Development of a Fitness Report Using the AppSheet Platform for Elementary School Students

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Development of a Fitness Report Using the AppSheet Platform for Elementary School Students

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ABSTRACTS

Purpose: This research aims to enhance the monitoring and reporting of physical fitness among elementary school students by developing an online fitness report application based on AppSheet.
Materials and Methods: The methods employed include data collection and organization, application development, testing, and adjustments. This application utilizes Google Spreadsheet as its primary database, enabling real-time access for teachers, students, and parents.
Result: Research findings indicate that the application is effective and efficient in monitoring students' physical fitness, thereby increasing engagement among all stakeholders. Testing with 35 teachers revealed some issues, such as app crashes due to re-registration, which were subsequently addressed through coding adjustments.
Conclusion: The conclusion drawn from this research is that the application successfully develops an innovative and practical technological solution for monitoring the physical fitness of elementary school students. Despite the reliance on stable internet connectivity, mitigation steps such as offline data storage, user training, feature enhancement, data security improvements, periodic evaluation, collaboration with fitness experts, and testing in various conditions are recommended to ensure consistent data availability and optimize the application's usage.
Keywords: Report; Fitness; Monitoring; Appsheet.

INTRODUCTION

Physical fitness is a crucial component in the development of children, including elementary school students. Physical activity plays an important role in their growth. Research on children aged 9-12 at SD Negeri 4 Sibang Gede shows that physical activity is linearly related to cardiorespiratory fitness (Rulyansah et al., 2022). Said (2023) also found a significant relationship between physical activity and physical fitness in elementary school children. Additionally, physical development positively correlates with academic achievement in elementary and middle school students (Wright et al., 2019). In Indonesia, only 17 percent of people have relatively good fitness levels, indicating a low level of health development. This is due to a lack of necessary physical activity to improve one's fitness (Setiakarnawijaya et al., 2021).

Regular monitoring and reporting of physical fitness help teachers and parents understand the health and development of students. By regularly reporting physical fitness, teachers and parents can gain deep insights into students' fitness and health status, allowing for early detection

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of changes in physical condition and necessary interventions. Studies by Ma (2021) and Sukarmin & Sudardiyono (2017) show that consistent monitoring and reporting are crucial for supporting students' health development. The knowledge gained from these reports can be used to formulate effective policies and interventions, thereby supporting students in achieving optimal health and physical fitness. According to Bafirman et al. (2023), a lack of supervision over students' physical fitness can lead to a decline in their fitness quality.

Digital technology, particularly platforms like AppSheet, allows for the creation of applications that facilitate efficient tracking and management of fitness data. Suitable mobile applications can be developed to meet user needs and enhance process operations with the support of mobile devices (Mohd Rusli, 2023; Rajan et al., 2018). According to Xiang (2022), technology, especially big data in sports and fitness programs for elementary school students, can simplify data collection, feedback, and fitness data analysis, thus forming a complete and integrated scientific fitness system. The implementation of technology in elementary schools can support more structured and sustainable physical education programs. Sports technology, particularly smartphones, is rapidly evolving and can be used to improve the measurement of physical fitness (Setiakarnawijaya et al., 2021). However, the use of technology in monitoring the fitness of elementary school students has not yet been implemented in educational units.

The main goal of this research is to enhance the monitoring and improvement of physical fitness in elementary school students using effective and efficient technology. This study develops an online fitness application based on AppSheet that allows real-time and structured reporting and monitoring of students' physical fitness, accessible by teachers, students, and parents, and can be customized to the needs of the school. The study aims to create an online fitness report.

METHODS

***Study Organization*:** This research uses a developmental design aimed at creating an online fitness application based on AppSheet, Google Sheets, Google Slides, and Autocrat. The application is designed to facilitate real-time and structured monitoring and reporting of students' physical fitness, accessible by teachers, students, and parents, and customizable to the specific needs of the school. The research procedure begins with the initiation phase, where the necessary database for the application is built. Next, the process moves to application development, where the features and functions of the application are designed and implemented. After the development is complete, the application is run in a trial to ensure all components work properly. Based on the trial results, a review is conducted to identify areas that need improvement. The final phase is adjustment, where improvements are made based on the review to ensure the application works optimally according to the research objectives.

RESULT

Initiation: The first stage of this research is the initiation phase, where the database required for the development of the application is created. This database includes essential information for monitoring elementary school students' fitness and uses Google Sheets. The data collected includes

1. Student Identification: ID, NISN, student name, class, school origin, test date, gender, date of birth, and age.
2. Physical Metrics: Height, weight, Body Mass Index (BMI) automatically calculated, and BMI criteria.

