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GreenPoin: Mobile Application with Reward Point System at Klabat University

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Abstrak

At Klabat University, the conventional method of deducting Sabbath points poses challenges for students and supervisors due to its inefficiency. To address this, the GREENPOIN smartphone application was developed as an innovative solution for managing Sabbath points. The application enables administrators to approve point redemptions, add supervisors, manage tasks, and monitor students' total Sabbath points. Students earn points by completing environmental cleaning tasks assigned by supervisors. The system was designed using prototype models and use case diagrams to evaluate user requirements. Key features include Mission Management and Validation for supervisors; Supervisor Management, Point Management, and Point Redemption Approval for administrators; and Login, Registration, Point Viewing, Mission Viewing, Task Submission, Point Redemption, History, and Point Reset for students. GREENPOIN has proven to enhance the efficiency of Sabbath point management, accelerate task validation, and streamline mission oversight. The application increases process transparency and encourages student participation in campus cleanliness initiatives. Future enhancements will include push notifications, an iOS version, mission-specific comments, and API integrations, such as Google Maps, to further improve functionality.

Keywords*—Sabbath Points, Smartphone Application, Point Management, Environmental Cleaning*

1. INTRODUCTION

The Sabbath point deduction process at Klabat University currently still uses conventional methods that make it difficult for both students and supervisors. Students must find supervisors to get Sabbath point deduction assignments that need to be completed. This process is not only time-consuming but also raises doubts regarding the validity of student point recording, considering that it still relies on manual verification by supervisors. In addition, students often have difficulty meeting supervisors because the presence of supervisors is uncertain, coupled with the large number of students queuing, which causes a lack of trust in the awarding of points. This method is considered less efficient, both for students who have completed their obligations and for supervisors who face challenges in maintaining the accuracy and transparency of the Sabbath point deduction process.

Rewards are a sign of gratitude or recognition given by the company to increase employee motivation and performance. In addition, rewards serve as a tool to improve or enhance performance that has been achieved. [1]. The reward point system mechanism works by giving points to students as recognition of their achievements or positive attitudes during the learning process. These points can then be exchanged for various incentives or benefits that students are interested in. [2]. A similar principle is used in the GREENPOIN application of Klabat University, which uses a point-based reward system to encourage students to complete

JURTI, Vol.9 No.3, September 2025, ISSN: 2579-8790

environmental clean-up missions in order to reduce Sabbath points. This approach makes the management of environmental conservation activities more transparent, effective, and well-organized compared to the traditional methods used previously.

Research on the development of a waste point application at KSM Bima discusses how this software allows users to exchange waste for basic necessities at participating shops, although it is still limited to the scope of certain partner collaborations. [3]. Furthermore, research discussing persuasive applications for food management in households focuses on how persuasive technology can help reduce food waste through prototypes that have been tested with good evaluation results, although the application has not been implemented. [4]. Other research regarding PlasticPay highlights how this application offers rewards to consumers as a means of encouraging them to recycle plastic waste, but the study only focuses on analyzing existing applications without further development. [5]. These three studies demonstrate the effectiveness of mobile applications in enhancing user needs through reward point systems.

GREENPOIN is expected to be an innovative solution specifically designed for Klabat University to facilitate the implementation of Sabbath point reduction tasks between supervisors and students.

2. RESEARCH METHODS

2.1. Conceptual Research

1. In this study, the researcher designed an Android-based application using the prototype software development method. [20]. The development process consists of five main phases that form a continuous workflow. The first phase is the Communication Phase, where the researcher identifies the problem and collects potential user requirements and system specifications through environmental observation and discussions with relevant stakeholders. Based on the gathered needs, the Quick Plan Phase is carried out to prepare an initial plan that includes user data, functional and non-functional requirements, and scheduling. The process continues with the Quick Design Phase, during which the researcher designs the application using Unified Modeling Language (UML), specifically utilizing component diagrams and use case diagrams as the modeling foundation. In the Prototyping Stage, the researcher builds an application prototype using Figma and React Native with Firebase as the backend, followed by testing to ensure the prototype is free from errors and bugs. Finally, in the Implementation, Delivery, and Feedback Stage, the application is delivered to users for validation to determine whether it meets their needs, and users are given the opportunity to provide feedback for further improvements.

