Web-Based E-Log Book Application for Enhancing the Quality of Student Projects

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Abstract

The student project is the biggest specter for students, and many are hindered by it. The problem that occurs is the difficulty of student activities and assignment supervisors who are still carried out manually, so it cannot be denied that there are many carelessness and errors that have an impact on the final result. The purpose of this research is to design and build a website-based final project guidance e-log book application using the prototyping method in Informatics Engineering S1 Faculty of Computer Science, Dian Nuswantoro University Semarang. The research method applies a qualitative approach with the source of interviews and document studies, while the development method uses the prototype method with three steps namely listen to customers, build and revise mock ups and testing. The results showed that the website for recording final project guidance in Informatics Engineering S1, Faculty of Computer Science, Dian Nuswantoro University Semarang that had been developed was in accordance with the needs of the Final Project Coordinator for monitoring students in recording final project guidance. The application of prototype method that starts from listen to customer, build and revise mock-up and testing is very helpful in the process of developing a website for recording final project guidance.

Keywords: Prototype Design, e-Log book, Student Project, Monitoring Website

1. Introduction

A log book is a notebook or document needed by students to document in detail all activities in the learning process which contains personal identity and competency information (Wijaya & Andry, 2020). Currently, the process of recording thesis guidance activities is still done manually through spreadsheets management applications. Although this method has been used, there are several obstacles in terms of recording efficiency and accuracy that need to be considered to improve the effectiveness of log book management. This can cause several problems such as errors in typing, or incomplete data filling. Torabi et al. (2013) also stated in their research that the log book is a useful tool in student learning and assessment, although with a capacity that is not yet qualified. The advantages of e-log book provide a higher level of security through the use of a database that can be designed and restored if needed, in this application there are notification and assignment features in the application that facilitate coordination between technicians and management (Aspy et al., 2015; Daningsih, 2021; Suprihartini et al., 2022). This e-log book application also develops real-time and remote monitoring features that can perform meter reading and equipment maintenance directly without having to visit the equipment (Akbar et al.,...
The e-log book application can improve the efficiency and effectiveness of data recording management as well as daily activities by technicians with the help of this digitalisation to reduce human error, and speed up the process of documenting activities (Anas et al., 2021; Fauzianty, 2022).

Previous study showed that the e-log book application is designed using the codeigniter framework Personal Home Page (PHP) programming language using MySQL database storage (Saputra & Zakaria, 2023). PHP which makes one of the programming languages that are in great demand in website development used to build various types of dynamic websites. PHP is a programming language to run through web pages that are used to process information on the internet and unite scripts with HTML on one server. The PHP programming language is supported by MySQL which has a simple query or SQL (Structured Query Language) language and uses the same escape character as PHP (Amanatidis & Chatzi, 2016; Nixon, 2014).

According to Kadarsih & Andrianto (2022), this combination of features makes MySQL a popular choice for website developers, as it makes it possible to manage data efficiently and integrate databases with PHP code without difficulty.

Designing and building a website-based e-log book application facilitates the process of guidance and recording final project guidance activities. The e-log book application prioritises effectiveness and efficiency in helping students in the process of recording final project guidance activities. The software development method through the prototype method is a method of developing applications by providing an example of offering a design to people who will be users of the application and providing a prototyping evaluation before writing the syntax (Meilinda et al., 2021). Prototyping itself is used as a forum for communicating ideas from developers and customers which can have the potential of how the system can function properly and completely in order to create a prototype. Prototypes do not present the original form of the system in full, but the prototype method plays an important role in research to provide an accurate description of the application (Ichwani et al., 2021; Wicaksono & Silalahi, 2020).

Several previous studies have shown that e-log book applications can improve efficiency, accuracy, collaboration and data management in the education process, health services, and data record management (Agung et al., 2021; Wijaya & Andry, 2020). In Iran, several universities reported that the log book is very effective as an assessment tool to evaluate students (Torabi et al., 2013). Thus, the use of the prototyping method is relevant in developing an information system that can assist students and supervisors in managing thesis guidance records more efficiently and effectively. In addition, the web-based log book application with the prototype method provides advantages in the development process that focuses on iteration and responsiveness to change. Based on this description, the research objective is to design and build a website-based final project guidance e-log book application using the prototype method.

