Journal of Computer Networks, Architecture and High Performance Computing
Volume 3, Number 1, January 2021
https://doi.org/10.47709/cnahpc.v3i1.920

Submitted : 10 November 2020
Accepted : 22 December 2020
Published : 11 January 2021

Case Study: Mobile-Based Application for The Election of The Student Council President in Tegal City

Taufiq Abidin[1)*], Slamet Wiyono[2)], Afif Maulana Iskandar[3)]
[1)2)3)]Politeknik Harapan Bersama, Indonesia
[1)]taufiq.abidin@poltektegal.ac.id, [2)] oc_slametwiyono@poltektegal.ac.id, [3)]afifmaulanaiskandar@gmail.com

Abstract

The development of information technology at this time has brought big changes for humans, including the way to implement voting. The use of computer technology in the conduct of voting is known as electronic voting (E-Voting). With e-voting, the voting process and vote counting have become more effective and efficient. The election of the head of the student organization at school (OSIS) is an annual event that is held regularly at schools. However, elections are still carried out traditionally. In fact, in the technological era, it should be made more practical. This article discusses the making of a mobile-based application for the student council president election in schools in the city of Tegal. The method used is Waterfall. The resulting mobile application is an application that can be used by the school to make elections, where students can choose directly using a smartphone. The Blackbox test results show that the application made is following the initial design. The Whitebox test results show that the application has not found an error. As for the usability test results, the application made was accepted 80%. However, the user does not like the application interface display with a satisfaction score of only 60%.
Keywords: e-voting; application; mobile; school; OSIS

INTRODUCTION

The development of information technology at this time has brought big changes for humans, including the way to implement voting. The use of computer technology in the conduct of voting is known as electronic voting (E-Voting). With e-voting, the voting process and vote counting have become more effective and efficient. The election of the chairman of the intra-school student organization (OSIS) is an annual event that is routinely held once a year at schools. Currently, the election process is implemented in schools based on the most votes gained or what is called conventional voting. Selection is carried out using ballots that are distributed to students. Problems that occur in conventional voting are quite a several invalid ballots, ineffective voting processes, inefficient vote counting processes, and frequent fraud in the login process. Besides, most of the existing student council president and deputy e-voting applications can only be used for one school, so each school must have its e-voting application and have to pay a lot of money to have its e-voting application. Therefore, with the above problems, this study designed a tool, namely the e-voting application for the head of the OSIS (Case Study: Tegal City).

Based on the background, there are several problems, namely: the number of invalid ballots is quite high, the selection process is ineffective and efficient, fraud often occurs in the login process. This study aims to create a mobile-based e-voting application for the chairman and vice-chairman of the OSIS.

LITERATURE REVIEW

Many studies have been done that have similarities to the research conducted. First, research with the title Mobile Voting System. The system created provides safe and efficient online voting as well as a paper voting system if online voting fails. In the Proposed system, there is no need for the internet for voting, it is required at the time of online registration only. All processing will be done via SMS message without internet connection requirements (Ameen, 2017). Analysis and Design of the E-Voting System for Chair Election Student Council. Utilizing computerized technology by using a web-based student council president election (e-voting) application can make the student council president election activity easier in conveying information, calculating faster votes, and making the paper more efficient so that the results obtained can be effective and efficient. So it is necessary to research to analyze, design, and implement the E-Voting System for the election of the Student Council Chair with a Web-based School (Ikhwani, 2018). Implementation of the laravel framework for e-voting for the election of the student council president at Cikini Junior High School (Farhan & Wahyuni, 2020). The process of selecting candidates for the head of the OSIS

* Corresponding author

Journal of Computer Networks, Architecture and High Performance Computing
Volume 3, Number 1, January 2021
https://doi.org/10.47709/cnahpc.v3i1.920

Submitted : 10 November 2020
Accepted : 22 December 2020
Published : 11 January 2021

