Implementation of Elementary School Student Attendance Information System Based on Android using AppSheet

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***Abstract*— This study aims to implement an Android-based elementary school student attendance information system using the AppSheet platform. This system is designed to replace the manual attendance method that is still widely used, making it easier for teachers to record student attendance and provide real-time attendance reports. AppSheet was chosen because of its ability to create Android-based applications without the need for complex programming skills. This system has key features such as attendance recording, cloud data storage, and integrated report access. The study results show that implementing this attendance information system can increase the efficiency of the attendance recording process by 89% compared to the manual method. In addition, attendance reports can be accessed by the school quickly and accurately. This system also received positive responses from teachers and administrative staff because of its ease of use. This system also improves the efficiency of attendance data management and makes the communication process between schools and parents more effective. Thus, the Android-based attendance information system using AppSheet provides a practical solution relevant to current technological developments, supporting digital transformation for managing student attendance data in elementary schools.**

Keywords—Students Attendance, Information System, Elementary School, Android, AppSheet, Efficiency.

I. INTRODUCTION

The advancement of information technology has brought significant changes in various aspects of life, including in the field of education. In today's digital era, school administration management, especially related to student attendance, requires a more modern and efficient approach. The manual attendance recording system, still widely used in elementary schools, often faces various obstacles, such as the risk of data loss, human error, and lack of accessibility and time efficiency.

Implementing a technology-based information system is a relevant solution to overcome these obstacles. One platform that allows application development without requiring complex programming skills is AppSheet. With AppSheet, school administrators can develop Android-based attendance applications that can be used by teachers and school staff to record, manage, and monitor student attendance in real-time and can be accessed anywhere [1].

This Android-based attendance system is designed to provide features such as daily attendance recording, automatic data recap, notification to parents, and integration with mobile devices. The use of this technology is expected to improve the efficiency of school administration processes, reduce teachers' workloads, and provide better transparency to schools and parents. Digitalization of attendance increases the transparency and accuracy of student attendance recording [2]. Using web-based or mobile applications in various educational institutions has improved attendance data management [3].

Related research shows that digital technology positively impacts student attendance in several ways. According to research [4] on the use of mobile technology in student attendance systems, the application developed uses QR codes as a medium for recording attendance. Although this system is effective, its implementation requires additional devices, such as QR code scanners, which can be an obstacle in schools with limited resources. A study focuses on using cloud technology to store and manage student attendance data [5]. Cloud-based systems provide flexible access to data for various stakeholders, including teachers and parents. However, the study also highlights challenges related to data security and the cost of subscribing to cloud services.

Study [6] explains how to implement a student attendance information system using an Android-based application. Although the Android-based AppSheet has limitations in complex design and function customization, the survey results show that AppSheet allows for fast and easy system development and is highly regarded as an application media expert in terms of functionality.

Therefore, this study aims to describe the process of developing an Android-based attendance system using AppSheet, analyze the benefits achieved, and evaluate the system's effectiveness in supporting student attendance management in elementary schools. The results are expected to provide practical guidance to other elementary schools that want to apply similar techniques in attendance management.

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II. LITERATURE REVIEW

A. *Attendance Information System*

A time and attendance information system is an application or software for recording and managing attendance data [7]. It replaces manual methods that are prone to errors and can be used in various situations, including work and educational environments.

B. *Android*

Android is an operating system for Linux-based mobile devices, including an operating system, middleware, and applications. It is also a Linux-based operating system for touchscreen mobile phones and tablet computers [8]. However, along with its development, Android has become a platform that innovates quickly. This is inseparable from the main developer behind it: Google. Google bought Android and created its platform. The Android platform comprises a Linux-based operating system, a graphical user interface (GUI), a web browser, and downloadable end-user applications. Developers can work freely to create the best and most open applications for use by a wide variety of devices [9].

C. *AppSheet*

AppSheet is a no-code platform that allows users to build data-driven applications without programming knowledge. However, to enable digital presence on AppSheet, AppSheet offers the following benefits: Ease of use, cloud integration, and customization, which allows you to customize its features according to your needs. Manage attendance data, reports and automatic notifications. AppSheet works by connecting spreadsheets to applications. This application can also be used on mobile phones both online and offline [10].

D. *Spreadsheet*

A spreadsheet is a computer program that allows users to organize, store, and analyze data in tables. It also stores, displays, and processes data in rows and columns. [11].

