DESIGN OF SAVINGS AND LOAN APPLICATIONS FOR ANDROID-BASED WOMEN'S GROUPS

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Abstract
Many savings and loan records in farmer women groups are still done manually using books, which can risk causing errors in recording. This is the background for the development of an offline-based android application that can help the VSLA (Village Saving and Loan Association) savings and loan recording process. The purpose of this research is to build an easy-to-use savings and loan recording application, with a simple appearance and according to the needs of users at the rural community level. Application development is carried out using the kodular platform by utilizing TinyDB local storage so that applications can be used offline. The prototype method used in this study allows the development of the system to be carried out in stages according to user input and requirements. The system is designed using the Unified Modeling Language (UML) approach, which consists of a use case diagram, class diagram, and activity diagram. Group financial management becomes easier and more efficient. With the system created offline-based, the application has proven to be relevant for use in areas that have limited internet connection issues. It is hoped that this research can contribute to efforts to digitize the community financial system, especially for farmer women groups.

1.0. INTRODUCTION

Pringsewu Regency as one of the agricultural centers in Lampung Province has many organizations such as the Farmer Women Group (KWT) and farmer groups that are active in carrying out community-based savings and loan activities. Based on the results of interviews conducted with VSLA program facilitators from Save the Children (2025), it was recorded that in 31 assisted villages in Pringsewu, around 70 farmer groups and KWTs have been formed that carry out VSLA activities independently. However, most of these groups still do financial recording manually without the support of digital systems.

One example is KWT Gemah Ripah which is located in Totokarto Village, Adiluwih District, Pringsewu Regency. This group actively runs the VSLA program, but all financial transaction records are still recorded using the administration book and member passbook. Conventional methods like this are at risk of errors in recording, data duplication, delays in reporting, and data loss due to document damage or human error. In addition, the absence of a digital system also makes it difficult for admins to recap data, calculate total deposits and loans, and compile reports in a timely manner. This situation shows the need for digital solutions that are simple, adaptive, and in accordance with the user's capabilities at the community level.

Various previous studies have raised the importance of digitalization in the community's microfinance system. Research by [1] developed Android and PHP-based lending applications for employee cooperatives, but the system did not provide educational features and were not suitable for the village community. Research of [2] develop a cooperative savings and loan system with the FAST method, which accelerates recording but does not yet have a financial literacy module. Research [3] Designing the app uses Kodular and Airtable, but it relies on the internet and lacks educational features. Research Dharma et al. [4] building Android-based applications with the Waterfall method that helps reporting, but is less flexible in the face of changing needs. Research by [5] uses React Native and Laravel for co-op applications, but the payment verification process is still done manually due to resource limitations[6], [7], [8].

Based on these gaps, the purpose of this research is to develop an android-based application that can be used offline that supports the education of the VSLA program for the Gemah Rifah farmer women group, implemented using a kodular platform with a prototype method. The update in this study lies in the use of applications that can be accessed without an internet connection, equipped with educational materials about the VSLA program, and built using a user-friendly visual platform. The system development approach with the prototype method allows the application to be easily adapted in case of changes in user needs in the future.

2.0. RESEARCH METHODS
2.1. Data Collection Methods
The data collection techniques in this study are observation, interviews, questionnaires, and literature studies.

a. Observation

Observations were carried out directly on savings and loan activities carried out by KWT Gemah Ripah in Totokarto Village, Adiluwih District, Pringsewu Regency. The observations made by the researcher include, the process of recording members' deposits and loans, the flow of group financial administration, the recording media used previously, and the obstacles that occur in manual recording.

b. Interview

The researcher conducted interviews with the management of KWT gemah ripah Totokarto and the VSLA program facilitator from the Save The Childern institution who actively assists farmer groups and farmer women groups in Pringsewu Regency. The questions asked included the number of assistance groups, the financial recording methods used, and the obstacles faced in manual recording. Interview data is used to compile features that are relevant to what users need in the developed application, as well as to strengthen the data from observations in the field.

c. Literature Study

Literature studies are carried out by looking for various written sources that are suitable for the research topic. The studies used include journals, books, scientific articles, and official documents that discuss application development, prototype methods, information systems, VSLA, farmer women's groups, and financial literacy. These resources are used as a basis for designing applications and supporting needs analysis and system design.

d. Questionnaire

Data collection was also carried out through a questionnaire with a likert scale as a result of the development of the savings and loan VSLA application. The researcher spread several questions related to the assessment of the VSLA application which included 3 main aspects, namely ease of use, beauty, and security. From a total of 100 users, researchers sampled 20% of users to conduct usage tests and app assessments.