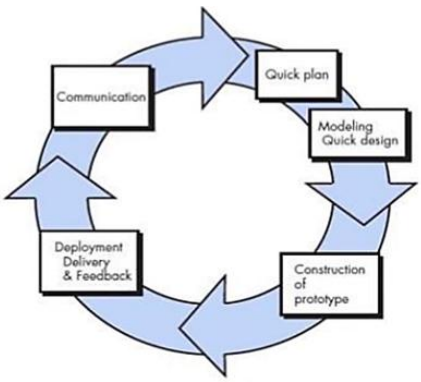

Figure 1. Prototype Model

JURTI, Vol.9 No.3, September 2025, ISSN: 2579-8790

2.2. Conceptual Application

From Figure 1, it can be seen the interaction flow between three types of users, namely Admin, Supervisor and Student, with an Android-based mobile application that was developed using the React Native framework. [18]. In the application system, the administrator plays an important role in supervising the supervisor account, supervising missions, calculating the total number of Sabbath points obtained by students, and monitoring and approving the point exchange process submitted by students. Supervisors use the username and password that have been created and managed by the administrator to access the application. On the other hand, students log in with Firebase Authentication using the email address and password that have been created. The administrator will be taken to a page where they can authorize student point exchange requests, send student Sabbath point information, create supervisor accounts, and manage missions. Supervisors will be directed to the main location where they can create missions. The missions created will be 13 automatically uploaded to Firebase and displayed on the mission page that can be accessed by students. Students can then choose from the available missions and carry them out according to the instructions. After completing the task, students send proof in the form of photos through the application. The supervisor will receive proof of student delivery through the notification page. Finally, in the validation phase, the workers observe and verify the results of the mission.

The results of this process will be displayed on the Student Notification page. In addition, students get access to Redeem Points. In this feature, students can change GP points (GreenPoin) into Sabat points based on the available menu. The exchange of points must first be approved by the administrator using the approval feature before the point exchange process can be successfully completed. This allows the system to verify the request before the transaction is officially recorded. In order for students to be able to observe historical activity, this history will be listed and displayed in History. If the conditions are met, students can reset Sabat points. Firebase, which serves as the main backend for the application, is used to import and process all mission, delivery, verification, exchange, and history data. Firebase is also used to store student authentication data. [17].

