User-Based Savings Application Increase Customer Satisfaction Cooperative

IKG Suhartana[1,*] [ID]* and I Gede Arta Wibawa [2] [ID]

[12] The Department if Informatics, Faculty of Mathematics and Natural Sciences, Udayana University, Badung, Bali – Indonesia
*ikg.suhartana@unud.ac.id

Abstract. Technological developments are currently experiencing rapid development, many tools have been discovered in the field of information technology, one of which is Near-Field Communication (NFC). One implementation of NFC can be applied to the savings transaction system in cooperatives. The current general savings transaction system is still mostly manual, namely using a paper savings book as proof of transactions. Such a savings transaction system has weaknesses, including that paper savings books are more easily damaged or lost and it is also wasteful to use savings book paper because savings book paper can only be used once. One solution to overcome these problems is to create a savings transaction system using NFC (Near-Field Communication) technology. Later, paper savings books will be replaced by using NFC tags that can be used repeatedly.

Based on the research conducted, all system functional requirements have been met after testing 6 times. All components of this savings transaction system are functioning well and have been tested using the black box testing method. This NFC (Near-Field Communication) based savings transaction system was built using the C# programming language and the database design used MYSQL. To increase security, the Blowfish cryptographic algorithm is used. This is done to avoid manipulation of the electronic transaction created.

Keywords: Near-Field Communication, Blowfish cryptographic algorithm, C# programming language

1   Introduction

Technological developments are currently experiencing rapid development due to ever-increasing needs so technology must continue to develop to meet those needs. If previously a system was done manually, now it has changed to a system that uses computers or more sophisticated technology. Now information no longer needs to be recorded manually but the data is stored in a storage place called a database. Many tools have also been discovered in the field of information technology, one of which is Near-Field Communication (NFC). NFC itself is a development of barcode technology, which is a radio wave-based identification technology. This technology is capable of simultaneous identification without the need for direct contact [2].

One implementation of NFC can be applied to the savings transaction system in co-operatives. The current general savings transaction system is still mostly manual, namely using a paper savings book as proof of entering the cooperative and proof of payment. Such a savings transaction system has weaknesses, including that the paper savings book is more easily damaged or lost, which makes it difficult for customers and it is also wasteful to use the paper savings book because the paper savings book can only be used once [2].

One solution to overcome these problems is to create a savings transaction system using NFC (Near-Field Communication) technology. The use of NFC provides significant advantages when compared to barcode technology. The advantage of NFC is that reading the tag does not require direct contact with the reader. In contrast to barcodes, card reading is done optically, so direct contact with the reader is required. With this NFC system, it is hoped that it will be able to replace the use of paper savings books which are easily damaged or lost because the paper savings books have been replaced using NFC tags which can be used repeatedly. Later, customers will only enter a certain amount of funds for cooperative electronic transactions. This NFC tag can later be used by customers every time they come to the cooperative [2].

Transaction data is important data that must always be kept secure. The role of data encryption is one of the steps that can be implemented to secure data. In this research, transaction data security will be used using the Blowfish algorithm. Blowfish is an algorithm that is simple to implement so it is very good for devices with specifications that have relatively small resources.[5][3][6]

The software development method that will be used in making this system will use the RAD (Rapid Application Development) method. RAD (Rapid Application Development) itself is a linear sequential software development process model that emphasizes very short development cycles [4].

2   RESEARCH METHODS

The methodology in this research is to design NFC security in sales transactions using the system development used, namely the System Development Life Cycle (SDLC). The development phase consists of system planning, system analysis, system design, system development, system integration and testing, system implementation and system maintenance phases shown in figure 1 [1].
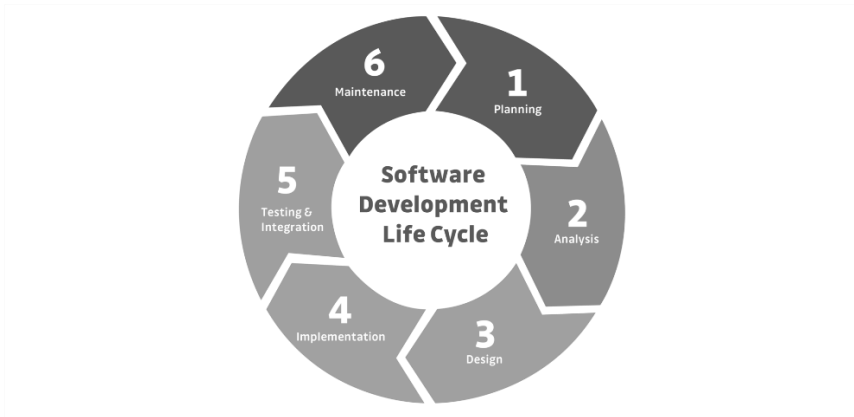
Fig. 1. System Development Life Cycle (SDLC)

Next, in the design and implementation, we will create a prototype of the system to be built, as well as encrypt and decrypt transaction data on the NFC smart card with the Blowfish cryptographic algorithm, after that we will test the security system using black box testing.

