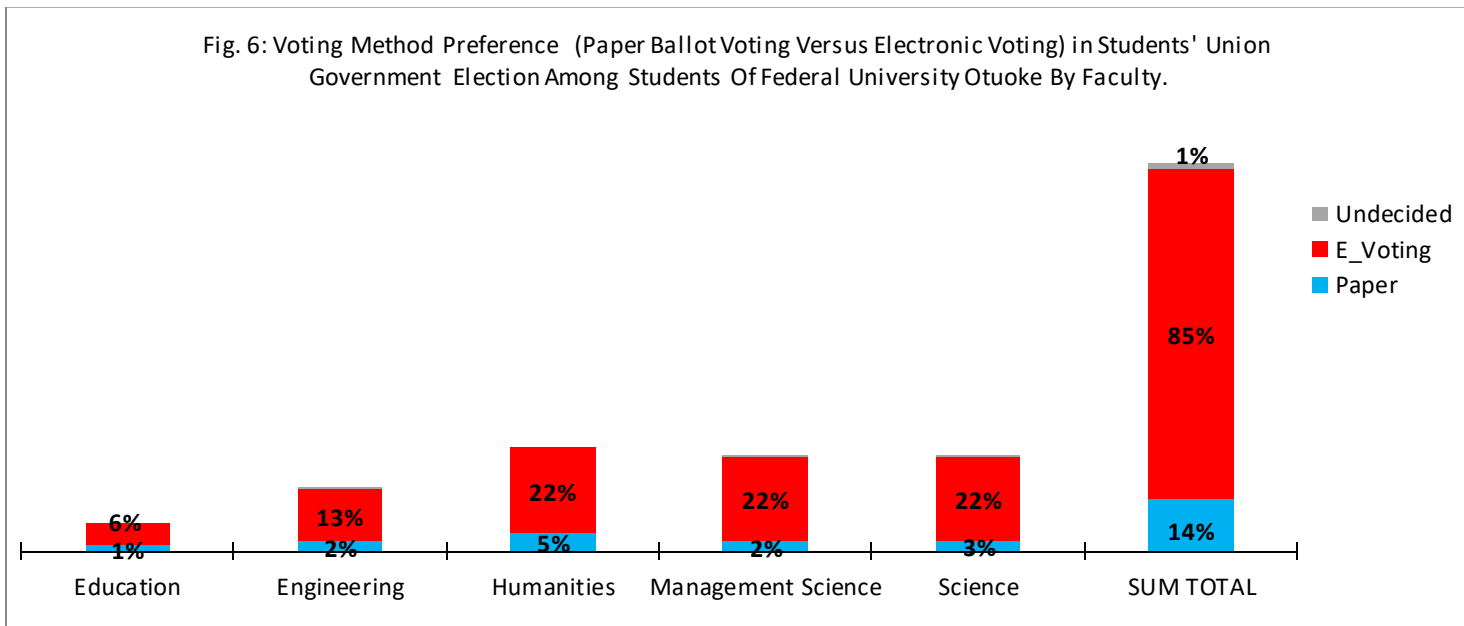
Faculty of Science: All the 47 questionnaires administered to students of the Department of Biochemistry were returned with 1 (2.1%) of this number being undecided. 11 representing 23.4% of the remaining 46 favoured paper ballot voting to e-voting, while the remaining 35 (74.5%) preferred e-voting system. The trend in the Department of Biology was a bit different with 3 (10.3%), about one-tenth of the 29 administered questionnaire favouring paper ballot voting, while 26 (89.7%), almost nine-tenth preferred e-voting system (Fig. 5). In the Department of Chemistry, 6 questionnaires were administered to the students, and all were returned. One-third, 2 (33.3%) of these students favoured paper ballot voting system, while the remaining two-third, 4 (66.7%) preferred e-voting (Fig. 3). Almost all 53 (96.4%) of the 55 students to whom questionnaires were administered in the Department of Computer Science and Informatics preferred e-voting to paper ballot voting system, while 2 (3.6%) preferred paper ballot voting. The same trend was apparent in the Department of Mathematics with all (100%) the 10 students to whom questionnaires were administered, preferring e-voting (Fig 5). Microbiology students demonstrated similar traits with 3 (7.0%) of the 43 administered questionnaires being in favour of paper voting, while the remaining 40 (93.0%) preferred e-voting. The trend among Physics students with 10 administered questionnaires was similar to those of Chemistry who also had few administered questionnaires. 2 (20.0%) of the students of the Department of Physics preferred paper ballot voting system, the remaining 7 (70.0%) preferred e-voting while, 1 (10.0%) returned undecided. Among students of the Department of Statistics to whom 21 questionnaires were administered, 1 (5.0%) favoured paper ballot voting system, while 20 (95.0%) preferred e-voting (Fig.5). Overall, in the Faculty

of Science, slightly over one-tenth (11%) of the 221 students to whom questionnaires were administered preferred e-voting, while almost nine-tenth (89%) preferred e-voting. There were 3 students who were undecided. Consequently, as in other faculties, most of the students of the Faculty of Science preferred e-voting, while only a few preferred paper ballot voting system (Fig. 5).