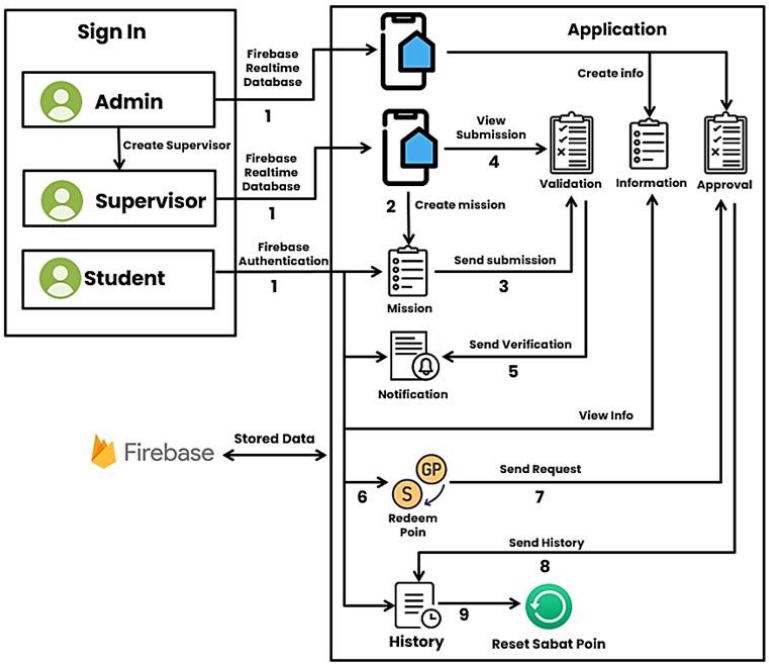

Figure 2. Conceptual Application

JURTI, Vol.9 No.3, September 2025, ISSN: 2579-8790

3. RESULT AND DISCUSSION

3.1. Analysis and Design

Designing user requirements is the next step after formulating them. UML is used by researchers to create application features. Figure 3, a use case diagram can be seen that comprehensively maps the interaction between the admin, supervisor, student, and system entities within the framework of Sabbath point management at Klabat University through the implementation of the GREENPOIN application. The admin has access to a special panel after logging in by entering a username and password. This panel includes: Create Supervisor (to create and delete supervisor entities), Create Sabat Points (posting student Sabbath point information), Redeem Approval (approving point exchange requests), and Mission Manager (to create and delete missions). Supervisors also have access to a special panel after logging in by entering a username and password. This panel includes: Create Mission (to create missions) and Validation (to validate proof of mission completion submitted by the user). Students can carry out the authentication process through the Sign In feature by entering an email and password to enter the application. Students can create a new account through the Sign Up feature by filling in the registration form correctly. After successful authentication, students can access the main features of the application. The features available to users include: Redeem (to exchange collected GP points for Sabat points), History (to view the track record of point exchanges that have been made), Notification (to view the mission validation status), and View Mission (to view the list of available missions to obtain GP points). Students can access View Detail Mission to obtain comprehensive information about a selected mission and decide to accept the mission. After accepting a mission, students can use the Submission feature to send proof in the form of photo documentation. Students can also use the Reset Points feature (to reset the accumulated points if necessary).

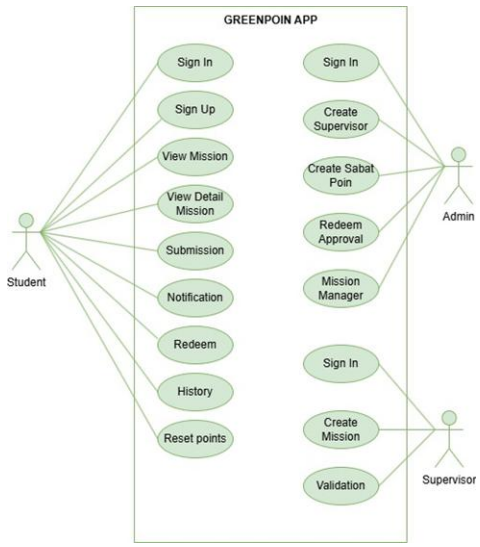

Figure 3. Use Case Diagram

From Figure 4, a component diagram can be seen that illustrates how users interact with the GREENPOIN application. This application consists of three main users, namely admin, supervisor, and student connected to Firebase as the backend and storage. The admin is involved in verifying point exchanges, managing and validating tasks, managing supervisor data, and maintaining Sabbath point information. This program is used by supervisors to design missions and check student assignment submissions. Students can browse tasks, submit work, redeem points, view mission verification status records, and view their point exchange history by accessing the program. The Firebase database serves as the main storage location for all reading,

JURTI, Vol.9 No.3, September 2025, ISSN: 2579-8790

sending, and editing operations, ensuring that all data is synchronized and updated in real time across all application users. The mission validation and point exchange approval procedures to maintain truth and transparency in Sabbath point management are also depicted in this diagram.

