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Implementation of Waterfall Method in Designing Website-Based Discussion Forums

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A B S T R A C T S

This research aims to find out the effectiveness and efficiency of the use of the waterfall model in designing a website-based discussion forum. The method used in this research was descriptive research by describing the object being studied systematically, factually, and accurately. The design method used was the waterfall model by including several stages, namely the analysis phase of software requirements, designing, programming code creation, testing, and supporting or maintenance. This site was designed using JavaScript and PHP as a programming language and MySQL as the database. This study found that the waterfall method can make the system's development more organized so that the system can be developed following what is desired or on target, which makes planning more effective and efficient.

A R T I C L E I N F O

1. INTRODUCTION

The waterfall model is a method that takes a systematic and neatly arranged approach such as a waterfall starting from the level of the needs of the system then continues to the stages of analysis, design, coding or implementation, testing, and maintenance (Massey & Satao, 2012). The analysis phase questions the phenomena and the contradictions that occur, and the thought of help is very important for solving the problem or phenomenon (Mahadevan, *et al.*, 2015). An analysis is not only supported by programmers but can also be given to economic and social-political experts. The design phase involves allocating hardware or software system requirements to the overall architectural design, software design related to depicting the system's basic software abstraction and repair (Martin, *et al.*, 2016).

When coding/implementing a design, the design is realized as a program or unit program (Kramer, 2018). In the testing phase, verification is carried out to find out all the units that meet the specifications (Hidayati, 2019). The maintenance phase resolves error corrections that were not found in the previous stages, improves the system unit's implementation, and enhances system services for new needs.

This research aims to find out how effective and efficient the use of the waterfall model is in designing a website-based discussion forum. The method used in this research was descriptive research by describing the object being studied systematically, factually, and accurately. The design method used was the waterfall model by including several stages, namely the analysis phase of software requirements, design, program code creation, testing, and maintenance. This site was designed using JavaScript and PHP as a programming language and MySQL as the database. The benefits of implementing the waterfall models include maintaining the project's scope in the requirements and needs of all stakeholders (Lucitasari & Khannan, 2019). This study found that the waterfall model can make the development of the system more organized so that the system can be developed following what is desired / on target which makes planning more effective and efficient.

2. METHOD

The research method used was the descriptive research method. The descriptive research method examines the status of a group of people, an object, a set of conditions, a system of thought, or a class of events in the present (Nassaji, 2015).

The main point of waterfall models is the system is carried out in sequence or linear. If step 1 has not been done, step 2 cannot be done. If step 2 has not been done, step 3 cannot be done either, and so on. Step 3 will automatically be done if steps one and step 2 have been carried out (Bariah & Putera, 2020).

While the system design and development method used is the waterfall model, the description of each stage of the waterfall that researchers use are as follows (Tabrani, 2019):

2.1. Software requirements analysis

The analysis is the initial stage for collecting data, identifying problems, and

analyzing system requirements to system-defining activities. This stage aims to determine the solution obtained from the analysis.

2.2. Design

At this stage, modeling of the software is carried out. This model aims to obtain a better understanding of data flow and control, functional processes, operating behavior, and information in it. The main activities of process modeling, data modeling, and system design are Entity Relationship Diagram (ERD) to define databases, use cases, and activity diagrams to define system design and define system procedures using sequence diagrams.

2.3. Program code / Implementation

The system that has been analyzed and designed begins to be translated into machine language through a programming language. It consists of two processes: making the program code and making the program interface for system navigation. Researchers use the JavaScript and PHP programming languages and use MySQL for the database.

2.4. Debugging

Furthermore, the program must be tested where it focuses on three activities: the internal logic of the software, ensuring that all the commands that have been tried, and external functions to ensure that with certain inputs, a function will produce output as desired.

2.5. Maintenance

At this stage, several things must be considered, including the user must be able to run the system properly. If an error occurs in the system, the developer must correct mistakes both on the system or on the connected network.

3. RESULTS AND DISCUSSION

3.1. Software requirements analysis

i. Functional Needs
   a. The system can display posts from each user.
   b. The system can display comments from each user.
   c. The system can store user data.
ii. Non-Functional Needs
   a. The system is built based on the website
   b. It can only be opened on browsers that already support Java.
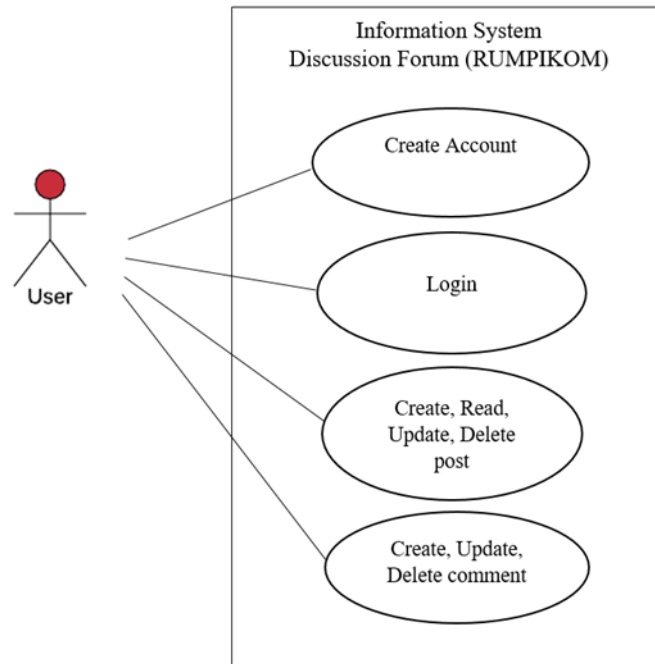
3.2. Desain

