BAB III

3.1 Research Type

This research is classified as applied research. The primary objective of this study is to develop and implement a web-based student attendance system at SMK NU Ungaran using the CodeIgniter framework. This research is also categorized as design and development research, as it focuses on designing, developing, and evaluating the resulting system.

3.2 Research Approach

The research adopts both quantitative and qualitative approaches. The quantitative approach is used to measure the effectiveness of the web-based attendance system by analyzing attendance data and the time required for manual attendance recording compared to the developed system. The qualitative approach is used to collect information regarding user experiences (students and administrators) with the newly implemented system.

3.3 Research Phases

The research is conducted in several phases, as follows:

1. Literature Review: The first phase involves conducting a literature review on theories related to attendance systems, the CodeIgniter framework, and relevant previous studies. This literature review serves as a foundation for designing and developing the system.

2. System Requirement Analysis: In this phase, a system requirement analysis is conducted through interviews with school staff (administrators and teachers) and observations of the current manual attendance process. The analysis results in determining the necessary features of the web-based attendance system, such as attendance recording, student data management, and attendance report generation.

3. System Design: After analyzing the requirements, the system design is carried out by creating user interface (UI) designs and workflow diagrams (flowcharts). Additionally, a database design is developed to store student, attendance, and report data.

4. System Development: During this phase, the web-based attendance system is developed using the CodeIgniter framework. This includes creating the user interface, implementing the programming logic for attendance recording, and integrating the system with the database to store attendance and student data.

5. System Testing: Once the system is developed, testing is conducted to ensure that the system functions properly and meets user requirements. Testing is performed by involving administrators and students to try out features such as attendance recording, student data management, and attendance report generation.

6. Evaluation and Analysis: In this phase, the system's effectiveness is evaluated after being implemented at SMK NU Ungaran. Data collected from system usage, such as time spent

on attendance recording, data accuracy, and feedback from users (administrators and students), is analyzed to assess the system's effectiveness.

3.4 Data Collection Techniques

The data collection techniques used in this research are as follows:

1. Interviews: Interviews are conducted with school staff (administrators and teachers) to gather information on the requirements for the attendance system and the issues with the current manual attendance process.

2. Observations: Direct observations are made to understand the workflow of the manual attendance recording process and to identify any challenges or difficulties faced by users.

3. Questionnaires: Questionnaires are distributed to students and administrators after the system has been implemented to gather feedback on the ease of use, functionality, and satisfaction with the new system.

4. Documentation: Documentation includes notes and reports generated throughout the research process, such as student attendance data, system testing reports, and user feedback.

3.5 Data Analysis Techniques

The data collected will be analyzed using both quantitative and qualitative analysis techniques:

1. Quantitative Analysis: Quantitative data obtained from system testing, such as time spent on attendance recording and data accuracy, will be analyzed using descriptive statistics to compare the effectiveness of the web-based attendance system with the manual system.

2. Qualitative Analysis: Qualitative data obtained from interviews, observations, and questionnaires will be analyzed using content analysis to assess user experiences and evaluate the level of satisfaction with the developed system.

3.6 Research Limitations

Several limitations of this research include:

1. This study focuses solely on the development and implementation of a web-based attendance system at SMK NU Ungaran, and therefore, the findings cannot be generalized to all schools or other educational institutions.

2. The research uses the CodeIgniter framework as the platform for developing the system, and does not cover the use of other frameworks or technologies.

3. This study does not include the development of a mobile application, focusing only on the web-based system.