University-wide: Overall, a total of 893 questionnaires were administered to students across the various departments in the University, 892 were returned, 1 (0.2%) was not returned. 11 of the returned 892 questionnaires was undecided, this represented 1.2%. 121 representing 13.5% of the returned 892 questionnaires preferred paper ballot voting, while 760 representing 85.1% preferred e-voting. Consequently, most (over four-fifth) of the students in the University preferred e-voting system to paper ballot voting system in Students' Union Government election in the University (Fig. 6).

Fig. 6: Voting Method Preference (Paper Ballot Voting Versus Electronic Voting) in Students' Union Government Election Among Students Of Federal University Otuoke By Faculty.



Department Basis: Study results using Chi-Square test further showed that the hypothesis stating that ‘there is no statistically significant difference in students’ perception of FOU SUG elections on the use of e-voting over paper balloting system at the Federal University Otuoke was accepted at the 95% significance level ($\alpha = 0.05$) in only 5 of the 29 departments, while in the remaining 24 departments, it was rejected at the 95% significance level (Table 1). This implies that in 29 departments: Chemistry, History, Physics (all in Education Faculty), Chemical Engineering, Civil Engineering, Electrical-Electronics Engineering, Mechatronics, Petroleum and Gas (all in Engineering Faculty), Economics, English and Communications, History and International Relations, Sociology and Anthropology, Political Science (all in Humanities Faculty), Accounting, Banking and Finance, Business Administration, Entrepreneurial Studies, Marketing (all in Management Science Faculty), Biochemistry, Biology, Computer Science and Informatics, Mathematics, Microbiology, Statistics (all in Science Faculty), students preferred electronic voting to paper ballot voting during Students’ Union Government (SUG) elections in the University. However, in 5 departments (Business Education, Mathematics (Education Faculty), Mechanical Engineering (Engineering Faculty), Chemistry, Physics (Science Faculty) there were no statistically significant difference in students’ preference between paper ballot and electronic voting systems at SUG election at the 95% significance level. However, there was a statistically significant difference in students’ preference between paper ballot and electronic voting systems at SUG elections at lower significance levels with students preferring e-voting to paper ballot voting. In the department of Business Education, the difference was significant at the 92.5% significance level ($\alpha = 0.075$), 85% significance level ($\alpha = 0.15$) in Mathematics (Education Faculty) and 90% significance level ($\alpha = 0.10$) in Physics (Science Faculty) (Table 1).

Faculty Basis: Study results using Chi-Square test further showed that the hypothesis stating that ‘there is no statistically significant difference in students’ perception of FOU SUG elections on the use of e-voting over paper balloting system at Federal University Otuoke was rejected at the 95% significance level in all the 5 faculties (Table 2). This implies that students in all the 5 faculties preferred e-voting to paper ballot voting at SUG elections. This finding tallies with the results on departmental basis discussed earlier.

University-wide: Study results using Chi-Square test further showed that the hypothesis stating that ‘there is no statistically significant difference in students’ perception of FUIO SUG elections on the use of e-voting over paper balloting system at Federal University Otuoke was rejected at the 95% significance level when all the data for all the 5 faculties were collapsed (Table 3). Overall, students of the Federal University Otuoke preferred the e-voting system as against paper ballot voting system during SUG elections. The same conclusion was reached when the data were subjected to analysis using t-test statistics. Finding showed that the hypothesis stating that ‘there was no statistically significant difference in students’ perception of FUIO SUG elections on the use of e-voting over paper balloting system at Federal University Otuoke was rejected even at the 99.99999% significance level (Table 4). In conclusion, students of the Federal University Otuoke preferred the e-voting system to the paper ballot voting system during SUG elections.

Table 1. Statistics of Chi-Square Test Between Paper Ballot and E-voting Systems Among Students of Federal University, Otuoke By Department.