2.2. System Development Methods

This research uses the system development method prototype. Method Prototype is a software development approach that uses a physical working model of the system as an early version of the system [9]. [10], [11] Prototyping is a method in the life cycle of a system that is based on the concept of a working model. Prototype aims to develop the model into a ready-to-use system. This means that the system will be developed faster than using traditional methods and the cost will turn lower. There are many ways to do Prototyping, as well as its use [12].
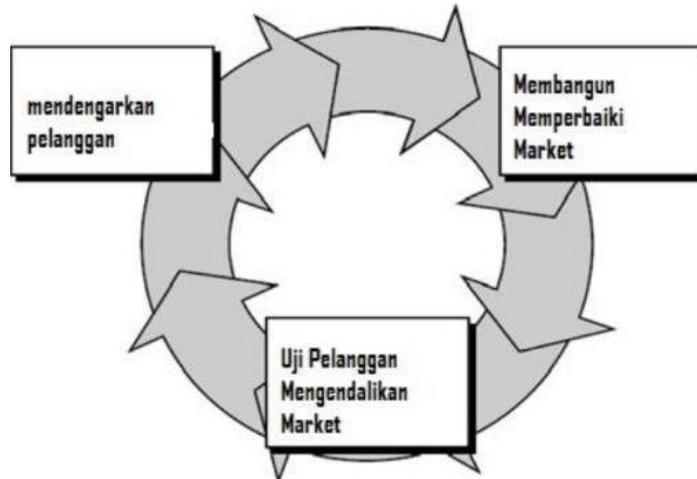

Figure 1. Prototype Model

The stages of developing the prototype model are as follows:

1. Listening to customers

   At this stage, customer complaints are taken into account to collect system requirements. To ensure the resulting system matches the needs, it is important to understand how the system is running before identifying the problem at hand. The researcher collected data on user needs through observation and interviews, such as the recording system of members' deposits and loans, the flow of group financial administration, as well as the recording media used previously, and the obstacles that occurred in manual recording.

2. Designing and prototyping

   This stage of designing and making a prototype of the system is carried out. Prototypes are made according to the needs that have been identified by the customer or user. In making a system prototype, this study uses the design of the Unified Modelling Language (UML) which consists of several diagrams, namely use case diagrams, class diagrams, and activity diagrams.

3. Trial

   In this part, the system prototype will be tested by customers or users, then an evaluation of customer needs is carried out. The developers then consider customer complaints to improve the current prototype.

3.0. RESULTS

This research has produced an android-based savings and loan recording application designed offline using the condular platform. It is hoped that this application can help community-based savings and loan groups to record deposit and loan transactions in a more orderly and efficient manner. In addition to making it easier to record finances, this application is also equipped with educational features about the principles of the VSLA program so that it can add user insight related to group-based financial governance. This result is expected to be able to support the improvement of financial literacy and efficiency of savings and loan activities in communities based on farmer women's groups, and can be an adaptive and easy-to-use technology solution at the rural level.

3.1. System Design

In this study, modeling was used Unified Modeling Language (UML) which includes use case diagrams, class diagrams and activity diagrams. According to Sumirat (2023) UML is a graph- and image-based language used to visualize, specify, build, and document OO-based software development systems (Object-Oriented) [13].

a. Use case Diagram

The use case describes the activities that actors and systems perform to achieve a specific goal. Use cases only describe the actions taken by actors and systems, not how they perform those activities [14].
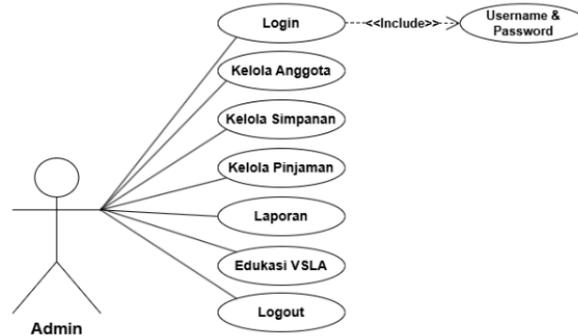

Figure 2. Use Case Diagram

Figure 2 is a use case diagram of the application to be built, illustrating all the activities that actors can do in the application. Administrators have access to this VSLA savings and loan application. They can access and log in to the application by entering a username and password. In addition, admins have the ability to manage application menus, which include member menus, deposits, loans, reports, and VSLA program education.

b. Class Diagram

A class diagram is a type of structural diagram in UML. This chart shows the structure and description of the classes, methods, attributes, and relationships of each object.
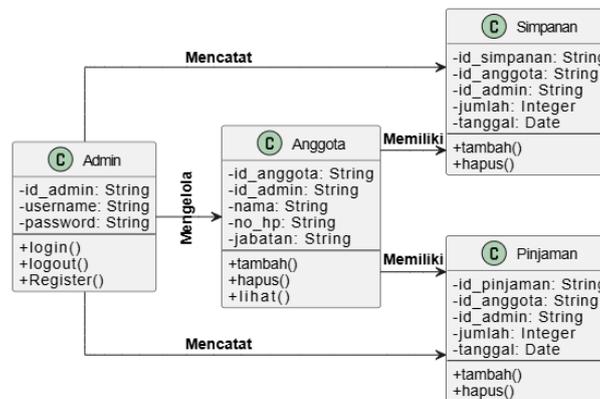