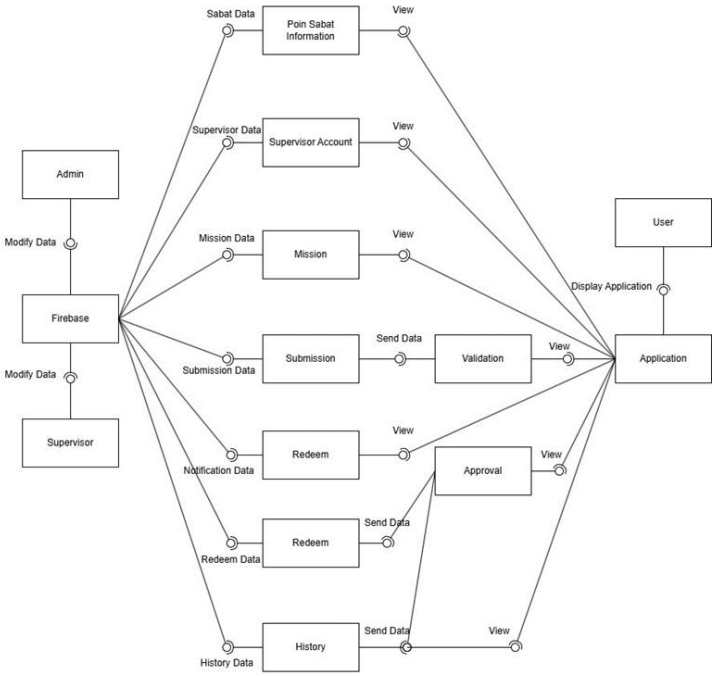

Figure 4. Component Diagram

3.2. Database Design

From Figure 5, the Firebase Realtime Database system design is visible. [16]. The nine tables in the GREENPOIN application database design have specific purposes to facilitate application operations. Important data, including each student's name, gender, outsider type, place of worship, and total Sabbath points, are recorded and stored in the StudentsPoinSabat table. Administrators post this information through the program so that students can see how many Sabbath points they need to collect in order to be reset. The transaction database serves as the basis for documenting GP point exchange activities for Sabbath points by storing information about user point exchange transactions, such as transaction dates and the number of points traded. Student requests for staff approval of suggested point exchange procedures are initially documented in the request database. This data, which will be updated by staff through the approval feature, contains user information, request date, number of points to be exchanged, and approval status.

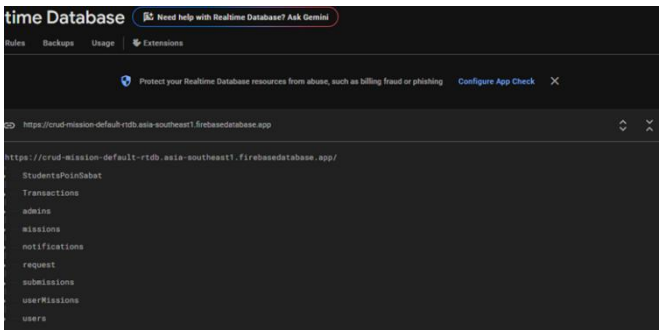

Figure 5. Firebase Realtime Database

JURTI, Vol.9 No.3, September 2025, ISSN: 2579-8790

3.3. Application Result

In this section, the researcher explains the application interface display. The display consists of 25 screens, each of which has a different function. From Figure 6, the login page of the GREENPOIN application can be seen. Users have three options to access this page. Users can log in as admin, staff, or student. To keep the program running smoothly, the main responsibilities of the administrator include managing staff accounts, determining the total number of student Sabbath points, and making changes to crucial data on the system. While the student option is intended for regular users who will utilize the general capabilities of the application, the staff option is intended for system supervisors who have special access rights to the application. This division ensures that each type of user has access that is appropriate to their function and duties in the system. From Figure 7, a unique login page is visible for the admin who serves as the system administrator. This page only asks the admin to enter a specific username and password that has been set by the system. Only admins with valid credentials can access the GREENPOIN application admin panel, which shows a high level of security reflected in this simple design. From Figure 8, the main admin page of the GREENPOIN application can be seen, which is designed to simplify system management with four main features. The Supervisor List feature allows administrators to add, edit, or delete supervisor accounts that are tasked with managing student missions and validation. The Student Point List feature allows administrators to view, add, or update information about the total number of Sabbath points owned by each student. The Exchange Verification feature allows administrators to review and approve or reject student requests to exchange Sabbath points. The Mission List feature allows administrators to monitor all available missions created by supervisors. With these four features, administrators can do their jobs well and keep the application's Sabbath point management smooth and transparent.

