Improve Quality Of Public Opinion In Website Using Blockchain Technology

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ABSTRACT

The unemployment rate in Indonesia is quite high, where the average value in Indonesia is 18%, the largest among Cambodia, Nigeria, and lower-middle-class countries, which show an average of 12%. The high unemployment rate is caused by the level of motivation of students to continue working, studying or participating in competency training with a lack of interest. To increase students' interest, it is necessary to have a large number of critical communications to arouse students' enthusiasm and motivation. The method used is qualitative and quantitative where to design the system design and system validation, the technique used is the System Development Life Cycle Waterfall. The results obtained by the Heuristic Evaluation stated that not many things needed to be improved for the system that was created and the SUS (System Usability Score) stated that it was good with a minimum score of 68 given by 5 experts. The Blockchain system can already be run or applied to the wider community.

Keywords: Blockchain, Heuristic Evaluation, System Usability Scale, Siswa, System Development Cycle

Introduction

Unemployment and employment remain a major concern in every country, especially in developing countries such as Indonesia [1]. Both problems create a dualism of conflicting issues when the government fails to minimize their impact. Indonesia's average unemployment rate is 18%, higher than India, Cambodia, Nigeria, and low-middle-income countries with a rate of 12.2% [2]. The lack of motivation among young people aged 15 to 24, who are vulnerable, is one of the reasons they are lazy to find a job, go to college, or take training to support their careers. In Kebumen, there were 48,861 graduates in 2022 [3]. According to BPS Kebumen data from 2021, the number of unemployed people was 37,408, indicating that the potential unemployment rate in Kebumen Regency was 76.6%. Therefore, the Kebumen government is urged to provide guidance containing motivation and basic knowledge to increase job searching, pursuing education, and seeking hard skills training.

The lack of job opportunities is one of the reasons why graduates are reluctant to find work, exacerbated by the Covid-19 pandemic, which has forced companies to lay off employees to reduce costs. Many individuals lost their jobs during the pandemic, causing a shortage of employment opportunities and difficulty in finding business capital. Ahmad Alamsyah Saragih, a member of the Indonesian Ombudsman, suggests that the government needs to go through an evaluation process and use digital approaches such as Blockchain technology, which has been used since the beginning of the Covid-19 social assistance distribution program [4]. Blockchain technology shows the potential for revolutionizing social practices, and its development has rapidly expanded beyond the economic and banking sectors.

Blockchain technology was initially introduced by Satoshi Nakamoto in the E-Cash or Electronic Cash Bitcoin system [5]. The Blockchain system began as a security measure for E-Cash users and has since been applied in other areas, such as manufacturing, industry, social services, and health [6]. [7] combined Blockchain technology with risk tracking in public opinion based on the NPO (Network Public Opinion) framework. This technology is highly advanced and can improve public credibility and trust. Indonesians are highly active on the internet, with [8] reporting that by early 2023, 212 million Indonesians, or 77% of the population, will be using the internet. Public opinion on the internet can vary, and decision-making can change when the public receives information on the internet without ensuring its risks or truthfulness[7], [9]–[15].

With the continuous development of science and technology and the progress of society, the spread of network public opinion has serious consequences for society [7]. Ethics are used as a guideline for behavior and have been expanded into etiquette, which is a guideline and determinant for individuals or groups to act following the civilization of society or the nation [16]. Ethics (etiquette) is increasingly necessary in public relations tasks to build positive corporate images, especially by forming public opinion.

