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Website-Based Electronic Voting (E-Voting) System in the BEM Unwaha General Election

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ABSTRACT
The election of the Student Executive Board (BEM) of KH.A Wahab Hasbullah University (UNWAHA) has undergone a transformation from a conventional system to a website-based e-voting system. This research aims to implement and start the e-voting system used in the UNWAHA BEM election. The method used in this research is Research and Development (R&D) with the stages of needs analysis, system design, implementation and evaluation. Data was collected through surveys of e-voting system users to measure ease of access, satisfaction, security, attractiveness and problems encountered.

Keywords: E – Voting, General Election, Website Based System.

INTRODUCTION
During the 2021-2023 period, the general election for BEM KH University. A. Wahab Hasbullah (UNWAHA) experienced various weaknesses, such as invalid ballot papers, a slow vote counting process, and high costs for procuring election equipment. This manual system has the risk of fraud and damage to physical documents. Therefore, a website-based e-voting system is proposed to improve the efficiency and integrity of elections. Research Focus This research aims to identify the benefits and challenges of e-voting systems, assess the impact of e-voting on student participation and election integrity, and develop recommendations for effective implementation of e-voting on campus.

A literature study was conducted to examine the implementation of e-voting in various countries to understand best practices and challenges. Needs analysis was carried out by collecting data from KPUM and stakeholders at UNWAHA through interviews and surveys. System design involves developing an e-voting prototype with registration, implementation, vote counting and results delivery features, as well as paying attention to aspects of security, transparency and ease of use. Testing and evaluation is carried out through system trials with selection simulations and collecting feedback from users.

Implementation and training includes implementing the e-voting system in the BEM UNWAHA general elections and providing training to the committee and students. Implementation The implementation stage includes building a system by developing an e-voting website with a friendly user interface and an encryption system to protect data. User training is carried out by holding training sessions for the committee and students.

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Formulation of the problem
The problem formulation of this research is: "How to increase student participation and overcome fraud in the General Election and save operational costs for KPUM Unwaha effectively and efficiently using website-based E-Voting?" This issue will be discussed through several research questions, such as:

1. How to speed up the process of calculating vote results using the e-voting system?
2. How to optimize the accessibility of the e-voting system so that it can be accessed by all UNWAHA students?
3. Prevent vote manipulation

Research purposes

1. Technology effectiveness: Assessing the extent to which the e-voting system is reliable and effective in managing UNWAHA BEM elections compared to manual voting methods.
2. How the process of implementing a website-based e-voting system can increase voter involvement in the BEM UNWAHA general election.
3. System and vote security, Analyzing the level of security and validity of votes in the e-voting system, thereby ensuring that the election process is free from manipulation or fraud.

Benefits of research

The research benefits that are expected to provide benefits are as follows:

1. For researchers, to find out whether the use of a website-based voting system can increase voter participation in general elections in an effective and efficient way.
2. This research is generally expected to provide insight and recommendations for general election organizers in using technology during the voting process.
3. It is hoped that the benefits of using technology which is always full of innovation will be felt by Unwaha students in particular and the wider community in general.

RESEARCH METHODS

1. Data Collection Method

At this stage, data collection is carried out, namely:

Literature Study

Literature or literature study is a study carried out by the author to obtain data and theory for the purpose of writing this research by reading books about E-Voting applications, journals and other references related to the research title.

interview

Interviews were chosen as a data collection instrument because of their ability to extract in-depth information from respondents who have direct experience of the e-voting system being implemented. The interview process was carried out in a structured manner using a collection of questions designed to ensure that all aspects related to the implementation of e-voting could be covered comprehensively. The interview questions were designed to collect data related to the technical aspects of the system, the effectiveness of using e-voting, as well as security and success during the election process. The selected respondents were students, committee members who had used the e-voting system.

Observation

Observations were carried out by monitoring user testing activities, where voters used the e-voting system that had been developed. Observations include: how users access the e-voting website, the responsiveness of the system during the voting process, as well as obstacles that users may face in the process.

2. System Development Method

The method applied for this research is the waterfall method, which is a method that offers a sequential or ordered software life flow approach starting with analysis, design, coding, support.