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3. Fitness Test Results: MFT level, number of MFT repetitions, and fitness criteria.
4. Additional Information: Resting Heart Rate (RHR), Exercise Heart Rate (EHR), student health history, gender, unique student code, role in the application, and responsible teacher data

The database also includes additional features such as student photos, student image links (Link Pic), the ability to download data, and manage merged documents (Merged Doc) for male and female students.

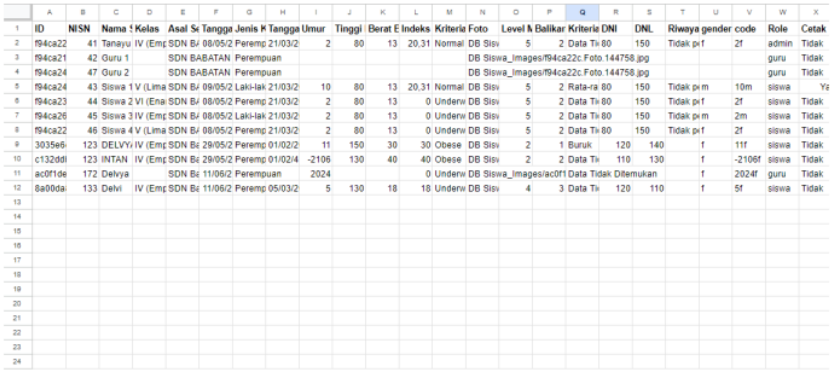

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Figure 1. Database on Google Sheets

Development: In the application development phase using AppSheet, the researchers developed features designed to meet teachers' needs for collecting fitness data from students in the field. These features were customized to ensure the application functions optimally and is user-friendly. The developed features include;

Login Page: This feature is designed to secure access to the fitness report application. Users are required to log in when first accessing the application, ensuring only registered users can enter.

Figure 2. Fitness Report Login Page

All Entries Feature: This feature is visible only to users with an admin role. This menu provides an overview and access to main management functions within the application.

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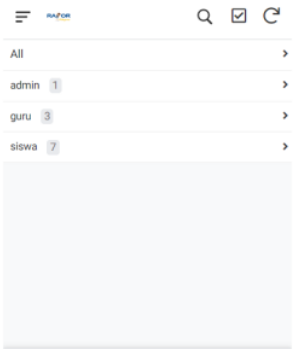

Figure 3. Fitness Report Dashboard Page

Student Menu: This page is specifically for users with a teacher role. Here, teachers can access student data, input fitness data, and monitor student progress.

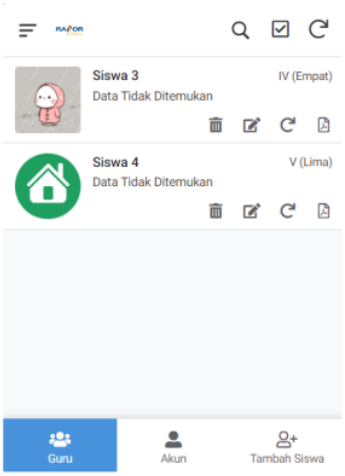

Figure 4. Teacher Fitness Report Page

Account Page: This feature is available to all users, allowing them to manage their own account information, including personal details and preferences.

Add Teacher Feature: This feature is available only to admins, allowing them to add new teacher accounts into the system to assist with fitness data collection.

Add Student Feature: This feature is available to admins and teachers, enabling them to add new student data into the application, facilitating the management and monitoring of student fitness data.

Create PDF Report Feature: This feature integrates the Autocrat Google Sheets plugin with AppSheet, run through Google Script, so commands can be executed within the AppSheet application. This command is run via the Play button on the student page.

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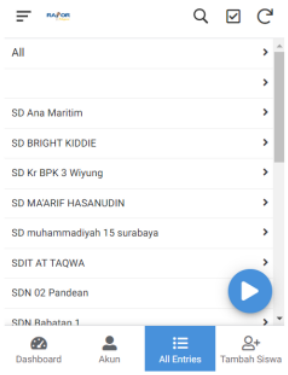

Figure 5. Play Button (PDF Creator)

Online Report Design (PDF): The design used for reports includes two types: a blue base design for male students and a pink base design for female students. The online report can be downloaded and printed for parent reports.

Figure 6. Online Report Design (PDF)

Trial: In the trial phase, the application was tested with a Working Group of 35 teachers. This process was conducted to ensure that all features and functions of the application worked properly and could be used effectively by teachers in the field. Based on the trial results, some features experienced crashes, causing the application to fail to identify students according to their respective schools. This issue occurred because some users attempted to re-register, causing the application to fail in identification.

***Adjustment*:** In the adjustment phase, solutions were found for the problems encountered during the trial to ensure the application functioned correctly. The researchers adjusted the coding in the teacher ID column, which previously used IF and LOOKUP commands, replacing it with the USERSETTINGS (userid) command in the initial value of the teacher ID column. This adjustment ensures that when a teacher registers a student, the teacher ID will automatically populate according to the userid used at login.

