DESIGNING A WEB-BASED REPORTING APPLICATION FOR ELEMENTARY SCHOOL KOMPLEKS SAMBUNG JAWA

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ABSTRACT

The management of student report cards at the Sambung Jawa Complex Elementary School still uses Microsoft Excel which can cause the data processing process to be less efficient and prone to errors. The aim of this research is to build a report card application that can increase the efficiency and accuracy of processing student report card data, as well as facilitate access and management of data by teachers and administrative staff. The method used in designing this application is the FAST method (Framework for the Application of Systems Thinking), which includes the stages of requirements analysis, system design, and implementation. Meanwhile, the testing method used is the black box method, which focuses on testing the functionality of each feature in the application without looking at its internal structure. The results of this research show that the designed web-based report card application can run well and fulfill the needs of report card management at the Sambung Jawa Complex Elementary School. This application has succeeded in increasing the efficiency and accuracy of processing report card data, as well as making data access and management easier by the school.

Keywords: Report Card Application, Website, Black Box, Academic Information Systems.

1. INTRODUCTION

Technology is currently very developed in educational institutions, allowing information that is available to be easily accessed at any time because this information is very important (Anshori, 2018). One of the fastest growing media in educational institutions today is a website (Qur’rotun, 2023). Its features allow websites to provide information easily and accurately. This is very relevant in the context of academic data management, where the speed and
accuracy of information are very important to support the teaching and learning process (Syah et al., 2021).

One implementation of this technology is designing a website-based report card application (Widiatry & Cordias, 2022). This application is designed to display information required by authorities or educational institutions in an efficient and effective way. With this application, managing academic data such as student grades can be done more easily and structured (Putri et al., 2019). This of course has a positive impact on the performance of teachers and administrative staff in managing student data (Zakiya et al., 2023). If this web-based report card application is designed well, of course, users can do everything necessary to implement solutions to the problems they face (Ibrahim et al., 2022). With this application, all components become easier to access and manage. For example, teachers can quickly enter student grades and generate report cards without having to go through a long and complicated process (Fajrina & Aliyyah, 2024). However, there are still many educational institutions that use Microsoft Excel to process their data (Yusfrizal et al., 2022). Using Excel to manage academic data is common, but this method still has many shortcomings (Sisca, 2019). Manual data processing often causes problems and obstacles, especially when it comes to inputting student grades and data which takes a long time. As a result, errors often occur in data processing which can result in inaccuracies in calculating students' average scores.

Manual applications used in MS Excel pose numerous challenges for schools, particularly for homeroom teachers in generating transcripts or grades. This process is time-consuming and prone to human error. Manual data processing is inefficient and can cause delays in providing necessary information to students and parents. Additionally, many schools still use manual methods for information delivery, resulting in slower, less precise, and less accurate information dissemination. Teachers and administrative staff must spend significant time ensuring data accuracy, leading to delays and potential negative impacts on the teaching and learning process and school decision-making.

By implementing a web-based report card application, it is hoped that these problems can be overcome. This application will enable more efficient and accurate data processing, as well as facilitate access to information for all interested parties. This research is in line with Suyatno (2023) research, namely web-based E-Report at the Cawang 09 Jakarta State Elementary School. with the aim of designing a web-based report application with the existence of an information system. With the existence of a web-based report card information system, the presentation of academic information at Elementary School (SDN) Cawang 09 has become faster.

Data management becomes easier and can provide time efficiency and effectiveness in creating reports. The same research conducted by Sirait et al. (2021), namely Designing a web-based E-Report Information System at the Harapan Kedaung Elementary School, resulted in a hypothesis that a web-based grades management system (E-Report) is needed which allows grades to be managed more quickly and efficiently and can be accessed by the student/guardian. Furthermore, Putra & Ariansidi (2019), designed and Developed a Web-Based Report Card Grade Processing Information System at SMK Negeri 1 Kotaraja. The
results of the black box testing that was carried out stated that the grade processing information system that was built could help teacher performance and make it easier for students to access report cards online. This will be a significant step forward for educational institutions in improving the quality of academic data management and services to students and parents.

2. THEORY
Design can be interpreted and functioned as drawings, plans, and illustrations, or as a series of individual groups that complement each other and can be used (Wikipedia, 2024a). Users are given an overview of the new system through this process. Systems design generally refers to the detailed design of the components of an information system, ensuring each element is properly integrated to achieve the desired goals. Thus, design can be interpreted as a stage in taking clear and structured action, where there is an initial process and a final process (Lesmono, 2024). This process involves careful planning, needs analysis, and developing the steps to be taken to achieve optimal end results. All of these stages ensure that the designed system meets user needs and can function effectively in its operational environment.