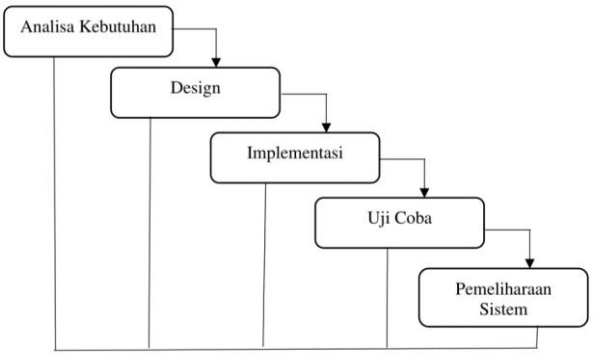

Figure1. The waterfall method of software development

The waterfall method is an approach to software development or sequential. The stages in the waterfall method are carried out sequentially, starting with requirements analysis, system design, implementation, integration, testing and maintenance.

a. Needs Analysis
   Needs Analysis, involves identifying detailed e-voting system requirements from stakeholders to ensure the system developed is in line with user needs.
b. System Design
   System Design, where the e-voting system framework is designed based on the results of needs analysis, including user interface, database architecture, appropriate security mechanisms.
   Implementation The Implementation Phase involves coding and creating a website-based system according to the planned design. In this process, the source code for the e-voting system is written and developed to create an operational system.
c. Trials
   Testing is a step where all components of the e-voting system that have been created are integrated into one complete unit, then various tests are carried out to ensure the system is free from errors and defects and runs according to the function that has been directed.
d. Maintenance
   Maintenance of the e-voting system becomes vital post-implementation. This stage includes continuous improvements and bug fixes based on user feedback, to ensure the system runs smoothly in every future election

3. Research Roadmap Method

Road map is a map to show the direction of the system that will be created. From this research the road map used is a Flowchart.

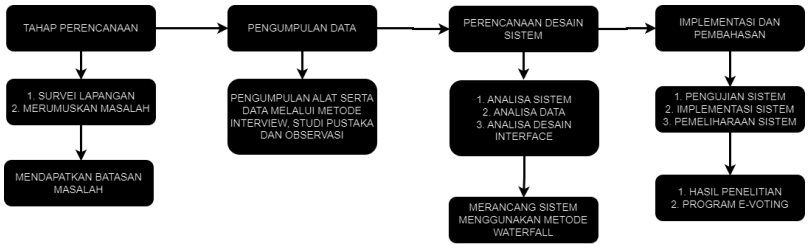

Figure 2. The image above is a research flowchart diagram which shows a system consisting of planning stages, data collection, system design and implementation of the system being studied.

DISCUSSION

This chapter presents the results of the discussion of the Website-Based E-voting System in the Unwaha BEM election as a tool that functions as a voting election platform that is connected to the internet and database. The results of this research describe the discussion and data obtained from the guidance and system testing process by the supervisor.

1. Interface design

The following image is a system design interface design

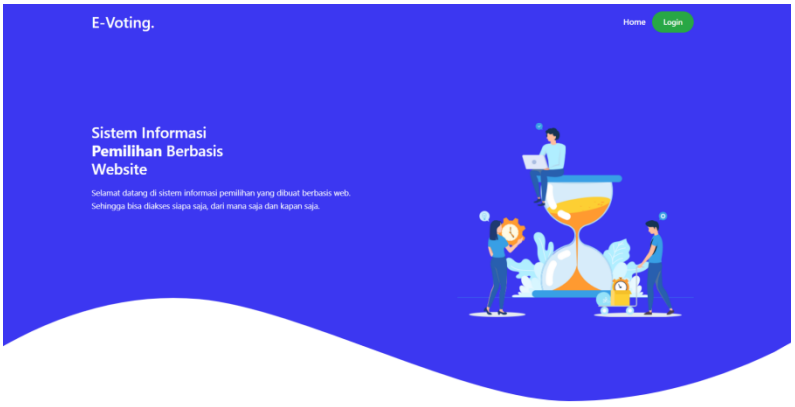

Figure 3. Opening Page The opening page is the initial page containing the title and login

Figure 4. admin page admin main view, dashboard menu, selection data, user data, change password and log out, then the dashboard has a click feature that leads to the prepared menus.

2. Implementation

Figure 5. admin on the number of elections (election data), contains number, name of submitter, name of election, description, status, start date, end date, proof, banner, update at, admin view at, options (edit, delete, view).