(Intra School Student Organization) in these schools is still using manual or non-computerized methods. The method used for the current election is by voting through each class. As a result of this, there are many obstacles faced by the Cikini Vocational High School Student Organization (OSIS) management in matters of voting such as processing incoming votes, the total number of ballot collection votes from each class which takes a long time and inconsistent data are often found due to still using manualization. This is where the need for E-Voting arises. E-Voting is a web that can assist in voting for candidates for the Head of the Cikini Vocational School Student Council (OSIS) which can process incoming votes, the total number of votes, and display the results of the voting in real-time. E-Voting System Design for Web-Based Election of Student Council Chairperson of Mardisiswa High School Semarang (Setyawan & Pratama, 2020). The voting process that is carried out is by ticking or punching on the ballot paper as a way of selecting candidates for the student council chairman. To overcome this, an application was built to carry out web-based voting or what is called e-voting (electronic voting). The e-voting system is considered to be more effective and efficient, it simplifies the vote-counting process and the results of the election can be immediately and accurately known. In the process of making and designing the e-voting system for the election of the student council chairman at Mardisiswa High School based on the web was built using the waterfall system development method, PHP programming language, and using the MySQL database. This system is expected so that students can carry out the process of selecting the Student Council Chair easily and quickly to reduce problems in the conventional election system. E-voting application for OSIS Election at SMA NEGERI 11 Luwu (Harike, 2019). The purpose of writing is to analyze the process of selecting the student council president at SMA Negeri 11 Luwu which is addressed to Jalan Andi Djemma, Lamasi District, Luwu Regency, South Sulawesi Province. The system that runs in the process of selecting the student council president is done manually, with the committee directly visiting the classes and taking the most voting results. This ongoing process has the drawbacks of fraud and an ineffective selection process. For that, we need an application that can assist in the process of selecting the student council president effectively without cheating. In designing this application using a database as a medium for data storage and conducting e-voting activities online. In implementing the e-voting application, it is hoped that the OSIS election that runs at SMA Negeri 11 Luwu can be carried out easily and can produce data documentation that is presented systematically and has security so that it can prevent fraud in the student council election process. This can run as expected and makes it easier for users to apply it. Designing an e-voting system for the election of the student council president of State Middle School 10 Pekanbaru (Syam, Darmayunata, & Afriansyah, 2019). SMP Negeri 10 Pekanbaru annually elects the Student Council Chairperson. The process of selecting the Student Council Chairperson of SMP Negeri 10 Pekanbaru was carried out by direct voting by all students. However, voting is still carried out conventionally, namely, the election still uses paper as a means for voters to determine their choice and in the calculation of votes, the results of the election are also carried out manually, so it will require a large amount of money and a long time to find out the results. The use of the e-voting system is a solution given by the author to solve this problem. In the analysis and design stage the writer uses the Object Oriented Analysis and Design (OOAD) approach. Meanwhile, system modeling uses the UML (Unified Modeling Language) approach. The results of this study are expected to solve problems regarding the process of selecting the Student Council Chairperson of SMP Negeri 10 Pekanbaru so that it can be implemented effectively, efficiently, quickly and transparently. Besides that, other research, namely; the design of an android-based e-voting application uses a framework of 7 case studies in the leadership of the IPNU IPPNU branch of Jombang Regency (Aminulloh, Fibrin, & Masrur, 2020), design and build a web-based e-voting application for the election of chairman and vice chairman of the student council at SMK Ibnu Kholdun Al Hasyimi (Jaya, Yuliana, & Kholidy, 2020), The e-voting application for the election of student council president at XYZ High School based on responsive web (Dahnial, 2020), Creation and creation of an e-voting system for the election of the student council president of SMP Negeri 10 Pekanbaru (Darmayunata, Syam, & Afriansyah, 2020), Use of the RSA-type Web for cryptography-based e-voting security (Anjaswari, Andryana, & Gunaryati, 2020), The implementation of the e-voting system is seen from the communication aspect in the context of selecting the village head in Kambitin Raya village, Tanjung District, Tabalong Regency (Jaleha & Suriyani, 2020), e-voting information system for the election of the student council president at SMK Strada II Jakarta (Ristiani, Hermaliani, & Utami, 2019), and application of e-voting for the election of the student council president at SMP PGRI Parung Panjang Bogor (Firmansyah, Yulianto, & Yusuf, 2019).

