ONLINE SOCIETIES ELECTION VOTING SYSTEM FOR APU STUDENT DEVELOPMENT USING E-LEARNING METHODS IN MALAYSIA IT INDUSTRY

Nimra Afga
School of Computing, & Technology
Asia Pacific University of Technology
and Innovation (APU)
Kuala Lumpur, Malaysia
TP047914@mail.apu.edu.my

Dr. Kamalakannan Machap
School of Computing, & Technology
Asia Pacific University of Technology
and Innovation (APU)
Kuala Lumpur, Malaysia
dr.kamalakannan@staffemail.apu.edu.my

Mr. Shounak Ghosh
School of Computing, & Technology
Asia Pacific University of Technology
and Innovation (APU)
Kuala Lumpur, Malaysia
shounakg@staffemail.apu.edu.my

Abstract— **In this paper, the research will be more focusing on The methods for voting and elections system for universities, there are two method for casting vote and that is link based and paper based voting system. A voter usually goes to access the given link to vote after register or goes to the voting stations after direct person-person verification with some IDs, the voter is allowed to vote. The voter is then given a ballot which allows a single vote. Once the ballot is used, it cannot be used again. However, this ballot must also be anonymous. The ballot must identify the voter as being permitted to vote, but not reveal their actual identity, and the voter must also be given assurances of this. Traditional polling methods trust a lot of parties during the election. The current methods require an attacker interact directly with the voting process to disrupt it. The existing method is a paper-based method consist of many problems. Firstly, most of the students think it is a waste of time to go and cast the vote because it is time consuming and it does not provide the accurate statistics on voting history. The manual voting consumes almost 4-6 hours (approximately) for every voter which is surely not bearable. (J. M. Nzoka, N. M. Muthama, and N. M. Mung'ithya) The existing system has a problem of fraud and chances of manipulation of the result. Also, there are some disable and duty-bond people who do not have access to voting booth. To overcome all the problems mentioned above, an online election and voting system for APU is proposed. (Fabio Muniz 2016) Mostly, polling place is assigned in the classes. This is often based on several factors, including the number of voters in each precinct, size/location of the polling place facilities and the expected voter turnout for each polling place. Voters must have their student ID card for casting vote. In this paper we proposed Online Societies Election Voting System will have some deliverables. Such as, admin will be able to add and delete the students/voters and candidates. Candidates will be able to select the position and add their campaign to get the votes. Lastly, voters can view the candidates list and their campaigns to decide who to vote. The web application would be efficient, the process will be shorter, it will be less time consuming and cost-free system.**

Keywords— **e-voting, security, Internet, system accuracy, central vote counting system and polling.**

I. INTRODUCTION

Election is an important part of democracy. Election is a repetitive process that take place every specified time of the year in APU. The election takes place to assign three individual president, vice president and operation manager for each society. This gives a chance to students to choose their leaders from the society of their same nationality people. For the election, APU use manual method of voting where students need to be present at APU to cast their vote on Election Day. Online society's election voting system is a substitution of current voting system. The implementation of Online Societies Election Voting System would allow the increase of potential voters. It is a web Application that would give the voters choice of voting at their own free time within the election time period, there is no need to be present at APU and queue up. The database would be used to submit the voter's data and the votes can be count within the database to find out who has the highest number of votes. The students/voters and candidates would require registering themselves by providing their personal and academic data. The system would be user-friendly and ease of voting procedure. To make the system secure verification and authenticated, one-time password (OTP) would be develop in the system. User would need to enter the one-time password after registering or logging into the system. To prevent duplicate votes, when voter register themselves, the data submitted in database ensure that the same data must not use for voting. Once a student votes and the name of the voting member appears in the database, the system will cross that person off from eligible voters list.

The researcher has explained the background of the research and problem with the current system. The reasons why new system is needed. Also, the benefits of this works are discussed about replacing the current system with a new system. The users will be target the new system and how it will be challenging in APU. In technical research has been performed by the researcher and choose the suitable proposed system is interactive development environment for voting system. The database management system is provided with comparison to decide which one is suitable and operating system, web server, web browser for project have chosen to help the developer. The system development methodology helps the project to achieve the goals, to support software, and in requirement gathering. Research methods have chosen to research about the project about the problem, benefits and usage. The research took place within APU from students and analyzed by the developer to get the idea of user's perception

and need. Researcher also needs to describe the findings about the project well after gathering of the data.

II. SCOPE OF THE RESEARCH

The online society's election voting system will be highly automatic. The registration will be provided to students to register themselves into the system unlike existing system there is no registration for voters. The election period will be announced to APU students using the various communication medium including social media, web space and screens available in APU. The voters would require registering by filling out form with details such as student's name, student's TP number, student's nationality, student's DOB, the user's Id and password will be given by the admin. The registration id would help voters to login and cast the vote for deserving candidate and for candidates to put up their information on the website to get votes. The system will be secured and precise with OTAC.