Research Method

In this public opinion analysis, the FMEA method using RPN (Risk Priority Number) is used to identify potential hazards, which will then be evaluated to determine the risk category. There are three risk categories: low, medium, and high [17]. In the FMEA method, an opinion's severity level and appearance will be determined for opinion filtering. Opinions that receive a low score will pass and be appropriate for students. In contrast, opinions with medium risk will be considered for student viewing, and opinions with high risk will be locked and cannot be accessed by students.
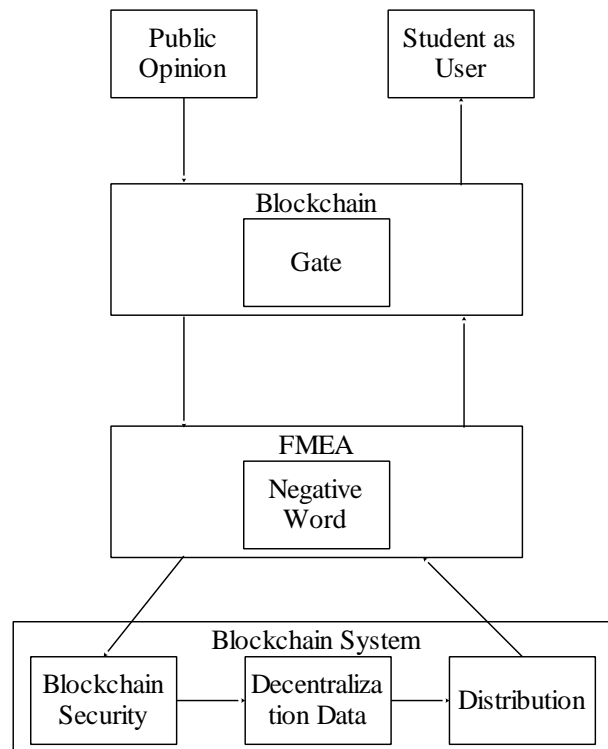

Figure 1 Conceptual of Blockchain

The picture above shows that all public opinions collected will be placed in the Blockchain Gate where all data is guaranteed for its security and cannot be accessed randomly. Later the opinions will be continued to be filtered or processed through the FMEA method. Failure Mode Effect Analysis (FMEA) is a systematic tool that identifies the consequences of system or process failures, as well as reducing or eliminating the chances of failure [18]–[23]. The function of FMEA in this study is to lock all opinions that negatively affect students. We treat sentiment classification of words into Positive, Negative, and Neutral as a three-way classification problem instead of a two-way Positive and Negative classification problem. By adding the third class, Neutral, we can prevent classifiers from assigning positive or negative sentiment to words containing weak opinions[24]–[28]. After going through FMEA, the data is continued to the Blockchain system, where the first process is securing the Blockchain data by securing all data to prevent negative opinions from coming out. The data that will be decentralized is considered neutral and positive.

In contrast, the neutral and positive data will be decentralized to facilitate and accelerate the search for data according to the needs of the students. After the data is decentralized, all data containing constructive opinions can be searched by students. In distributing opinion data, it will go through FMEA checking again so that there are no opinions containing negative words for students who read them. After all opinions pass through the FMEA stage, they will be placed in the Blockchain that students can read.