i. Use Case Diagram

Fig. 1. Use Case Diagram

User can create an account if the user does not have an account before. If the user is already registered, then the user only needs to log in. Users can also edit and delete posts and comments they have made.

ii. Use Case scenario

a. The use case scenario creates an account
Use Case Name: create an account

Table 1. Use Case Scenario Creates an Account

Actor Actions	System Reactions
Normal Scenario: Save User Data Into Database	
1. Select account creation menu	
	2. Show the account creation menu
3. Fill in personal data	
	4. Storing user data into a database

b. Use Case Login Scenario
   Use Case Name: login

Table 2. Use Case Login Scenario.

Actor Actions	System Reactions
Normal Scenario: Show Homepage	
Select login menu	
	Show login menu
Fill username and password	
	Show Homepage

c. Use Case Create Post
   Use Case Name: Create a post

Table 3. Use Case Login Scenario

Actor Actions	System Reactions
Normal Scenario: Show User Posts	
Select create post menu	
	Show create post menu
Fill form create post	
	Show user posts

d. Use Case Delete Post
   Use Case Name: delete a post

Table 4. Use Case Delete Post

Actor Actions	System Reactions
Normal Scenario: Show notification the post has been deleted	
Select delete post menu	
	Show notification delete a post
Select delete post	
	Show notification the post has been deleted

e. Use Case Edit Scenario
Use Case Name: edit post

Table 5. Use Case Edit Scenario

Actor Actions	System Reactions
Normal Scenario: Show edited post	
Select edit post menu	
	Show edit post form
Edit post	
	Show edited post

f. Use Case Create Comment
Use Case Name: create comment

Table 6. Use Case Create Comment

Actor Actions	System Reactions
Normal Scenario: Show Comment	
Fill comment form	
	Show comment

g. Use Case Edit Comment
Use Case Name: edit comment

Table 7. Use Case Edit Comment

Actor Actions	System Reactions
Normal Scenario: Show Edited Comment	
Select edit comment menu	
	Show text field for edit comment
Change comment	
	Show edited comment

h. Use Case Delete Comment
Use Case Name: delete comment

Table 8. Use Case Delete Comment

Actor Actions	System Reactions
Normal Scenario: Show Homepage	
Select delete comment menu	
	Show notification for delete the comment
Select delete comment	
	Show notification the comment has been deleted

- Interface Design
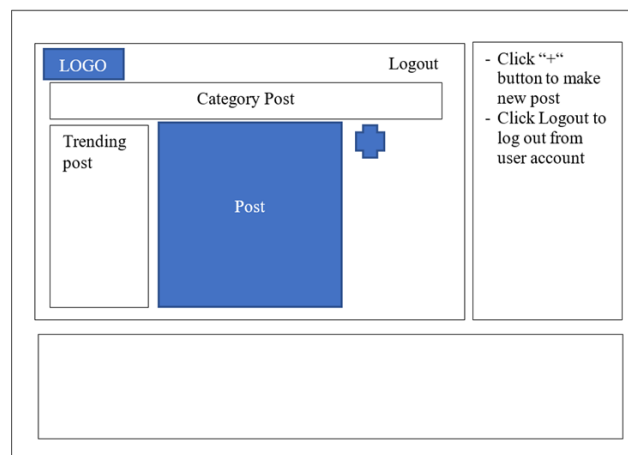Figure 2 below shows the interface design of the main page

Fig. 2. Main page interface

3.3. Program Code/Implementation

Making the program code is done by translating the system design that has been designed into the program code using the JavaScript and PHP programming languages with MySQL as the database.

3.4. Debugging

Debugging is carried out in three activities (Dokhanchi, *et al.*, 2017; Komala, *et al.*, 2021):

a. Software Logic
Seeing the logic that runs the program is in line with expectations or needs improvement.
b. Check program commands
Testing the program by running all the program's commands and ensuring program commands can be carried out.

c. External Function

Ensure outputs are as needed with specific inputs.

d. Maintenance
Fix errors that are not found in the previous step. Improve unit implementation and improve system services as new needs.

4. CONCLUSION

In designing an application, it needs the right method so that the application development runs well and in accordance with what has been planned. The waterfall model is the right method in designing an application because this method uses completion techniques one by one to minimize errors that might occur. The stages start from device analysis, design, implementation, testing, and maintenance, making designing and building applications more efficient and effective.

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