2. Research Method

Qualitative research methods are used in this study to obtain information from direct observation of the research background regarding managing the recording of final project guidance activities in Informatics Engineering department, Faculty of Computer Science, Dian Nuswantoro University Semarang (Hamzah, 2021; Moleong, 2014). This data will be recorded and documented in the research e-log book as an important part of the research process. The development method used in research on e-log book applications is the prototyping method, in which this method is often used developers and customers can communicate during the creation of applications in
detail (Maulana et al., 2020; Sari, 2020). The prototyping method is a very effective approach in developing the final project guidance e-log book application in Informatics Engineering S1 Faculty of Computer Science, Dian Nuswantoro University Semarang because it allows developers to interact with the Final Project Coordinator to receive direct feedback and adjust to the needs that arise during the development process. This allows the creation of applications that are more in line with the needs of end users (Nurkasih & Suparman, 2022; Suhaimah et al., 2021). The stages of the prototype method can be seen in Figure 1 (Fadhli & Marion, 2022).

![Prototype Method Steps](image)

Source: Research Result (2023)

Figure 1. Prototype Method Steps

Figure 1 shows the steps in using the prototyping method with the following explanation.

2.1. Listen to Customer

In the system analysis stage of the problems that occur in the management of the final assignment guidance record, we met with the final assignment coordinator and conducted interviews about the application used for managing the current final assignment guidance record. Researchers obtained information that Informatics Engineering department, Faculty of Computer Science, Dian Nuswantoro University Semarang still manages the recording of final assignment guidance manually using spreadsheets management applications. The results of the meeting with the final project coordinator showed that the application users included the final project coordinator, supervisors and students with the required features such as login, dashboard, users data, supervisor data, student data and log book.

2.2. Build and Revise Mock-Up

The developer starts by designing a prototype with several processes that occur in the system as a Unified Modeling Language (UML) diagram design process is a step taken to specify a system that explains the needs of the system and how the application will be documented with the Unified Modeling Language (UML) through use case diagrams, class diagrams, and sequence diagrams (Fowler, 2018). Interface implementation is the second step of implementing the interface design display that will be displayed by the user and is in accordance with the wishes of the user so that the application is easily understood by the user.

2.3. Testing

In the testing stage, it will be carried out between developers and users for prototyping testing aims to select software prototypes that have been built previously and mark deficiencies and problems contained in software prototypes. If there are problems or lack of features in prototyping, the developer will make improvements to suit user needs. The testing stage is an important part of the software development
process that aims to ensure that the software built can work properly and meet customer needs. In the testing stage, the software will be tested using a testing method, namely blackbox testing. In the blackbox testing method, researchers test the design of the e-log book application that has been built to ensure that the software is in accordance with expectations and meets user needs.

3. Results and Analysis

The results of the analysis and discussion related to the design of the website-based e-log book application will be presented in stages according to the prototype method with the following results.

3.1. Listen To the Customer

At the listen to customer stage through interviews to get information needed by customers about the final project guidance e-log book website and functional requirements on the website. The e-log book website is expected to help the Final Project Coordinator of S1 Informatics Engineering, Faculty of Computer Science, Dian Nuswantoro University Semarang in managing the recording of final project guidance more effectively and efficiently. On this website there are 3 actors, namely the final project coordinator, supervisor and student. The final project coordinator has an overall management role related to the recording of final project guidance, which involves the process of creating special accounts for supervisors and students.

3.2. Build and Revise Mock Up

Indicator design and improvement prototype consists of use case diagram, class diagram, and sequence diagram. Use case diagrams are used to describe application users and the behaviour that users do to the application. In this application, application users consist of three actors, namely the final project coordinator, supervisor, and student.

Class diagrams are used to describe the structure and description of classes, packages and objects along with the relationships between them such as association, containment, inheritance, and others (Figure 2). The emphasis on class diagrams is to describe system activities or activities that can be performed by the system, not what is done by actors. Class diagrams can be used to describe how activities are coordinated to provide services at various levels of abstraction (Saifulloh et al., 2021).

![Class Diagram](image)

Source: Research Result (2023)
Sequence diagrams are used to describe interactions between objects organised in events performed by an actor in operating the system. Sequence diagrams are related to use cases, this diagram shows how operations are carried out in detail, messages that are sent and when these events occur. Sequence diagrams in web-based e-log book applications consist of sequence diagrams of log books and verification log books which can be seen in Figures 3 and 4.

![Sequence Diagram Log book](image)

Source: Research Result (2023)

Figure 3. Sequence Diagram Log book

![Log book Verification Sequence Diagram](image)

Source: Research Result (2023)

Figure 4. Log book Verification Sequence Diagram

The implementation stage is the development stage starting from the construction of the entire application through writing code using the PHP programming language. This stage includes a process that takes quite a lot of time, where the system is built until it reaches the level of readiness for use. The following is a view of the website page. The following is the implementation of the website-based final project guidance e-log book application design with the prototype method which can be seen in table 1 below.