The Waterfall SDLC (Software Development Life Cycle) method and Blockchain designs are used in the system. The system design will be shown in the following figure.
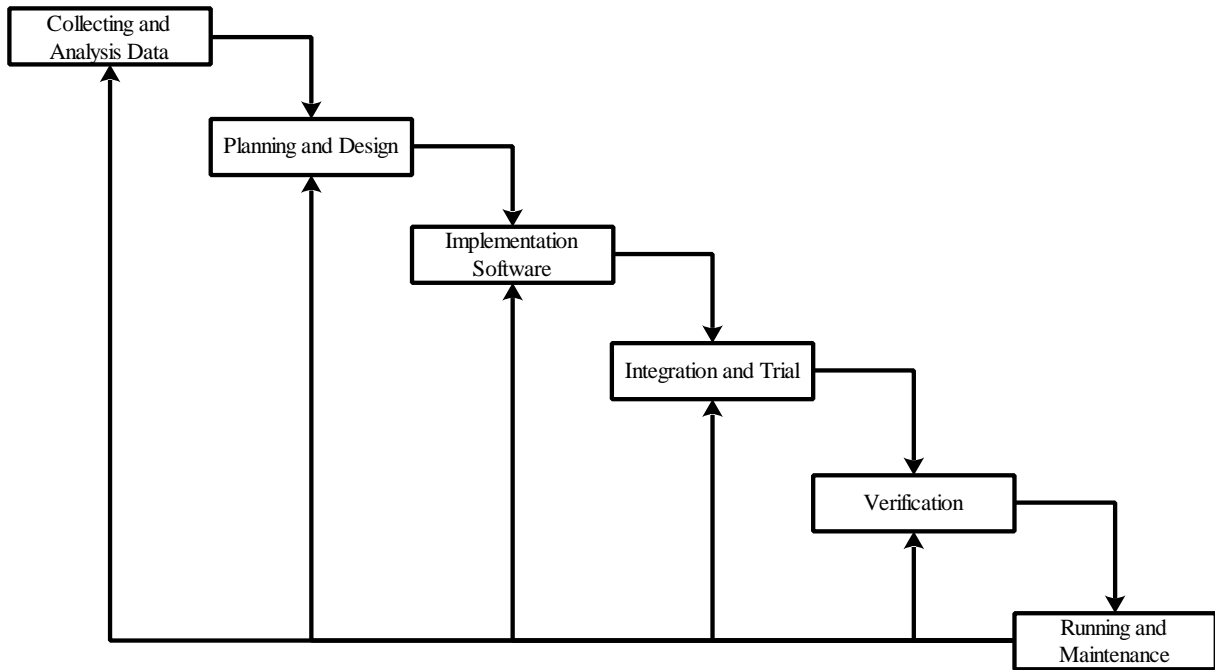
Figure 2 Step by step of *Waterfall*

The system design is tailored to the situation in Kebumen. Each region has its own differences and requires data authenticity so that the results obtained are in accordance with the problems that arise. After the system design, the next step is to implement it by conducting testing and usability testing to identify failures and errors that occur in the system. When everything has been done, the next step is system implementation, heuristic, and System Usability Score (SUS) testing.
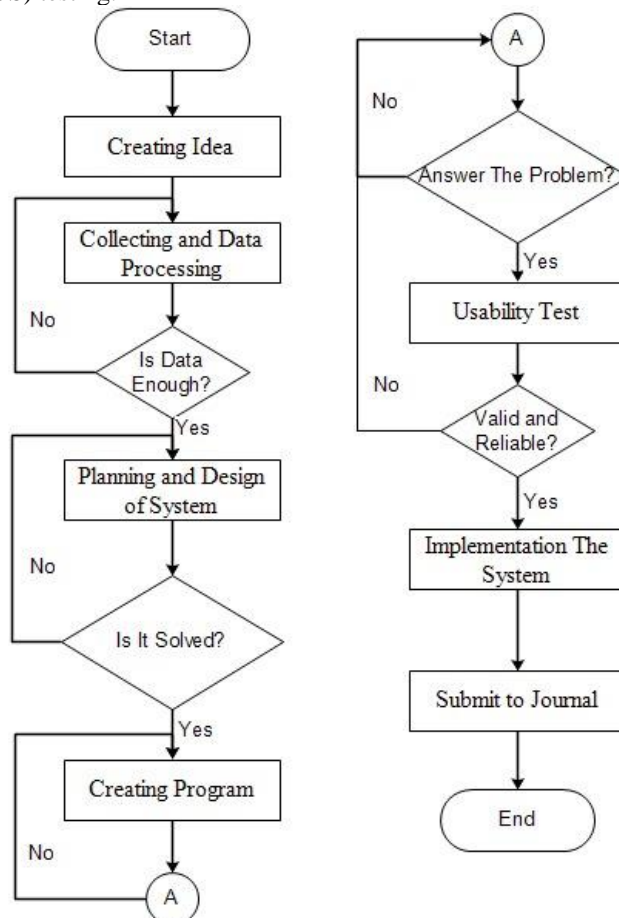

