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Designing E-Voting to Increase the Efficiency and Transparency of the Election of the OSIS Chairman at SMP Negeri 7 Prabumulih

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Abstract

Cindy Feronica Wulandari (2021210014), Supervisor I Mr. Andi Christian S.kom., M.kom., and Supervisor II Ms. Nur Aini Hutagalung S.kom.M.,Si.,M.kom., entitled "Designing E-Voting Technology to Increase the Efficiency and Transparency of the Student Council President Election at SMP Negeri 7 Prabumulih." This research aims to design an Android-based e-voting application to increase the efficiency and transparency of the Student Council President election at SMP Negeri 7 Prabumulih. The manual voting process currently used has resulted in various obstacles such as counting errors, damaged ballots, and is time-consuming. Using the Rapid Application Development (RAD) method, this application was developed to make the voting and vote counting process faster, more accurate, and more secure, while encouraging active student participation in the school's democratic process. Therefore, it can be concluded that the Android-based e-voting application can increase the efficiency, transparency, and participation in the Student Council President election at SMP Negeri 7 Prabumulih, as well as simplify the digital voting and vote counting process.

Keywords: *SMP Negeri 7 Prabumulih, Android and E-Voting*

1. Introduction

With the rapid advancement of technology, various aspects of life are beginning to adapt to improve efficiency, including the educational process. One crucial component of secondary education is the Intra-School Student Organization (OSIS), which serves as a platform for developing student leadership, collaboration, and organizational skills. The selection process for the OSIS President, as the organization's primary leader, plays a crucial role in determining the organization's future direction and goals. The election of the Student Council (OSIS) Chairperson in schools, particularly at SMP Negeri 7 Prabumulih, has been conducted manually using ballot papers. This method often encounters obstacles such as misspellings of candidate names, damaged ballot papers, and lengthy counting processes. This results in a lack of efficiency and disrupts teaching and learning activities. Therefore, innovative solutions are needed that can increase the speed, transparency, and accuracy of the election process. In this case, the OSIS is seen as a system, where a group of students coordinates in an effort to create an organization capable of achieving its goals[1]. An Android-based e-voting application is a solution that can overcome these obstacles. By utilizing digital technology, this application allows the election process to be carried out electronically, from candidate registration to vote counting. This system ensures that voter and candidate data are stored securely and accurately, while reducing paper use. Information regarding OSIS (OSIS) Chairperson candidates can be widely disseminated through the application page, making it easier for students to understand the vision and mission of each candidate. Furthermore, the counting process runs quickly, creating an Android-based voting system application to make it easier for students to vote using only an Android device connected to the internet[2].

Furthermore, e-voting reduces the time required to tally election results and minimizes the potential for vote manipulation. This system also provides efficiency in resource management, both in terms of time and costs. With an internet connection, students can participate in elections without having to wait in long lines at polling stations. This supports a fast, transparent, and efficient election process. This research aims to develop and test an e-voting application specifically for the election of the Student Council President at SMP Negeri 7 Prabumulih. This application is expected to provide a concrete solution to the various weaknesses of the manual system, while creating a more modern and relevant voting experience for students in the digital age.

2. Theoretical Basis

2.1. Understanding Design

Design is the process of defining something to be done using various techniques. It includes a description of the architecture, component details, and the limitations that will be encountered during the process[3]. Design is a set of activities that describe in detail how a system will operate. Therefore, it aims to produce a product that meets user needs[4].

2.2. Understanding E-Voting

E-voting is a system that utilizes electronic devices and processes digital information to create voter lists, notify elections, issue ballots, count votes, transmit vote results, display vote tallies, and maintain and tally vote tallies[5]. E-voting is a system that allows voters to vote electronically using digital devices, such as computers or mobile phones. This system focuses on increasing efficiency, transparency, and accuracy in general elections or organizational elections[6].

2.3. Understanding Android

Android is a system designed for mobile devices such as smartphones and tablet computers. This operating system is Linux-based, meaning that the foundation of this information system is Linux[7]. Android is a mobile operating system developed by Google. This operating system is designed to run on mobile devices such as smartphones, tablets, and other devices[8].

2.4. Understanding RAD Method

In the system development method, the author used the Rapid Application Development (RAD) method. The Rapid Application Development (RAD) method is a software development approach that focuses on rapid and literate prototyping. RAD prioritizes fast release times and active customer feedback to produce adaptive software solutions that meet changing business needs[9].

3. Research Methods

3.1. Data Sources

1. Primary data is data obtained directly from sources or respondents. Primary data can be obtained through direct or indirect interviews, observations, focused discussions, and questionnaires.
2. Secondary data is data obtained indirectly through an intermediary. Secondary data can be obtained through evidence, notes, books, journals, or historical reports that have been compiled in archives or documentary data, known as literature studies.