Figure 6. Election Page

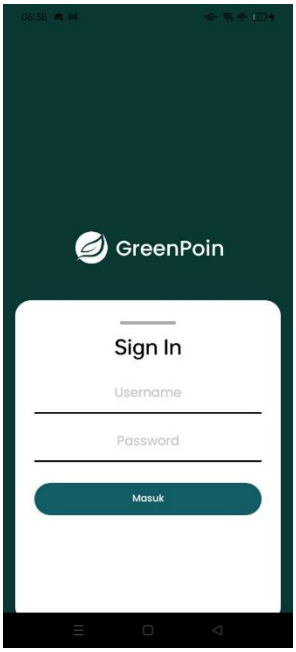

Figure 7. Admin Login Page

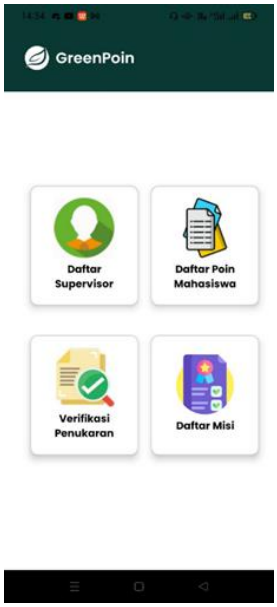

Figure 8. Admin Main Page

From figure 9, the sabbath point information list page on the GREENPOIN application can be seen, which displays information about each student, including name, gender, outsider type, number of Sabbath points, and seat location. This section is equipped with a name-based

JURTI, Vol.9 No.3, September 2025, ISSN: 2579-8790

search bar to facilitate quick entry searches. From Figure 10, it can be seen that the page allows students to exchange the GP points that have been set for Sabbath points. In this view, users can exchange the points provided. The student's GP points will be immediately deducted after the exchange, and the application will be forwarded to the administrator for confirmation. The student's Sabbath points will be added according to the amount exchanged if the administrator accepts the application. The GP points that have been deducted will be added back to the student's account if the application is rejected. This interface is intended to ensure transparency in the point exchange process.

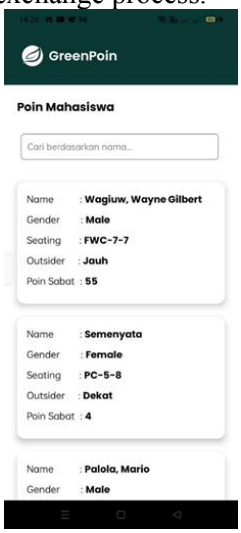

Figure 9. Point Information

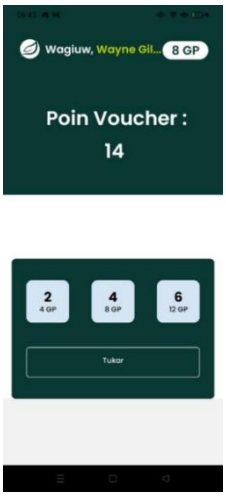

Figure 10. Point Exchange Page

From figure 11, it can be seen that the page lists the missions that students can choose. A brief description of each mission includes the title, supervisor, deadline, number of points available, time set, and availability status. Students can check the mission specifications and choose any task they want to do. From figure 12, the student-selected mission detail page is visible. In addition, there is an option to accept the task, which allows individuals to start working on it.