The phenomenal use of internet as a vehicle for improving communication, access to information and electronic commerce led to the claim that the internet could be used as additional voting system. The APU students have the choice of voting at their own free time and there is reduced congestion by developing online voting system. The individual votes will be submitted in the database which can be queried to find out who of the aspirants for a given post has the highest number of votes. The slow process of counting the votes in manual system will be changed into the fast-online counting by online voting system. Result page the task of voter registration is strictly preserved for the system administration. Students will be allowed to check the result by visiting the result page.

III. SIGNIFICANCE OF THE RESEARCH

1. The security issues of online voting
The main security issue of online voting system is attacks on website. This problem was found in the Western Australia 2017 state election. They discovered the online voting TLS encryption keys on servers in data centers in countries like japan, Poland and china. Worse, the online voting web application shared that TLS key with dozens of unrelated websites in countries such as Philippines, Lithuania and Argentina. (Roslan Logan Bin Abdullah, Nor Bahiah Binti Haji Ahmad (2017). The other issue is an anonymous vote makes it very difficult to verify whether the result is accurate or if there has been security compromise. To solve this issue the easiest way would be a database to check and verify the voter's identity. So, the system would not be anonyms and could lead to coercion. Another issue is authentication of a registration person. Authentication would also help to prevent the attacks on the website. When students will register themselves, they will get a onetime password to authenticate their identity.

2. Satisfy various requirements for online voting system:

A. *Fail-safe voter privacy*

Voter privacy is the inability to link a voter to vote. The requirement of voter privacy is to preserve the voter data even after the election end, there should not be revealing of voter's data before or after election. This system will preserver the voter's data at any cost, no data will be revealed on any order Ahamed Mulaffer, M. and Haleem, S. (2017).

B. *Election integrity*
Election integrity is to emphasis on creating confidence in elections. The past votes will be used to influence a vote before it is cast.

C. *Collusion-free vote secrecy*
Vote secrecy is the inability to know what the vote is. Vote secrecy must be assured even if all ballots and decryption keys are made known by collusion, attacks or faults. The APU online system will be collusion-free without any attacks and collusion.

D. *Accuracy*
Every vote must be correctly counted and saved to database with zero percent error to give accurate result of election.

E. *Prevent over votes*
There would be only single vote to cast. If voter tries to over-vote and it's detected, then must warn the voter that a vote has to be cleared if changing choices is desired otherwise, they can't cast multiple votes. This warning will be only made to the voter.

3. Types of voting system:

A. *Paper-Based Voting System (PVS)*
It records votes, counts votes, and produces a tabulation of the vote count from votes cast on paper cards or sheets. Some PVSs may allow voters to make selections by means of electronic input devices. Voter selections are, however, not independently recorded, stored or tabulated by such input devices.

B. *Direct-Recording Electronic Voting System*
Direct-recording electronic (DRE) voting systems utilize touch-screen terminals to record votes. A DRE is essentially a computer. Voters view ballots on a screen and make choices using an input device such as a bank of buttons or a touchscreen. Some DRE systems also employ a card swipe or cartridge system that must be activated before a ballot can be cast. Votes are stored on a memory card, compact disc or other memory device. Election officials transport these memory devices to a centralized location for tabulation, just as they would with paper-based ballots. Some machines have the capability to broadcast results over a modem-to-modem line (Nikhith 2018).

C. *Public Network Direct-Recording Electronic Voting System*
Make use of electronic ballots and transmit vote data from the polling stations to other locations over a public network. The votes may be transmitted as individual ballots as they are cast, or periodically as batches of ballots, or as one single batch, at

the end of voting. In all systems, the vote totals are made public only after the close of polling. This system allows for voters to be notified of voting errors such as over voting and can prevent residual votes.

D. Central Count Voting System

Tabulate ballots from multiple precincts at a central location. Voted ballots are safely stored temporarily at the polling station. These ballots are then transported or transmitted to a central counting location. CCVSs may, in some cases, produce printed reports on the vote count. It can be done by hand and in some jurisdictions. Voted ballots are typically placed into secure ballot boxes at the polling place.

IV.   RESEARCH METHODOLOGY

1. Research Approach

Waterfall as the methodology to develop online voting system due to several justifications. The precursor of the approach is a sequential and organized approach where a complete specification is developed with phases taking place in the order they are designed. Waterfall is more successful if you already have elements of the plan in place. The system that developer is developing can go by a plan easily because it is simple structured website with organized requirements (Kiss flow 2019).