3.2. Data Collection Thecniques

1. Observation
   Observation method or observation method in this system is carried out by collecting data originating from books, e-books, journals and previous research related to the title of the research being carried out, including the objects used.
2. Interview
   The data collection process was carried out by conducting direct questions and answers with M. Raffi Alkholik Diadi as the Chairperson of the Student Council of SMP Negeri 7 Prabumulih

4. Systems Analysis And Design

4.1. Proposed Class Diagram

The class diagram here illustrates the main structure of the Android-based OSIS e-voting system. There are five main classes, namely User, Candidate, Admin, Voting, and Recapitulation. The User class stores voter student data such as ID, name, password, and voting status. The Candidate class represents the OSIS presidential candidates with attributes such as ID, name, vision, mission, and photo. The Admin class is responsible for system management with attributes such as admin ID, username, and password. The voting process is recorded in the Voting class, which connects the User voters with the Candidate and records the voting date. Meanwhile, the Recapitulation class stores the number of votes for each candidate for statistical purposes. The relationships among these classes show how data is interconnected and managed in an efficient, transparent, and modern system.

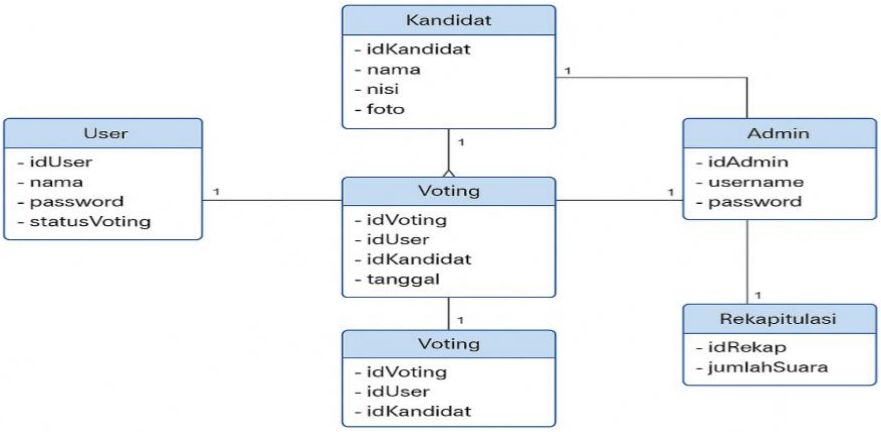

Fig. 1 : Proposed Class Diagram

5. Implementation and Testing

1. Interface Implementation

The Login Page displays the homepage of the e-voting application for the election of the Student Council Chairperson at SMP Negeri 7 Prabumulih. The screen displays two user role options: Login as a Student with a light blue button and Login as an Admin with a purple button. The interface design is modern and user-friendly, with clear icons and text to make it easy for users to select their role before proceeding to the next stage of the voting process. This display serves as the main entry point into the e-voting system.

Fig. 2 : Login Page Displays

The image below shows the login page for the Admin in the e-voting application for the Student Council Chair election at SMP Negeri 7 Prabumulih. This page displays two input fields: Username and Password, as well as a blue Login button used to access the system after the login data is filled in. The interface design is modern, simple, and easy to understand, making it easy for the admin to perform the authentication process before entering the e-voting system management page.

Fig. 3 : Login admin page

The image below displays the Student Login page for the e-voting application for the election of the Student Council President of SMPN 7 Prabumulih. To log in, students are asked to fill in two fields: their National Student Identification Number (NISN) and their Full Name, then press the light blue Login button. The interface is designed to be simple and attractive, making it easy for students to authenticate before casting their votes.

Fig. 4 : Login student page

The image below displays the Admin Dashboard display on the e-voting application for the Student Council Chairperson of SMPN 7 Prabumulih. At the top, statistics on the number of voters are displayed, namely Total Students (10), Those Who Have Voted (2), and Those Who Have Not Voted (8). Admins can also access the election results via the View Voting Recap button. Below that is a list of student names complete with their NISN and voting participation status, marked with a green label for Those Who Have Voted and a red label for Those Who Have Not Voted. This interface helps admins monitor voter participation in real-time.

Fig. 5 : Dashboard admin page

The image below shows the Admin Management page in the e-voting application. This page displays one registered admin account with the username "admin" and ID "1." There are two icons on the right: a yellow pencil icon for editing admin data and a red trash can icon for deleting the admin account. At the top, there's also a plus (+) button for adding a new admin. This feature allows for easy and efficient management of admin accounts within the e-voting system.