III. RESEARCH METHOD

Data analysis techniques are stages of the research process that process collected data to answer existing questions. The analysis method for building a student attendance information system is based on the prototype system development method. The research stages will be explained in the figure below

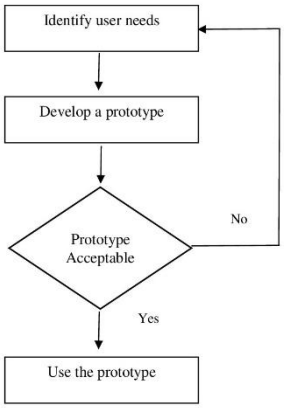

Fig 1. Research Stages

The prototyping method is a very fast technique for repeating the interaction process to develop and test new application behaviour models so that they can be used properly [12]. Prototypes can also overcome the problem of misunderstanding between users and analysts, namely that users cannot identify each other. Prototyping is a widely used system development technique. This technique also provides an opportunity for developers and users to interact with each other during the creation process, allowing developers to model the software created easily [13]. The process stages applied in this study utilize a prototype model diagram through five processes: communication, quick plan, quick design, prototype construction, and delivery and feedback, as explained in Figure 1.

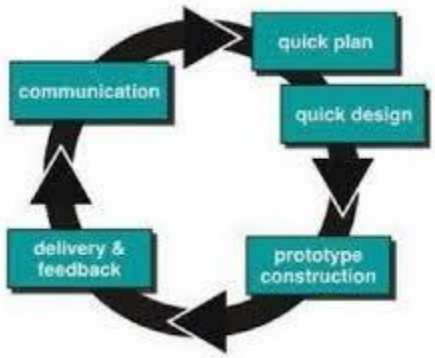

Fig 2. Prototype Model

The processes can be explained as follows:

a. ***Communication*:** During this phase, the developer and client review and establish general goals, desired requirements and an overview of the parts that are needed next.
b. ***Quick Plan*:** in this phase, the design is carried out quickly, revealing all known aspects of the software. This design becomes the basis for making a prototype.
c. ***Modelling Quick Design*:** This phase focuses on representing aspects of the software that are visible to the customer/user. It usually involves making a

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prototype.

d. ***Construction of Prototype*:** creating a framework or designing a prototype of the software that is made.
e. ***Delivery & Feedback*:** The prototype created by the developer is distributed to the user/client for evaluation. The customer then provides feedback that is used to change the requirements for the software that is made.

IV. Result And Discussion

A. *System Implementation*

The Android-based time attendance system was developed using AppSheet, a low-code platform that enables rapid application development. The application allows teachers and school officials to record student attendance in real time and provides stakeholders access to reports.

User Interface Prototype

1. *Login Page Design*

Fig 3. Login Page

2. *Student Form Page*

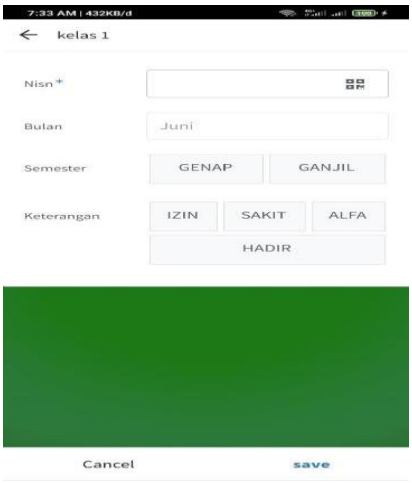

Fig 4. Student Form

3. *Student Data Page*

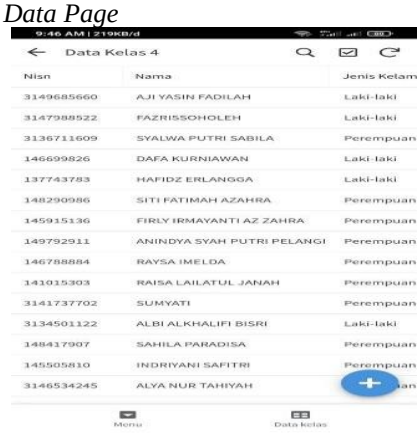

Fig 5. Student Data Page

4. *Student Data Report Page*

The data report page is used to print a report of all student data.

Fig 6. Student Report Page

Implementing the attendance system using AppSheet yielded significant results that impacted the school's operations and stakeholders, including teachers, parents, and administrators. Below is an outline of the key outcomes:

1. ***Enhanced Efficiency in Attendance Tracking***

Time-Saving: Teachers could mark attendance within seconds using the app instead of manual record-keeping, which was more time-consuming.

Automation of Reports: Daily and monthly attendance reports were automatically generated and distributed, eliminating the need for manual compilation.

2. ***Improved Communication***

Real-Time Notifications: Parents received instant updates about their child's attendance status, fostering better communication between schools and families.