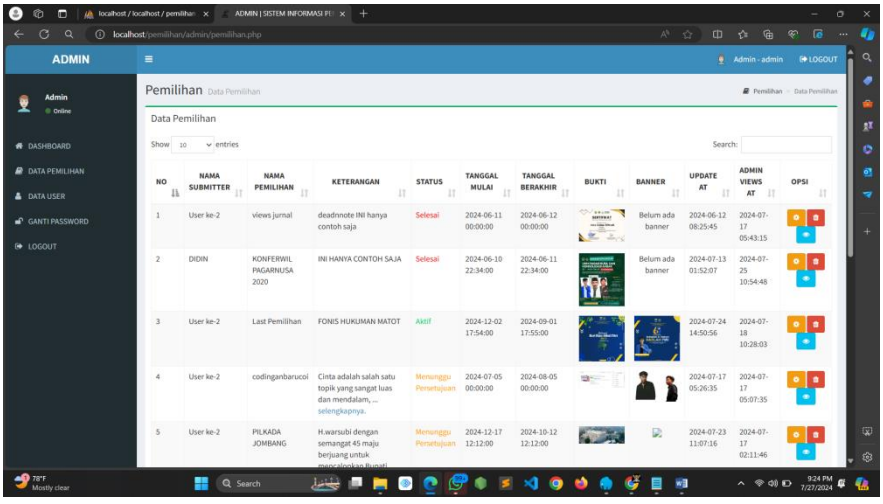

Figure 6.

The menu displays making a selection, there is a list of voters waiting for approval, active and completed.

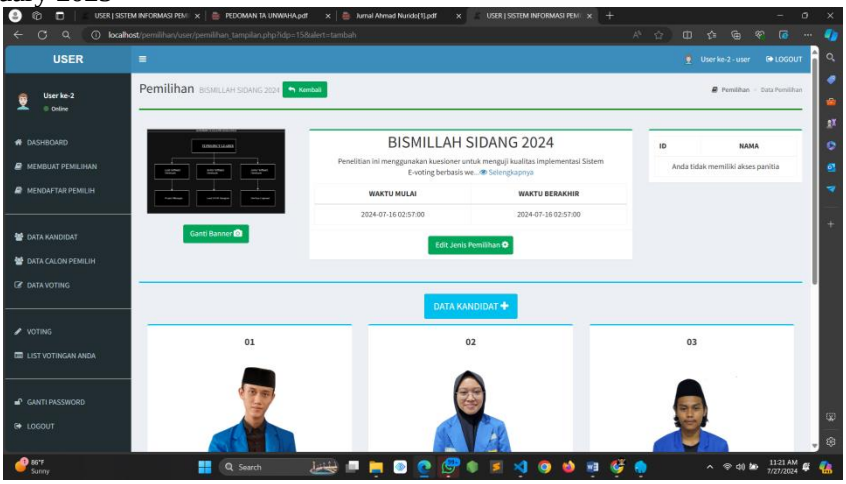

Figure 7. View the committee page

In the selection edit menu committee display there is a description table, start and end dates then an update button.

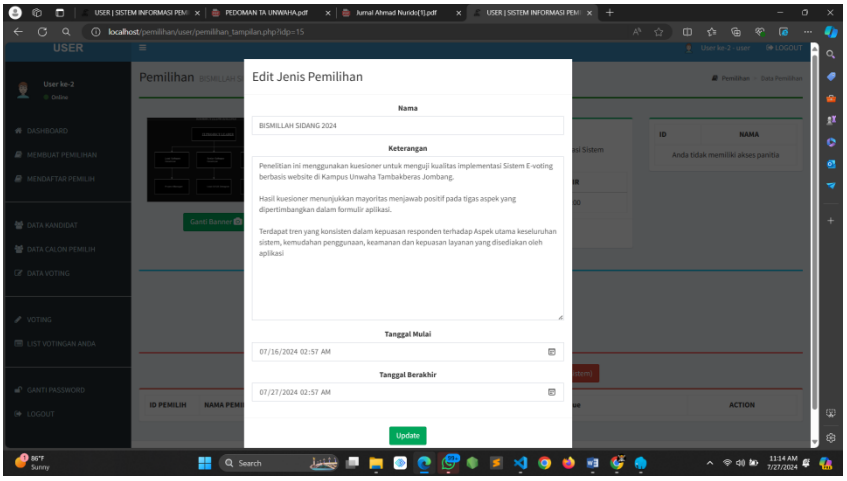

Figure 8. Candidate description and menu

committee display on candidate data, there is a display of potential candidates, delete and edit buttons.