Journal of Computer Networks, Architecture and High Performance Computing
Volume 3, Number 1, January 2021
https://doi.org/10.47709/cnahpc.v3i1.920

Submitted : 10 November 2020
Accepted : 22 December 2020
Published : 11 January 2021

METHOD

The method used in making the system is the waterfall. The waterfall method is a model that is often used in software development. "This method proposes an approach to systematic and sequential software development starting from the level of system progress in all analysis, design, code, testing, and maintenance" (Wijaya & Astuti, 2019). The research was carried out as shown in Figure 1, starting from analysis to testing. Research is not carried out until maintenance.

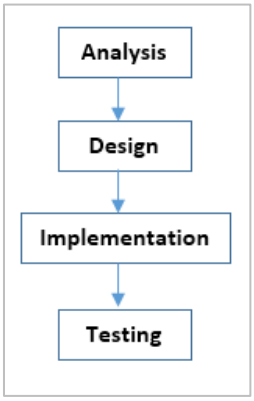

Figure 1. Research flow

The data used in this research is school data in the city of Tegal. The analysis was carried out in several steps. The first step is to identify the problem that occurs. The second step is to carry out the needs analysis needed to solve the problem. The third step is to determine the data collection method. The final step is to analyze the system design. The design is done by making an initial picture of the system to be made. At this stage, the system interface design is made so that it is easy to use. The tool used to create the interface in Photoshop CS6. At the implementation stage, a system that has been designed in parts is made, such as; menu system, village profile, activities, and services. The tools used at this stage are sublime text, XAMPP, HTML, PHP native, and Code Igniter. At this stage, adjustments are also made to the modules that have been made, whether they meet the needs or not. At the testing stage, system testing is carried out using the white-box testing method and black-box testing by conducting test case testing directly on the system to obtain possible errors in the application before implementation. If errors are still found, repairs are made.

RESULT

The mobile application that has been created as an interface like the following. The super admin login page display is shown in Figure 2. When opening the super admin login page, you are required to enter your email and password to enter the application.

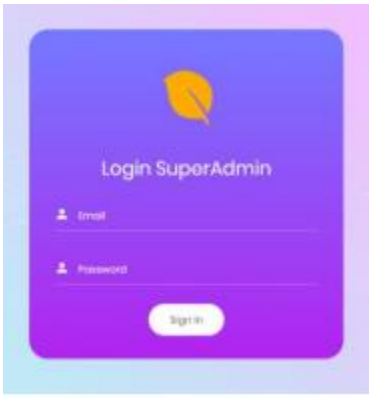

Figure 2. Super admin Login view

After successfully logging in, then enter the dashboard. The super admin dashboard page is the main page of the

Journal of Computer Networks, Architecture and High Performance Computing
Volume 3, Number 1, January 2021
https://doi.org/10.47709/cnahpc.v3i1.920

Submitted : 10 November 2020
Accepted : 22 December 2020
Published : 11 January 2021

application after the super admin has logged in. The dashboard displays the number of data users and data on school names can be seen in Figure 3.

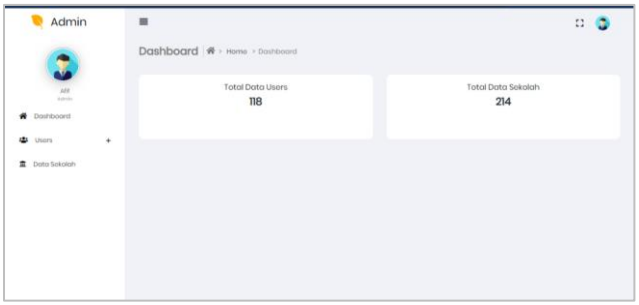

Figure 3. Super Admin Dashboard view

Figure 3 shows several menus that can be used, namely user data and school data. User Data displays all the School Admin users who have a sign up. Users are unable to log in before being confirmed first. School data displays the names of schools in Tegal City that can register their schools to use this E-Voting Application. Super admins can add, change, and delete school data.

Login page for students whose data has been entered by the respective school admin. Students will get 94 random passwords sent by the admin to the student's email, then these students are encouraged to change their passwords so that their accounts cannot be used by other people. The student login display can be seen in Figure 4.