Transparent Data Access: Administrators could access attendance data in real-time, allowing for immediate interventions in cases of frequent absenteeism**.**

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3. ***Reduction in Errors***
   Accurate Data Entry: QR code scanning or digital forms reduced errors caused by illegible handwriting or manual miscalculations.
   Data Validation: AppSheet's built-in validation rules ensured incorrect or incomplete data could not be submitted.

4. ***Accessibility and User Adoption***
   Ease of Use: The intuitive interface of the AppSheet app enabled even non-tech-savvy users to navigate the system effortlessly.
   Broad Device Compatibility: Since the system was Android-based, it was accessible to a majority of users, with an option for iOS or web-based access.
5. ***Enhanced Monitoring and Analytics***
   Attendance Trends: Administrators could easily track attendance patterns across grades, identifying students with chronic absenteeism.
   Improved Decision-Making: Data-driven insights helped school management implement targeted strategies to address attendance issues.
6. ***Cost and Resource Optimization***
   Paperless System: The digital system reduced dependency on paper records, contributing to environmental sustainability and cost savings.
   Low Development Costs: AppSheet's no-code nature eliminated the need for hiring specialized developers, reducing overall implementation costs.
7. ***Positive Feedback from Stakeholders***
   Teachers: Reported satisfaction due to reduced administrative workload.
   Parents: Appreciated the transparency and real-time notifications, which helped them stay informed about their child's school activities.
   Administrators: Valued the system's ability to provide instant access to attendance data and reports.

Implementing an Elementary School Student Attendance Information System based on Android using AppSheet proved successful. It streamlined attendance management, reduced errors, and enhanced stakeholder communication. The results demonstrated that such systems could significantly modernize and improve school administration, paving the way for future enhancements and broader adoption.

B. System Testing

The next stage is the system evaluation stage. Where testing is carried out using black box testing and usability testing. Black box testing is a technique that analyzes software functionality by comparing input and output values [14]. As explained in Table I, the results of black box testing are intended to determine whether the design of this information system is acceptable.

TABLE I. BLACK BOX TEST RESULTS

No	Module	Test	Expected Result	Conclusion
1	Login	Enter the correct username and password	Enter the main page	Valid
		Entering the wrong username and password	Login failed; return to home page	
2	Manage User Menu	Complete the user management process by adding, editing or deleting the required users.	The process of adding, editing or deleting the desired users has been completed.	Valid
3	Add Document Menu	Add transactional data related to archived documents.	Transactions are successfully entered, and the amount increases in the Add Document menu.	Valid
4	Upload Document Menu	The process of downloading the desired document is in progress.	The transaction successfully uploaded the desired document.	Valid
5	Document Download Menu	Download the desired document.	The transaction successfully downloaded the desired document.	Valid
6	Edit Document Menu	Make changes to documents.	Transaction successfully made the required document changes.	Valid
7	Delete Documents Menu	Delete documents.	Transaction successfully deleted the desired document.	Valid

Usability testing was conducted to determine the opinions of respondents who acted as users regarding the monitoring system, which was developed and easy to use. This test involved 40 respondents whose opinions were assessed on learning ability, effectiveness, memory, error tolerance, and satisfaction. Users rated their experiences using a Likert scale of 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree). The survey results are shown in Table 2.

TABLE II. PERCENTAGE OF USABILITY TESTING QUESTIONNAIRE ANSWERS

Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Number of Respondents	Percentage
P1	15	20	5	-	-	40	87%
P2	22	10	8	-	-	40	85%
P3	21	16	3	-	-	40	85%
P4	23	15	2	-	-	40	93%
P5	34	6	-	-	-	40	96%

Based on the test results in Table II, the calculation results for the percentage of questionnaire answers from 40 respondents to 5 questions were 87% for the question all functions and menus of this android app work fine, 85% for questions this android app is easy to understand and easy to use, 85% for questions this android app has an attractive appearance, 93% regarding the fourth question that this android app helps in

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data processing and 96% this android app can speed up admin work.

V. CONCLUSION

Implementing an Android-based student attendance information system in elementary schools using AppSheet has provided an effective and efficient solution to the attendance management process. This system is useful for teachers and schools to record, monitor, and manage student attendance data in real time. AppSheet offers several important benefits compared to manual attendance methods: The attendance process is now faster and less prone to errors. Attendance data can be accessed directly from Android devices, improving communication between teachers, schools, and parents. The digital system makes attendance information more accurate and transparent, increasing trust between schools and parents. Overall, this AppSheet-based attendance system shows great potential to improve operational efficiency and the quality of student attendance management at the elementary school level. With further development, this system can be expanded to include additional features, such as automatic reporting and integration with other academic systems, thus supporting digital transformation in Education.

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