Application refers to the use of a computer to follow a series of instructions or statements designed to process input and produce output. This concept allows the transformation of complex problems or tasks into something more accessible and understandable for users. By implementing this system, solutions to existing problems can be achieved more efficiently and quickly, ensuring that the resolution process becomes more precise and effective. Computer applications do more than just execute commands, they also change the way users interact with technology. This creates reliable solutions to challenges, increases efficiency in solving problems, and enables easier access to information and functionality required by users in various contexts (Putra, 2022).

A report card is a book that records the final results or total grades of students from each subject in a learning period, usually one semester or six months (Wikipedia, 2023). The report card is not only an academic evaluation, but also a tool for monitoring student progress in the teaching and learning process. In it, teachers or lecturers record test scores and assignments and use them as a benchmark for student development (Soetrisno, 2024). Apart from being an evaluation, report cards also function as a place to record extracurricular activities and student participation in the learning process. This document is concrete evidence for pupils or students to measure their learning outcomes in a year, which is carried out twice in one academic year (PSKP, 2024).

Web is a general term that refers to the World Wide Web (WWW), a part of the Internet consisting of pages that can be accessed using a web browser (Rerung, 2018). Although the web is the largest component of the internet, the two have significant differences in terms of functionality and use (Empatpilar, 2023). Websites, as collections of pages designed to display various types of content such as text, still or moving images, gifs, and sounds, as well as static and dynamic combinations, play a major role in facilitating interaction and information exchange globally (Kumparan, 2023). Hyperlinks, or hypertext links, function as bridges that connect one web page to another (Verborgh et al., 2012). The use of hypertext allows web users to connect with various information distributed throughout the web, forming a vast and
connected information network. Thus, the web not only allows access to diverse content, but also facilitates intuitive navigation and an interactive user experience in navigating today's digital world (Kopak, 1999).

HTML is a web programming language that uses special tags with code that must be defined precisely (Muscia & Kennedy, 2002). Each tag in HTML has a specific function to regulate how the content of a web page is displayed in the browser (Castro, 2003). The existence of these tags is very crucial because the browser needs to understand and interpret them correctly so that the web page can be rendered properly and as intended by the creator. By using HTML, a website can function effectively and efficiently (Andre, 2023). HTML's ability to define the structure and content of web pages in a structured manner allows users to easily add and format text, images and other elements (Robbins, 2012). This not only makes it easier to create content on an existing website, but also facilitates the process of creating a new website in a more organized and easy-to-learn way.

Cascading Style Sheet (CSS) is one of the many style (design) languages where CSS is a markup element that makes it possible to beautify or organize web pages (Setiyani, 2021). CSS is usually used together with HTML in web creation. In the website-based report card application, the CSS programming language will be used to beautify the appearance of the user interface (Casabona, 2020). Cascading Style Sheet (CSS) is very important to use in web creation so that the web that is built is not monotonous or without style, so by using this CSS programming language, the web that we build can be attractive and good to look at (Devmountain, 2023).

A browser is software for searching for information and visiting websites on the Internet (Choo et al., 1999; Team, 2023). These devices make it easier for users to access data and find the references they need. In the website-based report card application, it can be accessed in any browser, making it easier to progress students' grades.

(Hypertext Preprocessor) PHP is a programming script, where this script can be combined or inserted into an HTML script (Lerdorf, 1995; Jason Gilmore, 2006). PHP (Hypertext Preprocessor) is often used in creating dynamic or static websites. PHP (Hypertext Preprocessor) is also often used in developing a CMS (Content Management System) (Yodyo, 2022). The website-based report card application will be designed or built using the PHP programming language anywhere, making it easier to progress students' grades (Marsya et al., 2023). PHP (Hypertext Preprocessor) is a server-side script programming script developed in website development. It is also said to be a server side programming script because PHP (Hypertext Preprocessor) can be processed by a server machine. In this way, PHP is different from JavaScript, which is a client-side programming language that can be processed on the client browser site.

A database often called a database is a collection of data, where the data will be arranged to form very useful information (Khafidz & Adriansina, 2023). Databases consist of collections of data of similar types. Examples include data such as names and addresses (Akbar, 2024).

XAMPP is a software package consisting of Apache, MySQL, PhpMyAdmin, PHP, Perl, Filezilla, and more (Wikipedia, 2024b). XAMPP itself is designed to be easy to install in a PHP
environment. In this environment, the web development environment usually requires PHP (Hypertext Preprocessor), Apache, MySQL, PhpMyAdmin, and web development software (Ghimire, 2020).