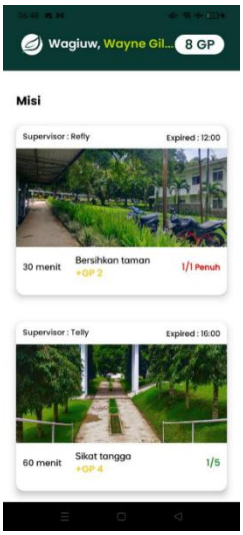

Figure 11. Mission Page

Figure 12. Mission Details Page

JURTI, Vol.9 No.3, September 2025, ISSN: 2579-8790

From figure 13, it can be seen the page where the student sends confirmation of task completion. The student can provide a documentation image that the mission has been completed.

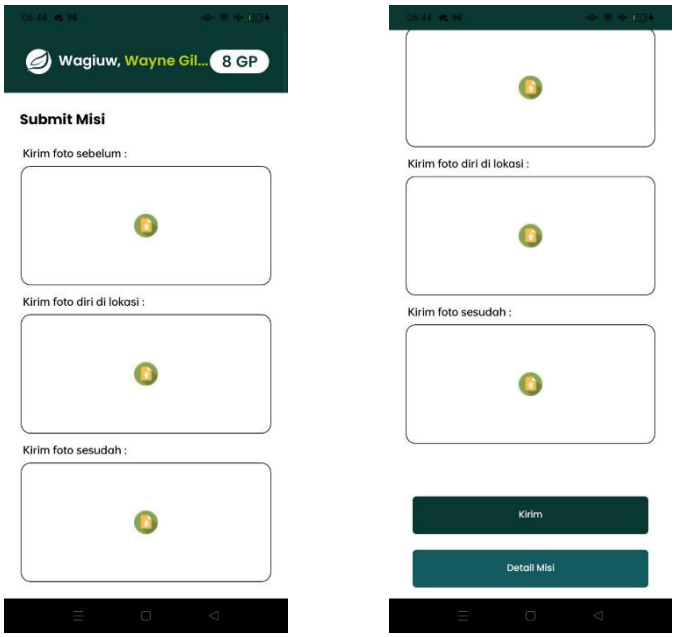

Figure 13. Submit Mission Page

From figure 14, we can see the notification page that students can visit. Important messages are displayed on this page, especially those related to the validation status of submitted tasks. From figure 15, a page showing the history of student point exchange can be seen. Students can see the chronology of each GP point exchange transaction to Sabbath points on this page, along with the date and total points. To help students understand the cycle of Sabbath point accumulation and resetting, this page also shows information about point resets if necessary. From figure 16, The Sabbath points reset verification page is visible. Before students reset their accumulated points, a points reset verification serves as an additional layer of protection. Students must visit the Village Dean's office to request verification. The Village Dean's office head must enter the admin username. The purpose of this procedure is to ensure that the points reset is conducted under proper authorization and supervision.

Figure 14. Notification Page

Figure 15. Student Points Redemption History

JURTI, Vol.9 No.3, September 2025, ISSN: 2579-8790

Figure 16. Reset Point Verification Page

4. CONCLUSION

The GREENPOIN application has proven to be a successful digital way to manage Sabbath points at Klabat University. The application layout makes it easy for users to log in. Students can use the application to view their total points, view available mission data, provide proof of mission completion, apply for point redemption, view mission verification status, and view their point redemption history. In a clear and structured manner, supervisors can post missions and confirm task verification. Admins also play an important role in overseeing the mission list, compiling students' Sabbath point data, monitoring supervisor accounts, and confirming point redemption. GREENPOIN has succeeded in promoting active involvement and improving the efficacy and accuracy of Sabbath point management with the help of students, admins, and supervisors. In short, this application is a digital way to improve Sabbath point management. Even if the application is operating smoothly, there are still a few things that may be done to enhance user performance and happiness. Future development suggestions include making an iOS version of the application so that it can be used on many devices, integrating external APIs like Google Maps to enhance functionality, adding a push notification feature to facilitate the delivery of information in real-time, and including comment or discussion options for every task to encourage user participation.

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