Figure 4. Student user login

After students log in, there are several menus on this display, namely vision and mission, voting, results, and profiles. On the student homepage, there are also provisions to become the student council president and vice president and a button to log out. The home display can be seen in Figure 5.

Journal of Computer Networks, Architecture and High Performance Computing
Volume 3, Number 1, January 2021
https://doi.org/10.47709/cnahpc.v3i1.920

Submitted : 10 November 2020
Accepted : 22 December 2020
Published : 11 January 2021

Figure 5. display the student home menu

The Student Home Menu contains; Vision and Mission, Voting Menu, Voting Results, and Student Profiles. Figure 6 shows the detailed vision and mission of the candidate for chairman and vice-chairman of the Student Council. Before selecting students, they can see the vision and mission of the candidates first.

Figure 6. Vision mission display

The Voting Menu is used to elect the student council chairman and vice-chairman after seeing the vision and mission of the candidates. For students who have voted, students cannot vote anymore. Voting Menu Display can be seen in Figure 7.

Journal of Computer Networks, Architecture and High Performance Computing
Volume 3, Number 1, January 2021
https://doi.org/10.47709/cnahpc.v3i1.920

Submitted : 10 November 2020
Accepted : 22 December 2020
Published : 11 January 2021

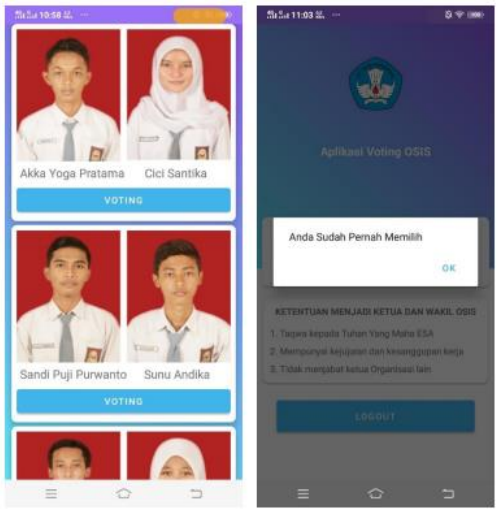

Figure 7. Display of voting menu

Figure 8 shows the results of the election for the student council president and vice president. Students can see the results of their selection on the results menu.

Figure 8. Display of voting result

DISCUSSIONS

This application consists of three access rights, namely super admin, school admin, and student menu. In the super admin, there are several menus, namely: login, dashboard, users, school data (containing the name of the school along with the license number which will be used to match the permit number entered when the school admin registers). In the school admin, there are several menus, namely: Register (for school admins who have not been registered in the

Journal of Computer Networks, Architecture and High Performance Computing
Volume 3, Number 1, January 2021
https://doi.org/10.47709/cnahpc.v3i1.920

Submitted : 10 November 2020
Accepted : 22 December 2020
Published : 11 January 2021

application), Login (for those who have registered in the application), dashboard, Student Data, Candidate Data (adding candidates for the chairperson and vice president of the OSIS along with their vision and mission), Arrange Elections (organize election events to be held by the school). After the application is completed, the application is tested using the method; Blackbox, Whitebox, and Usability.

Blackbox Testing

The system is tested using the Blackbox method, wherein this test the success rate of input/output will be tested or not. The results of this test will use an input and output table. If the system is given input then the output is as expected, then the system is said to have passed the Blackbox test. The Blackbox testing is carried out in the Super Admin section which includes testing the Login Page and testing the Add School Page. The second test is in the School Admin section which includes testing the Register Page, testing the School Admin Login Page, testing the Add Student Data Page, testing the Add Candidate Page, and testing the Student Login Page. The results of the input test produce output following the design.

Whitebox Testing

Testing with a white-box is carried out by the basis path testing method. The test results have not found any errors in writing the code. Testing with the black-box is done by performing a functional test on each page. The test results show that the system has been running according to its function.

Usability Testing

Usability testing resulted in the conclusion that the application made was accepted where the acceptance value was 80%. The details of the test results are: the ease score is 75%, the most helpful score is 85%, the language use score is 80%, the user interface score is 60%, and the utility score is 100%.