Faculty	Department	# of Students	Hypothesis Result ($\alpha = 0.05$)	Other Comments
Education	Business Administration	15	Accepted (A)	Rejected at 92.5% significance level ($\alpha = 0.075$).
	Chemistry	12	Rejected (R)	
	History	30	Rejected (R)	
	Mathematics	06	Accepted (A)	Rejected at 85% significance level ($\alpha = 0.15$).
	Physics	04	Rejected (R)	
Engineering	Chemical	34	Rejected (R)	
	Civil	21	Rejected (R)	
	Electrical-Electronics	26	Rejected (R)	
	Mechanical	21	Accepted (A)	
	Mechatronics	09	Rejected (R)	
	Petroleum & Gas	30	Rejected (R)	
Humanities	Economics	46	Rejected (R)	
	English & Communications	29	Rejected (R)	
	History & International Relations	56	Rejected (R)	
	Sociology and Anthropology	62	Rejected (R)	
	Political Science	45	Rejected (R)	
Management Science	Accounting	39	Rejected (R)	
	Banking & Finance	49	Rejected (R)	
	Business Administration	38	Rejected (R)	
	Entrepreneurial Studies	40	Rejected (R)	
	Marketing	51	Rejected (R)	
Science	Biochemistry	46	Rejected (R)	
	Biology	29	Rejected (R)	
	Chemistry	06	Accepted (A)	
	Computer Science & Informatics	54	Rejected (R)	
	Mathematics	10	Rejected (R)	

	Microbiology	43	Rejected (R)	
	Physics	09		Accepted (A)
	Statistics	21	Rejected (R)	
				Rejected at 90% significance level ($\alpha = 0.10$).

Table 2: Statistics of Chi-Square Test Between Paper Ballot and E-voting Systems Among Students of Federal University, Otuoke By Faculty.

Faculty	df	Cal. χ^2	Cri. χ^2	Hypothesis ($\alpha = 0.05$)	Comment
Education	4	72.2537	9.488	Rejected	Rejected at all significance levels.
Engineering	5	105.0426	11.070	Rejected	Rejected at all significance levels.
Humanities	4	128.0504	9.488	Rejected	Rejected at all significance levels.
Management Science	4	143.9677	9.488	Rejected	Rejected at all significance levels.
Science	7	290.0367	14.070	Rejected	Rejected at all significance levels.

Table 3: Statistics of Chi-Square Test Between Paper Ballot and E-voting Systems Among Students of Federal University, Otuoke.

School	df	Cal. χ^2	Cri. χ^2	Hypothesis ($\alpha = 0.05$)	Comment
Fed. Univ. Otuoke	28	915.6833	41.340	Rejected	Rejected at all significance levels.

Table 4: Statistics of Students' t-Test Between Paper Ballot and E-voting Systems Among Students of Federal University, Otuoke.

Statistic	Paper Ballot Voting	Electronic Voting	Comment
Descriptive			
Number of Obs. (n)	29	29	
Sum (Σ)	121	760	
Sq. Sum of Obs. (Σ^2)	14,641	577,600	
Mean (μ)	4.172414	26.206897	
Variance_Population (σ^2)	13.590963	223.267539	
Variance_sample (σ^2) σ^2_{n-1}	14.076355	231.241379	
SD_Population (σ)	3.686592	14.942140	
SD_sample (σ^2_{n-1})	3.751847	15.206623	
Inferential			
df	28	28	
Diff btw Means	21.615934		
Calculated t value @ df = 28	7.444189		
Critical t value @ df = 28*	2.048		
Hypothesis Tested	There's no statistically significant difference in students' percentage preference of e-voting over paper balloting system at Federal University Otuoke.		
Significance Level (s.l.) (%)	95%		
Alpha level (α)	0.05		
Hypothesis Result	Rejected at the specified alpha level.		

*	Neave, Henry R. (1979). Statistical Tables for mathematicians, engineers, economists and the behavioural and management sciences , Third Impression. George Allen & Unwin Ltd, London.
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Discussion

According to Sanjay & Ekta (2011), e-voting is intended both to reduce errors and to speed the counting process. Its advantages over the traditional ballot paper system are;

- i. Eliminating the possibility of invalid and doubtful votes which, in many cases are the root causes of controversies and election petitions.
- ii. Making the process of counting of votes much faster than the conventional ballot paper voting system.
- iii. Reducing to a great extent the quantity of paper used thus, saving cost and making the process eco-friendly amongst others.

Findings from this study revealed that students of the Federal University Otuoke (FUO) preferred e-voting system to paper ballot voting system during SUG election which agrees with findings of similar studies elsewhere. Molokwu and Agu (2014) in their study revealed that the majority of the students at the main campus, University of Benin, Ugbowo, Benin City, Edo State, Nigeria, preferred the e-voting system to the manual paper ballot voting system adopted in the institution during SUG elections. The findings from that study showed that 25, representing 25% of the returned 100 questionnaires, were satisfied with the manual paper ballot voting system used at the institution, while 62% were unsatisfied; 13% was undecided. 72% agreed that the “proposed automated Voting System [e-voting] will go a long way in tackling the limitations of the manual secret-ballot voting system [paper ballot voting]”, 16% was undecided, while 12% opined that it will not. 73% agreed that they will prefer e-voting system, 8% will not prefer e-voting system, while 17% were undecided⁵.