Unified Modeling Language (UML) is software for visualization and collection of analysis and design results, including syntax for modeling visual systems (Kaur & Singh, 2011). UML can be interpreted as a language of syntax and semantics (Booch et al., 1996). UML was created to define visualizing, building and documenting information systems (Jacobson & Booch, 2021). Although UML was developed as an object-oriented design and analysis tool, it can be used to understand and document any information system (Dennis et al., 2015). As a result, the use of UML (Unified Modeling Language) is increasing in the industry. This standard is used as general modeling in software and system development (Booch et al., 1996).

Black Box Testing (black box testing) is testing software against functional specifications without testing the design or code (Jacob & Prasanna, 2016). Testing is carried out to determine whether the functionality, input and output of the software meet the required specifications (Peled et al., 1999). Black box testing examines the fundamental aspects of a system without considering the logic between software (Peled et al., 1999). This method is used to determine whether the software is functioning properly. Black-box testing is a data design technique for testing software specifications (Dashti & Basin, 2020).

3. METHOD
In the process of inputting report card grades at SDN Komp Sambung Jawa, the teacher still uses the manual method using MS Excel with the Website-Based Report Card application. Teachers have no difficulty inputting report card grades if the formula is deleted.

Research methods are approaches or procedures used by researchers to collect, analyze, and interpret data in order to answer research questions or test hypotheses (Iskandar et al., 2023). The method used to build this system is the Fast Method (Parulian et al., 2022), a framework for implementing systems thinking. The stages of the method are as follows:

![Figure 1. Stages of Creating a Web-Based Reporting System](image)

### 3.1 Scope Definition
In this step, the problems experienced by teachers as people who interact directly with the report card assessment system that is running every semester are explained. Teachers face various obstacles in managing and inputting student grades using Microsoft Excel, which is still used manually by many educational institutions.

### 3.2 Problem analysis
Problems that often arise include errors in data input, long-time processing of grades, and lack of efficiency in producing report cards. Observation of this problem shows that the current
process is not only time consuming but also prone to errors which can affect the accuracy and reliability of student report card data. Teachers and administrative staff have to spend a lot of time verifying and ensuring the accuracy of the data they input, which can ultimately interfere with other teaching tasks. By understanding these obstacles, an opportunity arises to build a web-based report card application that can solve these problems effectively and efficiently. This application is designed to make it easier to manage student grades and data, increase accuracy in calculating average grades, and speed up the process of creating and submitting report cards. In addition, this application will provide easier and faster access for teachers and administrative staff in managing student academic data.

3.3 Needs Analysis
The web-based report card application that will be created needs to provide a system that allows academic data to be managed efficiently, accurately, and easily accessed.

3.4 Logical Design
The design stage uses web-based report information system flowchart design, application use case design, and interface design. This flowchart illustrates the flow of the student grade management process which involves three main roles: Admin, Homeroom Teacher, and Subject Teacher, as can be seen in Figure 2.

![System Flowchart](https://doi.org/10.35585/inspir.v14i1.89)
a) Use Case Application Use
This use case diagram depicts the interaction between the main actors Admin, Class Teacher, and Study Teacher. With a system in the context of managing student data and grades. This interaction ensures that any data required for student assessment and evaluation is managed well and efficiently, supporting a structured and organized teaching and learning process can be seen in Figure 3.

![Use Case Diagram]

Figure. 3. Application use case

b) Interface Design

![System Interface Design]

Figure. 4. System Interface Design
This interface design diagram shows the structure of a web-based report card application for the Sambung Jawa SDN Complex, which is designed to serve three main roles: Admin, Homeroom Teacher, and Study Teacher. This application starts with a dashboard as the main page which is the navigation center. From the dashboard, users can select the appropriate role to access the features provided. Admins have access to log in and input various important data such as teacher, student and subject data. After logging in, Admin can carry out essential administrative tasks to support school operations. Homeroom teachers, after logging in, can input the grades of students under their responsibility and can log out when finished. Likewise, Subject Teachers have access to log in and input student grades for the subjects they teach, with the option to log out after completing their assignments. This interface design ensures that each role has clear and structured access to the functions relevant to their tasks. With the dashboard as a navigation center, users can easily move between features according to their respective access rights and responsibilities. This structure is designed to facilitate the management of student data and grades in an efficient and organized manner, supporting a better educational process at SDN Komplek Sambung Jawa.

3.5 Construction and Testing

At this stage, in the form of construction, the step in creating a web-based report card application is designing the database. This database will be the backbone of the application, storing all important information such as student data, grades, subjects, and other academic information. Database design must be done carefully to ensure that all data can be accessed and managed efficiently. The database structure must include relevant tables with appropriate relationships to support the operations required by the application.