After completing the system design phase, the model will proceed to next phase Implementation. The design will be taken from system design phase to start coding. Since online voting requires security so security will be high priority in the implementation. All the pages required will be started coding one by one. Firstly, registration page will be coded and then other pages. This is one of the most important and difficult phases. For security there will be a coded page with SMS-tac. After implementing the design waterfall continue toward nextphase which is testing. Testing is the most important phase for online voting system because this is a real-time system, so it has to conduct well before launching for APU students. If any bug can be found in testing phase, developer can fix those bugs and retest to ensure that bug is fixed. There will be usability testing with APU students to ensure that the system works well. Design reviews will be conduct in the form of questionnaire, interview and survey. The data will be analyzed to make sure system tested fully. The next phase is deployment. After completing implementation and testing the system will be ready to launch for APU students in this phase and if students find the website as expected then developer proceed to next phase. The last phase is maintenance in which developer will ensure the Online voting system is running smoothly without any downtime.

2. Requirement Analysis

The potential requirements of the application are methodically analyzed and written down in a specific document that serves as the basis for all future development. In Online voting system, the requirements of voter and system will be analyzed. In research investigation where all the requirements will be written down to work on those requirements in the implementation phase (UKEssays 2017).
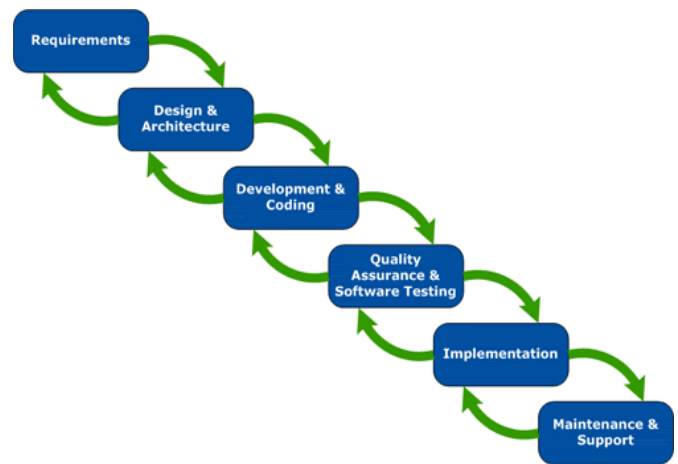

Figure: 1. Research Process Model

A. System Design

System design phase largely covers the technical design requirements like plan the programming language, chose the database system for the application, hardware and defining the overall system architecture. The project online voting system's high-level technical details and software details are required to be finalized in this phase.

B. Implementation

Coding and software starting to requires implementing of all models, business logic and service investigation. The system is developed in smaller unit first that will be integrating in next phase, each unit is developed and tested for its functionality Hosany, M. and Chedembrun, N. (2017).

C. System Testing

System testing starts with the testing of units that are implemented in pervious phase. If system or unit passes the testing, waterfall continues forward. It is a necessary repeat of the coding/unit phase to find or revealed the bugs from the system.

D. System Deployment

This phase deploys the system in respective environment. Once the implementation and testing are done on the system, it is ready to launch in the market.

E. System Maintenance

The system is completed and ready to use. Maintenance could be needed according the customer/user's requirements. After completing all the phases, the online voting system will be ready to use in APU for the online election, but subsequent support might require updating and maintained the system.

V.   CONSTRUCT VALIDITY AND RELIABILITY

1. Research Validation

Construct validity main aim is to identify if the interpretation created about the results and assessment are meaningful and support the purpose of assessment. Primary research is a method used by developer to collect the data rather than depending on pervious collected data. Primary research is simply carried out to address a certain problem.

Primary research provides result specifically about the system. This research is developer's own original work. Primary research is used to validate system idea, evaluating the need for the system among the students, examining the problem statement, understanding the student's pain point and preference and informed decision in the favor of system. The advantage of primary search is that data collected is firsthand and accurate. Primary research allows researcher to go in depth to get the data according to the system. There is control in collecting data by researcher. It is up to researcher how they collect and use the data. Although this method of research is time consuming but worth of it because of the accurate data. The data will be collected in two ways quantitative and qualitative. (Fabio Muniz, 2016).

2. *Qualitative Research Validation*

In quantitative form of collecting data, the questionnaire has chosen. It is a research technique that is used to collect the data from respondent. There are two types of questions in this an open-ended questions and close-ended questions. Open-ended questions are long form questions which requires respondent to answer with elaborating their thoughts. Close-ended questions are short form of questions which doesn't require respondents to respond with very long answers. Additionally, the questionnaire has a limitation which is, the respondent has to read all the questions and answers them all. If respondent does not have the knowledge of system, they can't answer the questions. The questionnaire will be done among APU students to gather the data about system. The data will help to develop the system according to their preferences by analyzing the student's opinions and suggestions. The pervious election for communities of APU has taken place few months ago, the questionnaire will be given to them to collect their experience. The experience and opinion they have will help the developer to analyze their preference.