This is not surprising as e-voting is seen as a modern system of voting with seemingly numerous and convincing advantages over the traditional paper ballot voting system as a writer rhetorically posited; “In a world where your kettle can be connected to the internet, why is voting still done on paper?” This could be one of the reasons for the global trend towards electronic voting method at elections, including Students’ Union Government elections. The preference of voters for e-voting system stems from their disappointment and dissatisfaction with the paper ballot voting system. This disappoint and dissatisfaction against paper ballot voting method has been manifested in many different ways including numerous election petitions filed against acclaimed winners of elections where the paper ballot voting method has been adopted, violence during SUG elections, which Adekitan, etal. say, ‘dates back to the 1988 (ABU) Ahmadu Bello University crisis’. The advantages which have been adduced for e-voting system over paper ballot voting system include the following:

Cost Effectiveness of E-voting: The traditional paper ballot voting system is said to be expensive to run, even for the rich advanced economies due to the total cost of procurement of election materials. This cost stems from among others, the cost of printing ballot papers with the names and photographs of each contestant, and possibly their party affiliations, the cost of manufacturing ballot boxes, the cost of purchasing indelible ink used for voting, the cost of transporting both ballot papers and ballot boxes to the polling centers, the cost of recruiting vote counters after elections, and in some cases for recounting of votes. Unlike in paper ballot voting, e-voting does not require the printing of ballot papers, the purchase of the indelible ink, the manufacture of ballot boxes

or the transportation of these election materials from one place to another. Neither does it require vote counters as votes are electronically counted.

Time Wastage: Usually, so much time is needed to cast and count votes when using paper ballot voting system. Worst still, if votes have to be recounted. The total time required for one voter to cast his/her vote include travel time from the voter's residence to the polling center, the time used on accrediting the voter, the time required to thumb-print the ballot paper during voting, the time required to manually count, and possibly recount the votes. This could account for why 67% of the students of University of Benin main campus said the manual voting system in the university SUG election was 'time consuming'. According to the study by Molokwu, et al (2014), only 13% said it was not time consuming, while 20% was undecided. With the e-voting system however, the voters can cast their votes from the confines of their home with no need for travels. Even if he needs to travel to an approved voting center, the time required to cast vote electronically is much reduced, better still with counting of votes which is done electronically within a short period of time. With the e-voting system, less time is used on the entire voting process therefore, saving much time.

Voter Participation: The e-voting system is said to encourage voters to vote thereby increasing number of people who take part in the voting process. Batt (2019) puts it this way "another major plus of electronic voting is voter engagement. Many people fail to take advantage of their right to elect their officials, even when Google begs them to vote. Advocates of e-voting argue that by offering an option to vote from home or work, more people will cast their votes". This is particularly true of the physically challenged, people with physical disability. Findings resulting from the study of Molokwu, et al (2014) supports this view. The study found out that 22% responded 'YES' to the question "Does the current Voting System encourage the participation of physically-challenged students?", while 44% responded 'NO', and 34% were undecided. The high percentage of undecided could be attributable to the fact that being physically-able, they could not determine if the system was encouraging or not to physically-challenged students.

Accuracy and Credibility: Paper ballot voting is usually seen as a primitive and less credible voting system because of human errors introduced into the election process. These human errors include stealing and vandalization of pooling boxes, pre-election voting (which is very common in developing countries, the case of Nigeria's 2019 presidential election is a case in history), and error in counting of votes which has usually resulted in recounting of votes. Losers of election where the paper ballot voting system is used had always hinged there so-call loss on all these factors to decry the credibility of elections. Human errors are said to be random, however, cumulative errors may mar the credibility of the entire election process. With the e-voting system, besides the fact that results come in with speed, the introduction of human error is erased resulting in more accurate result since votes are counted electronically and with a more acceptable result.

Security of Election Votes: E-voting system is seen to offer better security of votes than paper ballot voting system due to the multi-faceted limitations of the latter. Findings from the study of Molokwu, et al (2014) supports this view. Of the 100 returned questionnaires, 65% responded "YES" to the question; "with the current Voting system (paper ballot voting system), do you think election results can easily be manipulated?", 14% responded "NO", while 21% was undecided.

Conclusion

The study therefore, concluded that students of the Federal University Otuoke (FUO) to a very large extent, prefers e-voting to paper ballot voting system during SUG elections adding that e-voting is transparent, the electoral process is easy to manage, it is cost effective, saves time, encourages voter participation, enhances accuracy and credibility as well as promoting electoral peace and security on campus.

Recommendation

The paper recommended that the NUC should approve the use of e-voting system as a standard practice in all universities in Nigeria. Non-Governmental organizations, corporate bodies and the Federal Government of Nigeria via INEC should as well, adopt and implement the e-voting system in national and state elections, as well as the various organs and levels of governance.

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