Figure 3. Class Diagram

Figure 5 shows the relationship between each interrelated table in the VSLA savings and loan application. The admin table contains id_admin, username, password. Furthermore, the members table includes id_anggota, id_admin, name, no_hp, position. The deposit table consists of id_simpanan, id_anggota, id_admin, amount, date. Then the loan table includes id_pinjaman, id_anggota, id_admin, amount, date. The tables are interconnected and interrelated to achieve the application's goals. Admins can manage members, while members can have deposits and loans. Then, the admin can record deposits and loans made by members.

c. Activity Diagram

Activity diagrams, also known as activity diagrams, describe the various activities involved in business processes and use cases. This diagram can also illustrate the steps that will be taken when an operation is performed, along with the results of those steps [15].
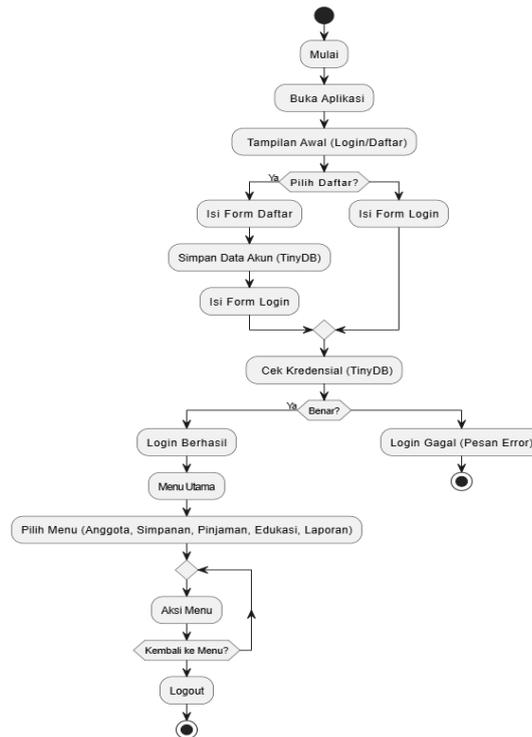
Figure 4. Activity Diagram

The image above is the activity diagram of the VSLA savings and loan application to be built. The process starts when the user starts opening the app, then it will be shown an initial view containing the option to log in or register. If the user does not have an account and chooses to register, then the user will be directed to the registration page to fill in the full name, email, and create a password. The data that has been filled in will be saved using TinyDB storage, and then the user is directed to the login form. On the other hand, if the user already has an account and immediately chooses to login, the user will be asked to input a username and password which will then be verified by the system through data matching in TinyDB. If the data matches, then the user will successfully enter the main menu, but if it is incorrect, an error message will be displayed and the login process will stop. After successful login, users can access the main menus available consisting of the VSLA members, deposits, loans, reports, and education menus. Users are also free to choose the menu according to their needs and can perform actions such as adding data, deleting data, viewing data, or reading information. After completing the activity on the menus in the application, users can choose to return to the main menu or exit the application. If the user chooses to log out, then the application usage session will end.

3.2. Interface Design

This part is an implementation of the system design design that has previously been made into the form of an android application using the kodular platform.

a. Initial Views

In the initial view, it presents two main options, namely logging in if the user already has an account and registering if the user does not have an account yet.

Figure 5. Initial Views

b. Main Menu View
   This view contains several main menus that users can browse. The available menus include, namely the member menu, deposit menu, loan menu, report menu, and educational menu about the VSLA program.

Figure 6. Main Menu View

c. Member Menu Page
   On the members menu page, users can add members by entering related data, such as member name, phone number, and job title (chairman, treasurer, secretary, member).

Figure 7. Member Menu Page

d. Member Data Page
    This page displays member data that has been previously input by the user on the member menu page. There is data on names, phone numbers, and positions.

Figure 8. Member Data Page

3.3. Analysis of Research Results

The results of the development of the savings and loan VSLA application were then implemented to 100 users. However, the researcher only tested 20% of users through a *questionnaire with a likert* scale for the assessment of application usage that focused on several key aspects, namely ease of use, beauty, and security. Based on the results of the questionnaire, it can be obtained that 84% of users stated that the app is easy to use, 86% rated the appearance of the app as attractive and not boring, and 83% felt that the app is safe to use. These results are in line with the study conducted by Sumarno et al., (2023) the results show that users are satisfied with the applications made, both in terms of convenience, appearance and functionality of the application. Thus, this VSLA application is considered to be able to help in the savings and loan recording process which is carried out offline, can minimize errors, and speed up the reporting process. The addition of educational features has also been proven to increase members' understanding of the VSLA program and financial literacy.

4.0. CONCLUSION

This research succeeded in developing a savings and loan recording application for the VSLA program which is intended for use for farmer women groups. The application is designed based on android and is implemented through a kodular platform that is tailored to the needs of users in rural environments. Local storage (TinyDB) is highly supportive, so the app can run offline and not rely on an internet connection. The application is equipped with various features such as member registration, deposits, loans, reports, and educational information related to VSLA. The method used is prototype, development is carried out iteratively to suit the needs of users. This application is easy to use with a simple appearance and is able to support the digital group financial recording process, and can speed up the process of reporting savings and loan activities. In addition, the addition of VSLA educational features can help users understand information related to VSLA programs.

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