3. *Quantitative Research Validation*

In quantitative research validation the research is using Qualitative form of collecting data, this method focuses on collecting the data through conversation communication. People cannot only have response in one word or to close-end questions. (Fabio Muniz, 2016).It is used to get understanding of underlying reasons and opinions. Qualitative data collection methods are interview, focus group and observations. Today our world is more complicated, and it is difficult to understand what people think and perceive. Qualitative research method makes it easy to understand that as it is more communicative and descriptive. The chosen method is Interview. There are three types of research interview. Structured, semi-structured, and unstructured. Structured interviews are verbally administrated interviews and essentially. The questions are relatively quick and easy and particular use of clarification. The semi-structured is consists of several questions that help to define the part to be explored, but also interviewee needs to response in more details. The unstructured interviews are performed by no organization and they simply start with an opening question. They are usually very time-consuming and can be difficult to manage. The purpose of the interview is to explore and understand the views, experience and preference of individuals on this system.

VI.   CONCLUSIONS

In this research project is providing The Online Societies Election Voting System for APU Student which is developed by the developer can help to solve the problems which found on the problem statements. The data and information will be used for referencing the design of the system. Due to the problems, the new voting system is needed and also a solution for the problems. Students can easily register themselves and cast a vote according to their wish. By doing this report, it has benefited developer to dig in more specific information in domain and technical research. Developer will create the system according to chosen database management, programming language, IDE, system development methodology and research methods. This system will be web application. Web application is a sincere effort by the developer to meet the requirements of final year project. Every project needs an initial time to analyze the system, to gather requirements and carry out the feasibility studies to evaluate which hardware and software fits the best. The calculation of success factors has been evaluated before starting the project. The developer has spent a lot of time in planning, researching, analyzing to complete this research report. The proposed system is made to use for only Asia Pacific University students. Students can use this proposed system to cast online voting in society's elections. The developer has mentioned aims and objective to achieve for this project. The deliverables of the system will allow the students of APU to vote among the societies. There are a lot of features and functionalities that can be merged in the end of the system. However, the investigation has been done for the proposed system to provide the most critical things that can be discussed in the report, and that can make researcher ensure to develop the new system. The questionnaires and interviews have been held to get the ideas of preferences of APU students about proposed system. The suitable methodology is waterfall with what this report works through such as, analyzing the requirements to server the basis for future development. This report was made by analyzing all the requirements that developer needs to develop the proposed system. A researcher learnt many skills and knowledge such as analysis skills, data finding methods, interviewing skills, handling questionnaire, time management skills, documentation skills, database skills, and the data have been gathered by analyzing skills.

References

Ahamed Mulaffer, M. and Haleem, S. (2017). *Web-based election system for students' unions of faculties in srilankan universities*, 8(1), pp. 47-53.

Fabio Muniz- (with example) Test Lodge Blog. (2016).*What is Usability Testing?* 14 Sep pp.1-4.

Hosany, M. and Chedembrun, N. (2017). *Design and implementation of an online voting system for the election of students of the University of Mauritius. International Journal of Advanced Research in Science, Engineering and Technology*, ISSN: 2350-0328, Vol. 4, Issue 7, July, pp.4321-4327.

J. M. Nzoka, N. M. Muthama, N. M. Mung'ithya. Taita Taveta *University College E-Voting System: A Web Based Approach to Elections Management. International Journal of Intelligent Information Systems.* Vol. 2, No. 5, 2013, pp. 70-76.

Kiss flow. (2019). Waterfall vs. RAD - *Which Development Method Is Best?* 8 Nov, pp.1-7.

Nikhith. Pprojects.org. (2018). *Online College Voting System Java Project – 1000 Projects.* 3-June, pp.7-11.

Roslan Logan Bin Abdullah 1 , Nor Bahiah Binti Haji Ahmad (2017), *E-Voting System with 2-Step Verification Security Feature, UTM Computing Proceedings Innovation in Computing Technology and Applications* Volume: 2, ISBN: 978-967-0194-95-0.pp 1-6.

System, E. (2015). E - Voting: *In the Purview of Its Reality and Practicability in Campus Election System.*10 Feb, pp.342-351.

UKEssays. 2017. Waterfall Model Vs Prototyping Model.24 April, pp-21.

Zulita Mustafa (2018). *Student activism on campus, New Straits Times. 18- April.*