Figure 3 Flowchart of research

The research begins by collecting and processing data until the required amount of data is fulfilled. Once enough data has been collected, the next step is to design and develop the Blockchain system. The design and development of the system must address the existing problems before proceeding with program development. If the program design is deemed to solve the problem, the next step is to proceed with developing the Blockchain program. Once the program is created correctly, usability testing will be conducted to ensure the data is valid and reliable before moving on to collaborating with the Kebumen government. After collaborating with the Kebumen government, the research is completed and can be implemented by anyone.

Result And Discussion

This study using heuristic evaluation and system usability score then involve 5 experts in website. The evaluation conducted by 5 experts found several issues in accessing the website prototype that uses blockchain system. There were also satisfactory results, so there was no need for any improvement. The heuristic evaluation will be displayed in table 1.

Table 1. *Heuristic Evaluation*

No Heuristic	Heuristic Board	Information	Severity Rating	Fixed Rating
1	Visibility of System Status	- Additional information is needed for the design parameter.	1	0
2	Match Between system and real world	- No information provided for the parameter.	1	0
4	Consistency and Standard	- Non-standard icons used.	2	1
5	Error Prevention	- None found.	0	0
6	Recognition rather than recall	- Search engine has a suggestion history.	2	1
7	Flexibility and Efficiency	- No notification provided when a search term is misspelled.	2	1
8	Aesthetic and Minimalist Design	- Easy to go back to the previous page.	2	2
10	Help and Documentation	- More attractive color selection.	1	0

b.   *System Usability Scale*

The System Usability Scale will be displayed in table 2 as follows:

Tabel 2. Scoring *System Usability Scale*

Respondent	Question										Total
	1	2	3	4	5	6	7	8	9	10	
1	4	0	4	3	3	3	4	1	4	3	72.5
2	3	1	3	3	3	3	4	1	3	3	68
3	3	0	4	3	3	3	4	0	4	3	68
4	3	0	4	4	3	3	4	0	3	4	70
5	3	0	4	3	4	4	3	1	3	4	72.5

Table 2 shows the System Usability Scale scores from the 5 experts. The first expert had a score of 72.5, the second expert had a score of 67.5, the third expert had a score of 67.5, the fourth expert had a score of 70, and the fifth expert had a score of 72.5.

The experts answered 10 questions provided by the researcher to determine whether the website is usable or not. These scores have classifications, which will be shown in table 3 below.

Table 3. Score Classification

Score	Rating	Classification
> 80.3	A	*Excellent*
69 – 80.3	B	*Good*
68	C	*Okay*
51 – 67	D	*Poor*

According to the value of classification that found 3 experts scored the capacity of website is good and 2 experts score the website is okay. The result shows that the expert agreed about the system, but no significant error system shows. The system follows another reference like the benefit using blockchain system because the system that made for public that involves many user and technical features to make the system appropriate, [13] [14] state blockchain can adopt in specific context like major stakeholders, application areas, commercial benefits, and technical features. The system synchronized with [15] that a Blockchain efficient rescue network to minimize the bad word appears in website.

Conclusion and Suggestion

Based on the results and discussion, the study concludes that using the Blockchain system on the website minimizes negative words or sentences and bad public opinions that can decrease the motivation and spirit of students in Kebumen. The implementation has been good and running well. However, there is still room for improvement based on heuristic evaluation, which is not urgent because the previous improvements have already been evaluated by heuristic evaluation.

The heuristic evaluation conducted by 5 experts to test the website's usability using System Usability Score found that the product usability is in a good and sufficient category. The researchers suggest that future research needs to add a better interface test not only on the functional features of the website and add a bad words state based on the Blockchain system, so there is no need to consider good and bad sentences, as the current system needs to weigh good and bad sentences based on user feedback ratings.

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