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Table 1. E-Log book Display

<table>
<thead>
<tr>
<th>No.</th>
<th>Display Menu</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Login page view</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>View of the final project coordinator page</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>User data page display</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Student account login input formular</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Student data page display</td>
<td></td>
</tr>
</tbody>
</table>

![Image of Login page view]

![Image of View of the final project coordinator page]

![Image of User data page display]

![Image of Student account login input formular]

![Image of Student data page display]
### Display Menu Results

<table>
<thead>
<tr>
<th>No.</th>
<th>Display Menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Lecturer account login formular</td>
</tr>
<tr>
<td>7</td>
<td>Lecturer page view</td>
</tr>
<tr>
<td>8</td>
<td>Plotting page display</td>
</tr>
<tr>
<td>9</td>
<td>View of the final project guidance log book page</td>
</tr>
<tr>
<td>10</td>
<td>Display of student log book content page</td>
</tr>
</tbody>
</table>

Source: Research Result (2023)

#### 3.3. Testing

The testing stage on this website aims to test and evaluate the extent to which the website can work according to the expected functionality. The test method used to test the stability of this e-log book website uses the black box testing method. This
method focuses on system functionality from the perspective of website input and output. The test results on the website-based e-log book can be seen in Table 2.

Table 2. Test Results

<table>
<thead>
<tr>
<th>No</th>
<th>Test Case</th>
<th>Scenario</th>
<th>Expected Results</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Account login</td>
<td>Fill in the correct email and password</td>
<td>Successful login</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fill in the wrong email and password</td>
<td>Email and password notifications appear</td>
<td>Success</td>
</tr>
<tr>
<td>2.</td>
<td>View user data that has been</td>
<td>View the details of the account that has been created by the final project coordinator</td>
<td>Successfully view accounts that have been created</td>
<td>Success</td>
</tr>
<tr>
<td></td>
<td>created for an account</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Create an account for students</td>
<td>Pressing the create new button and filling in the form provided</td>
<td>Successfully added an account for students</td>
<td>Success</td>
</tr>
<tr>
<td>4.</td>
<td>Create account for the lecturer</td>
<td>Click on the create new button and fill in the form</td>
<td>Successfully added an account for students</td>
<td>Success</td>
</tr>
<tr>
<td>5.</td>
<td>Connecting lecturer with students</td>
<td>Pressing create new and selecting the name of the lecturer and the name of students</td>
<td>Successfully plotted lecturer with students</td>
<td>Success</td>
</tr>
<tr>
<td>6.</td>
<td>View the list of students at the lecturer</td>
<td>In the guidance view, students press the dropdown button and then select the lecturer to be seen</td>
<td>Successfully view the list of students on the lecturer and can see</td>
<td>Success</td>
</tr>
<tr>
<td>7.</td>
<td>Fill, modify and delete the log book</td>
<td>Pressing the log book button after that create new and fill in the form that is listed can also change and delete the log book that has been filled in</td>
<td>Successfully save, edit and delete the log book</td>
<td>Success</td>
</tr>
<tr>
<td>8.</td>
<td>Verifying the log book with a checklist</td>
<td>In the log book that has been filled in, it can be verified by pressing the checklist button as proof that the students has conducted guidance</td>
<td>Successfully verify student log book</td>
<td>Success</td>
</tr>
</tbody>
</table>

Source: Research Result (2023)

3.4. Discussion

The design of a website-based final project log book application in the Informatics Engineering study programme, Faculty of Computer Science, Dian Nuswantoro University Semarang using the prototype method has met the needs of the final project coordinator for monitoring students in recording final project guidance. The application of the prototype method starts from listening to customers, designing and creating prototypes, and testing prototypes. These results are in line with the research of Saifulloh et al. (2021) that designing village website applications using a prototype system can help complete archiving more effectively, safely and quickly in terms of input and search for village data. Nurhadi & Muhammad Ridwan, (2022) also explained in their research that inventory information systems using prototypes can help users in carrying out the work process as needed. The prototype system is proven to be able to create an accurate and well-synchronised system that makes it easier for users to carry out the data collection process. Ichwani et al.’s research (2021) shows that a website-based system can provide informative information, effective promotional media, a wider
target market, easier service and time saving, simplify the data management process and increase credibility.

4. Conclusion

Based on the results of the research and discussion, it can be concluded that the website for recording final project guidance in Informatics Engineering S1, Faculty of Computer Science, Dian Nuswantoro University Semarang has been developed in accordance with the needs of the Final Project Coordinator for monitoring students in recording final project guidance. The application of prototype method which starts from listen to customer, build and revise mock-up (designing and making prototype), and testing (testing prototype) is very helpful in the process of developing website for recording final project guidance in Informatics Engineering S1 Faculty of Computer Science, Dian Nuswantoro University Semarang.

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Author Contributions

Devanda proposes the topic; Devanda models and designs the experiment; Defri monitors the research topic; Devanda and Defri analyse the research results.

Conflicts of Interest

The authors declare no conflict of interest.

References