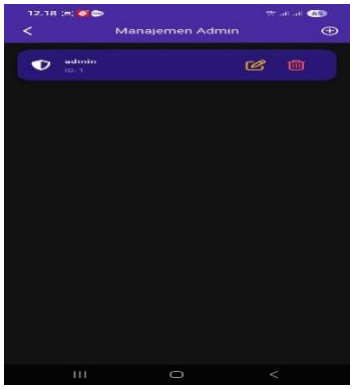

Fig. 6 : Admin management page

The image below displays the Voting Recap page of the e-voting application. A donut chart displays vote statistics, showing Fajar Hidayat and Nadya Salsabila each receiving 50% of the vote, with a total of 2 votes cast. Despite the equal number of votes, the system displays Fajar Hidayat as the winner and Nadya Salsabila as the winner, likely based on the order of input or additional parameters. This display makes it easier for users to visually and detailedly view the voting results.

Fig. 7 : Voting recap page

The image below displays the list of candidates for OSIS (OSIS) chairperson. Each candidate is displayed with a photo, full name, and two action buttons: a green "Vote" button to cast a vote, and a purple "Details" button to view more detailed information about the candidate. This display makes it easier for voters to quickly and interactively choose and learn about the available candidates, while ensuring the election process is digital, transparent, and efficient.

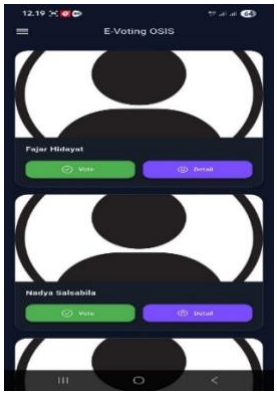

Fig. 8 : OSIS chairman candidate list page

The image below displays a pop-up from the OSIS E-Voting application, detailing one of the OSIS chairperson candidates, Fajar Hidayat. In this view, users can see the candidate's vision, namely, OSIS as a driver of achievement, as well as a mission consisting of three points: focusing on academic activities, holding inter-class competitions, and improving the library. There is also a Close button to close this information window. This feature provides transparency and clear information to voters before making their choice.

Fig. 9 : View the vision and mission page

The image displays details of the student council (OSIS) chairperson candidate, Fajar Hidayat, in the OSIS E-Voting application. This display displays the OSIS's vision, which is to drive achievement, and its mission, which consists of three main points: focusing on academic activities, holding inter-class competitions, and improving the library. This information aims to provide voters with an overview of the candidate's work program before casting their ballot.

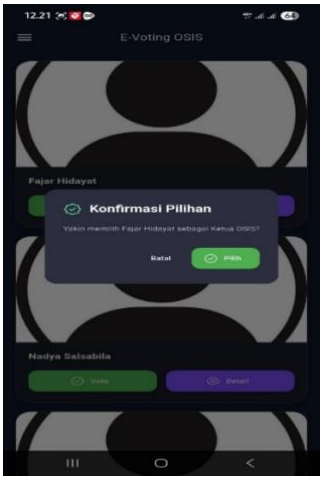

Fig. 10 : Display the selection confirmation page

2. System Testing

Black-box testing is a software testing method that focuses on an application's functionality without examining its internal structure or program code. In the SMP 7 Prabumulih e-voting application, this testing was conducted to ensure that each feature functioned as expected based on user input and the resulting output.

Table. 1 : Black box testing

No	Tested Features	Input	Expected Output	Description
1	Admin login	Valid Username and Password	Successfully logged in to the admin dashboard	Succeed
2	Add Sound	Select one candidate and press the left button	Voice is saved successfully and voice data is added	Succeed
3	Vote Counting	1 vote for Fajar, 1 vote for Nadya	The graph shows each 50%, and the number of votes accordingly.	Succeed
4	Voting Recap Display	Voice data available	Displays graphs, candidate names, and the number of votes for each	Succeed
5	Download Recap PDF Button	Press the PDF icon button	The PDF file of the voice recap has been downloaded successfully.	Succeed

6. Conclusion

Based on the discussion in the previous chapters and in answering the research questions and objectives, it can be concluded that the election process of the OSIS president at SMP Negeri 7 Prabumulih is still conducted manually using paper, which causes the election process to take a long time, be less efficient, and not transparent. The design of the e-voting application for the OSIS president election at

SMP Negeri 7 Prabumulih was developed using Android Studio, and to simplify this application, the development method used is the RAD (Rapid Application Development) method with the class diagram design model, while the research approach method used is descriptive qualitative. This application was developed to make the election process more efficient, transparent, and to minimize errors.

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