Black box testing involves testing all the main features of the application, such as input of student grades, calculation of average grades, generation of report cards, and data access by users. Each feature is tested to ensure that it works properly and that no errors occur during operation. The results of this testing will be used to make improvements and improvements to the application before launching. After all testing stages are completed and the application is declared to meet user needs, the final step is launching the application. This web-based report card application can then be used by teachers and administrative staff at SDN Komplek Sambung Jawa to manage academic data more efficiently and accurately.

4. RESULTS AND DISCUSSION

4.1 Login Page

The login page for users of the website-based Report Card application is the class teacher or homeroom teacher, study teacher and admin.
The login page is the first page that appears when you first access this application. The main function of the login page is to verify the user's access rights to enter the application's main page. On this page, there are columns for entering username, password, semester year, as well as a button to log in.

### 4.2 Main page

On the main page or home page, the main menu page for the Report Card application will be displayed, which is in Figure 6 below:

![Main or Home Page](image)

**Figure. 6. Main or Home Page**

### 4.3 Profile Page

The school profile page in the admin account will display school information such as photo, user name, curriculum used, national school statistics number, name of the school principal, etc. It can be seen in Figure 7 below:
4.4 Subject Pages

The subject page in the admin account will display a list of subjects and minimum completion criteria (KKM). Where admin will include the subjects and school KKM standards that have been mutually agreed upon which can be seen in figure 8.

4.5 Values Page

On the homeroom account user's grades page, the subjects, knowledge grades and skills grades will be displayed. Where the homeroom teacher or class teacher will input knowledge scores and skill scores according to the subjects that have been input by the school admin. Can be seen in Figure 9.
4.6 Basic Competency (KD) Page

On the Basic Competencies (KD) page for study teacher account users. The study field teacher will input a description in accordance with the basic competencies contained in the handbook. Can be seen in figure 10.

4.7 Print Report Page

On the printed report card page for homeroom or class teacher account users, the student's profile, subjects, predicates, knowledge scores and skill scores will be displayed as well as displaying the overall achievement decision where the student will be determined whether the student is promoted to a grade or remains in grade after being validated by homeroom teacher then print out. Can be seen in figure 11.
4.8 Test Results

Test the system by running the system that has been created using black box testing. Black box testing itself is a software testing method that focuses on the output of the application used that has been created. The following are the results of the Report Card Application test in table 1 as follows:

<table>
<thead>
<tr>
<th>No</th>
<th>Testing</th>
<th>Which are expected</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Login</td>
<td>The login page can be accessed</td>
<td>Success</td>
</tr>
<tr>
<td>2</td>
<td>Main page</td>
<td>The main page can be accessed</td>
<td>Success</td>
</tr>
<tr>
<td>3</td>
<td>Profile</td>
<td>Profile can be accessed</td>
<td>Success</td>
</tr>
<tr>
<td>4</td>
<td>Teacher Data Menu</td>
<td>Teacher data can be accessed</td>
<td>Success</td>
</tr>
<tr>
<td>5</td>
<td>Student Data Menu</td>
<td>Student data can be accessed</td>
<td>Success</td>
</tr>
<tr>
<td>6</td>
<td>Subject Menu</td>
<td>Subjects can be accessed</td>
<td>Success</td>
</tr>
<tr>
<td>7</td>
<td>Basic Competency Menu</td>
<td>Basic competencies are accessible</td>
<td>Success</td>
</tr>
<tr>
<td>8</td>
<td>Value Input Menu</td>
<td>Value input is accessible</td>
<td>Success</td>
</tr>
<tr>
<td>9</td>
<td>Print Menu</td>
<td>Can print report cards</td>
<td>Success</td>
</tr>
</tbody>
</table>

In table 1 are the results of application testing, which are accessed. From the test results in this research according to the table above, it can be concluded that everything can function well.

5. CONCLUSIONS AND SUGGESTIONS

The conclusion of "Designing a Website-Based Report Card Application at the Sambung Jawa Complex State Elementary School" is that a report card application has been successfully developed to facilitate the preparation of report cards at the Sambung Java Complex State Elementary School. This application uses the Fast method in its design because of its ease of implementation. Testing uses the black box method to evaluate the input and output of this web-based report card application. The implementation of this application at SDN Sambung Jawa promotes the use of information technology to increase work efficiency, especially in the process of reporting student data and grades by class teachers, homeroom teachers and study
areas. Suggestions for developing this application so that it runs according to its proper function are as follows: First, it is necessary to provide outreach to users such as class and study teachers regarding the use of Website-based Report Card Applications to ensure that the performance of the report card application can be optimal. Second, it is important to always log out when not using the application to prevent misuse of access. Third, admins should perform database backups regularly to avoid data loss. Finally, good communication and cooperation between users and developers are needed for the purposes of developing a better system.

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