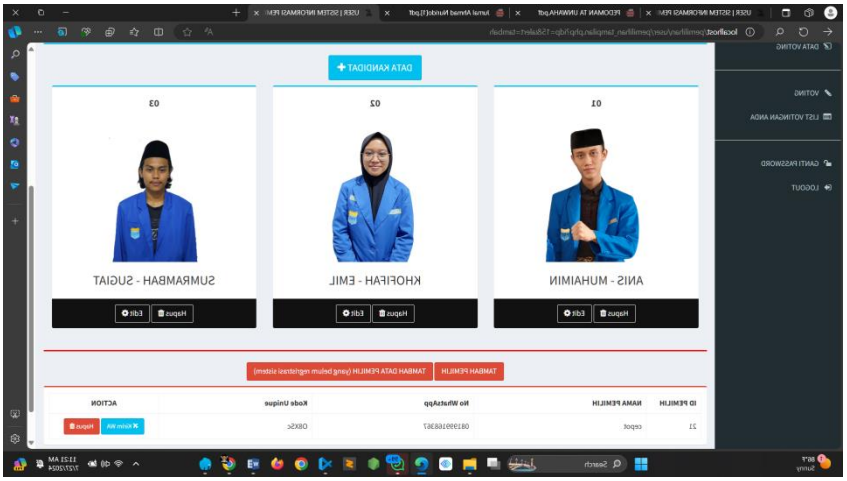

Figure 9. The edit page on the committee contains a table description and then a photo of the candidate.

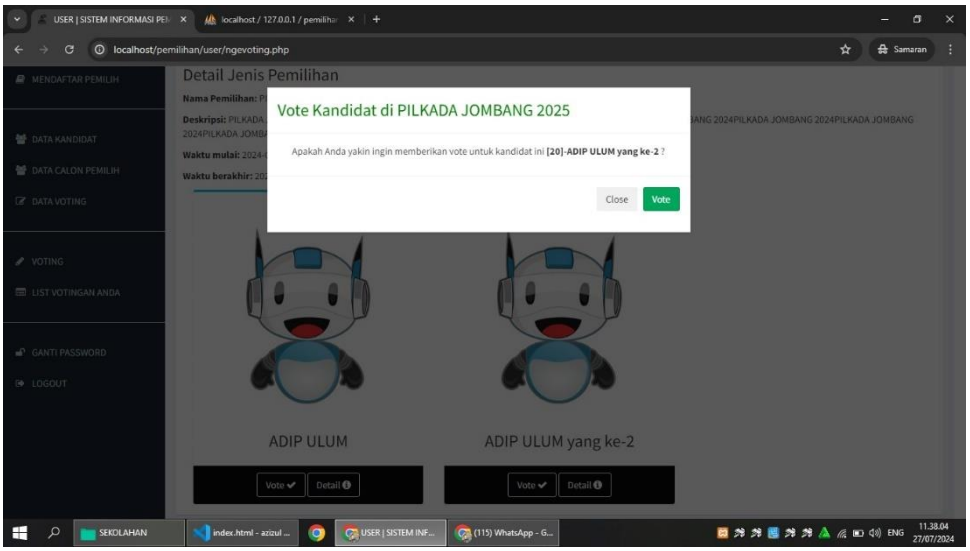

Figure 10. The election selects candidates and finishes voting.

This system offers accelerated vote counting, improved accuracy, reduced risk of manipulation, and cost efficiency. This research shows that the implementation of a website-based E-Voting system in the post-conflict local elections of the Student Executive Board (BEM) of KH University. A. Wahab Hasbullah (Unwaha) has proven to be more effective, efficient and transparent than manual methods. This system, developed using a waterfall method, provides many benefits such as a faster voting process, reduced risk of fraud, increased participation, and operational cost savings. Survey results show high user satisfaction, with the majority experiencing convenience, security and comfort. In addition, this system also has a good audit trail, maintaining the validity and integrity of elections. These findings indicate that the E-Voting system can be implemented more widely, both on campus and in the election context.

CONCLUSION

Conclusion This research focuses on the problems faced in the BEM Unwaha general election system which still uses manual methods. Some of the main obstacles identified were inefficiencies in the vote counting process, the risk of fraud, and high operational costs. Based on the data obtained, there is an urgent need to make a transition towards a better, modern and efficient system. Adoption of an E-Voting based system website is proposed as a solution that can increase effectiveness, security and participation in the BEM general election at Unwaha.

a. The effectiveness of the e-voting system in the BEM Unwaha Election is known to be high in increasing the efficiency and speed of the voting and counting process. Using a website as an e-voting platform makes access easier for voters and reduces operational costs when compared to conventional paper voting.
b. Obstacles faced in implementing the e-voting system include, among other things, technical and social aspects. Technically, obstacles include infrastructure limitations, such as unstable internet connections. Meanwhile, from a social aspect, obstacles include the varying levels of digital literacy of voters.

By overcoming these obstacles, it is hoped that the implementation of a website-based e-voting system for village elections can run more smoothly and become the right solution in increasing student participation, democratic and efficient election quality.

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