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Figure 7. Adjustment of Coding in the Teacher ID Column

The teacher ID was created to group students according to their respective teachers and schools, so in the application, teachers only see students who have been registered by them.

DISCUSSION

This study aims to develop an Appsheet-based application to monitor the fitness of elementary school students. The application utilizes Google Spreadsheet as the primary database. The research process involves several key stages: initiation, development, testing, and adjustment.

Initiation Stage: The first stage of this research is the initiation phase, which focuses on collecting and organizing the data required for the application development. This stage aligns with the systematic framework for data collection in Product Configuration System (PCS) projects. The framework includes essential steps such as setting goals, categorizing data, prioritizing products, and collecting and validating data, which are then analyzed and documented (Shafiee et al., 2017). In this context, the initiation phase reflects the structured approach used to ensure the collected data is relevant, accurate, and well-organized to support the effective development of the application.

The use of Google Spreadsheet as the database has proven effective in managing various important pieces of information regarding student fitness. The data collected includes student identification, physical metrics, fitness test results, and additional information. The main advantage of using Google Spreadsheet is the ease of access and real-time data manipulation, as well as flexibility in sharing and collaboration with other users. Google Spreadsheet is a tool for creating sheets that can summarize data in tables and columns and can be easily accessed for free via Google Drive (Aini et al., 2019). A potential drawback of using Google Spreadsheet as a database is the dependence on a stable internet connection. Theory supports the importance of a stable internet connection to ensure data availability and accessibility (Maheshwari et al., 2021). Therefore, in implementing this system, it is crucial to consider mitigation steps, such as using temporary offline data storage solutions or selecting data collection locations with good internet connectivity, to minimize the impact of this dependency.

Development Stage: During the development phase, the researcher designed and implemented various essential features in the application using Appsheet. Features such as login pages, student menus, add teacher, add student, and create PDF report were designed to ensure the application functions optimally and is user-friendly. This aligns with the design and implementation process of application features, including stages such as definition, design, and development (Sitanggang & Gultom, 2020). A significant innovation is the integration of the Autocrat Google Sheet plugin with Appsheet, allowing for automatic creation of fitness reports in PDF format. The use of Appsheet as a development platform enabled the researcher to quickly

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create prototypes and test various features (Hadar & Itzhaky, 2023), though some challenges were faced, including limitations in customization and complexity in advanced coding. This is in line with (Luterbach & Hubbell, 2015), which states that limitations in customization can be a concern as some application development tools with visual programming features may face constraints in advanced coding and customization.

Testing Stage: The application was tested with a Teacher Working Group consisting of 35 people. The testing revealed several critical issues, such as crashes on certain features that prevented the application from identifying students according to their respective schools. This problem was caused by some individuals attempting multiple registrations, resulting in the application failing to accurately identify the data. Common causes can include general (incorrect) knowledge or lack of knowledge during software development, leading to common errors that cause crashes (Diao et al., 2023). This testing was crucial for identifying weaknesses in the application and providing valuable feedback for further improvements. It also highlighted the need for more thorough and iterative testing to ensure the stability and reliability of the application. This aligns with (Xavier et al., 2017), which emphasizes the need for comprehensive testing practices to ensure application stability and reliability.

Adjustment Stage: The adjustment stage was undertaken to address the issues identified during testing. The software development process involves iterative stages, including technical design, coding, and testing. If issues are found during testing, corrective actions are taken (Xavier et al., 2017). The researcher adjusted the coding in the teacher ID column by replacing the IF and LOOKUP commands with the USERSETTINGS (userid) command in the initial value of the teacher ID column. This adjustment allows the application to automatically populate the teacher ID based on the userid used during login, ensuring that each teacher can only see students they have registered. This solution effectively addresses the issue of multiple registrations and improves the accuracy and efficiency of the application in managing student data. This adjustment demonstrates the importance of iterative methods and continuous development in the application development process. According to (Mumtaz et al., 2022; Wynn & Eckert, 2017), iterative methods have positive effects such as improving quality and reducing complexity, but they also increase project duration and cost.

CONCLUSION

The research successfully developed an effective and efficient online fitness application based on Appsheet to monitor and report the physical fitness of elementary school students. This application enhances monitoring capabilities for teachers and involves students and parents. Despite the dependency on a stable internet connection, recommended mitigation measures include offline data storage, user training, additional feature development, data security enhancements, regular evaluations, collaboration with fitness experts, and testing under various conditions to ensure consistent data availability and optimize the use of the application.

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CONFLICT OF INTEREST

There are no conflicts of interest.

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