CONCLUSION

Based on the research that has been done, several conclusions can be drawn. First, the e-voting application for the chairperson and vice president of the Student Council has been completed and tested. Second, the test results show that the application made can run according to toad the design. Third, the application that is made has shortcomings in terms of the user interface. For future research, it is advisable to add facial recognition features for system security.

REFERENCES

Ameen, Z. J. M. (2017). Application Voting System of Web-based in Iraq. *Irafi Journal of Iraq*, *58*(1), 192–200.

Aminulloh, H., Fibrin, I. D., & Masrur, M. (2020). Rancang Bangun Aplikasi E Voting Berbasis Android Menggunakan Framework 7 Studi Kasus Di Pimpinan Cabang Ipnu Ippnu Kabupaten Jombang. *MISI*, *3*(2).

Anjaswari, I. A., Andryana, S., & Gunaryati, A. (2020). E-Voting Application Security Using Web-Based Cryptography RSA type. *Jurnal Mantik*, *3*(4).

Dahnial. (2020). Aplikasi E-Voting Untuk Pemilihan Ketua Osis Di Sma Xyz Berbasis Web Responsive. *SISFOKOM*, *9*(1).

Darmayunata, Y., Syam, F. A., & Afriansyah, A. (2020). Implementation And Development Of E-Voting System For Election Of Student Council Chairperson Of SMP Negeri 10 PEKANBARU. *JAETS*, *1*(2).

Farhan, M., & Wahyuni, A. (2020). Implementasi Framework Laravel Untuk E-Voting Pemilihan Ketua Osis Pada Smk Cikini Berbasis Web. *JIKA*, *4*(2).

Firmansyah, Yulianto, A., & Yusuf, D. H. (2019). Penerapan E-Voting Untuk Pemilihan Ketua Osis Pada SMP PGRI Parung Panjang Bogor. *REMIK*, *3*(2).

Harike, M. hajar. (2019). Aplikasi E-voting Pemilihan OSIS pada SMA NEGERI 11 Luwu. *Prosiding Semantik*, *2*(1).

Ikhwani, Y. (2018). Analisis Dan Rancangan Sistem E-Voting Pemilihan Ketua Osis. *TECHNOLOGIA*, *9*(3).

Jaleha, S., & Suriyani, E. (2020). Implementasi Sistem E-Voting Dilihat Aspek Komunikasi Dalam Rangka Pemilihan Kepala Desa Di Desa Kambitin Raya Kecamatan Tanjung Kabupaten Tabalong. *JAPB*, *3*(2).

Jaya, F., Yuliana, D., & Kholidy. (2020). Rancang Bangun Aplikasi E-Voting Berbasis Web Pada Pemilihan Ketua Dan Wakil Ketua Osis Di Smk Ibnu Kholdun Al Hasyimi. *EDUSAINTEK*, *7*(1).

Ristiani, V., Hermaliani, E. H., & Utami, D. Y. (2019). Sistem Informasi E-Voting Untuk Pemilihan Ketua Osis Di SMK Strada II Jakarta. *Journal of Information Management*, *4*(1).

Setyawan, F., & Pratama, F. I. (2020). Rancang Bangun Sistem E-Voting Pemilihan Ketua Osis SMA Mardisiswa

Journal of Computer Networks, Architecture and High Performance Computing
Volume 3, Number 1, January 2021
https://doi.org/10.47709/cnahpc.v3i1.920

Submitted : 10 November 2020
Accepted : 22 December 2020
Published : 11 January 2021

Semarang Berbasis Web. *Jurnal Informatika Dan Rekayasa Perangkat Lunak*, *2*(2).

Syam, F. A., Darmayunata, Y., & Afriansyah, A. (2019). Perancangan Sistem E-Voting Untuk Pemilihan Ketua Osis Smp Negeri 10 Pekanbaru. *ZONASI*, *1*(2).

Wijaya, Y. D., & Astuti, M. W. (2019). Sistem Informasi Penjualan Tiket Wisata Berbasis Web Menggunakan Metode Waterfall. In *Seminar Nasional Teknologi Informasi dan Komunikasi 2019* (pp. 273–276). Universitas PGRI Madiun.