The stages in research are (a) Planning, namely at this stage the problem will be defined and users identified. In this case, the importance of securing electronic transaction data on NFC cards is defined, as well as the dangers that occur when the transaction data is not secured. Apart from that, once it can be secured, it will increase the level of confidence in using an NFC card in carrying out the transaction process. (b) System Analysis: At this stage, a system requirements analysis is carried out and the data collection is carried out using the Literature Study Technique. This technique is carried out by studying various references from books or journals related to securing transaction data and using NFC cards. (c) System Design: At this stage, design is carried out regarding the use of various dialogues that will be used, interface design, and assistance design for users in using the system. At this stage, database design, and relational and data flow diagrams are also carried out. (d) System Development, namely at this stage, system development is carried out by programming the applications that will be carried out, such as using programming languages, and application tools and integrating the required modules. (e) System Integration and Testing, namely at this stage, integration is carried out between system components such as device installation, and application installation on the computer used. At this stage, testing is also carried out on the applications created such as the success of the program with the expected program results. Testing is carried out with BlackBox on the success of system input or output. Testing was carried out with White-Box on system performance. (f) System Implementation, namely at this stage implementation is carried out for purchasing cooperative tickets. This implementation was carried out for several cooperatives. (g) System Maintenance,

namely at this stage documentation of system performance is carried out, monitoring of application loads and recording so that later you can find out system limitations and can be used as a reference for developing a better system.

3   RESULTS AND DISCUSSION

The design method used to develop an information system for the presence of savings transactions such as checking customer balances, withdrawal amount transactions, and current interest transactions uses Data Flow Diagrams (DFD). DFD is a method used in structured system development methodology. By using notation, DFD describes the flow of data from a system logically without considering the physical environment where the data flows or the physical environment where the data is stored. The design results are divided into several parts of the data flow diagram (Data Flow Diagram), namely: DFD level 0 (context diagram), which is an overview of the entire system in general where the cellphone application and server application are connected via an NFC connection. Applications on the server can only be accessed by admins and applications on smart cards (NFC). The DFD method is also used in data flow in the process of testing the security of savings transaction data using the Blowfish algorithm. The complete procedure can be seen in Figure 2 below:
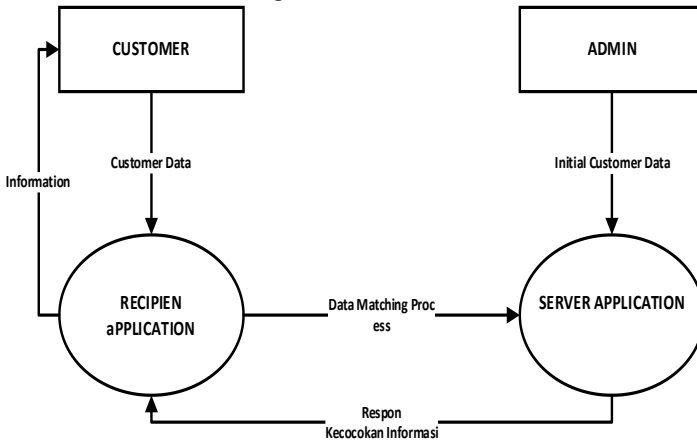

Fig. 2. The Procedure Application

Testing is carried out using scenarios regarding data input by admin, balance check transactions, deposits, withdrawals, and transaction history. Based on the provisions in Table 1, it show scenarios and testing using the Black Box method for the application created.

Table 1. Application Testing using Black Box

No.	Trials	Test System Scenarios	Results
1	Admin Registration	Admin inputs customer NFC ID data which is stored in the Database Server	The system can record user data properly on the server
2	Input Customer Data	Customer data can be input by admin and recorded on the server	Admin can update customer data properly
3	Balance check	Customers authorize and check balances	Customers authorize and check balances properly
4	Debit Transactions	The application can carry out additional savings transactions by customers.	The application can carry out additional savings transactions by customers properly
5	Credit Transactions	The application can carry out savings withdrawal transactions by customers.	The application can carry out savings withdrawal transactions by customers properly
6	Transaction Reports	The application can display transaction reports.	The application can display transaction reports well

Testing was carried out to obtain results regarding the Satisfaction of using the savings application using NFC. This test was carried out by distributing questionnaires to 20 respondents. The test tool used is an application questionnaire with a Likert scale consisting of 24 questions whose validity and reliability have been tested. From the testing, it was found that 75% stated that the application developed had good Satisfaction, while 15% said it was less satisfaction able. Of the 15% who said they were unsatisfaction able due to delays or delays in searching for customer data. Meanwhile, the results of testing the level of ease obtained a result of 76%, while 24% said it was not easy. This inconvenience occurs especially for users who register more than 1 smartphone. In this incident, there was more than 1 identity, resulting in difficulties in entering data and searching for it.

4 Conclusions

From the results of the User-based Savings Application increasing Customer Convenience at the Cooperative, it can be concluded (a) The use of NFC as a transaction medium can be carried out safely, (b) The application can check balances, debit or credit savings transactions and transaction history transactions, (c) Convenience of 75% and convenience of 76% shows that the application is easy and satisfaction able for customers to use.

References

1. Christanto, H. J., & Singgalen, Y. A. (2023). Analysis and Design of Student Guidance Information System through Software Development Life Cycle (SDLC) dan Waterfall Model. Journal of Information Systems and Informatics, 5(1), 259–270. https://doi.org/10.51519/journalisi.v5i1.443
2. David TM, J., & Putro, I. H. (2023). Penggunaan Teknologi Nfc Untuk Akses Informasi Di Laboratorium Telematika Uk Petra. *Jurnal Teknik Elektro*, *16*(1), 15–18. https://doi.org/10.9744/jte.16.1.15-18
3. Dony, Arius. 2008."Pengantar Ilmu Kriptografi". penerbit Andi Yogyakarta.
4. Rahman, A. (2020). Rapid Application Development Sistem Pembelajaran Daring Berbasis Android. *Intech*, *1*(2), 20–25. https://doi.org/10.54895/intech.v1i2.639
5. Trianggana, D. A., & Latipa Sari, H. (2015). Analisis Perbandingan Kinerja Algoritma Blowfish Dan Algoritma Twofish Pada Proses Enkripsi Dan Dekripsi. *Pseudocode*, *2*(1), 37–44. https://doi.org/10.33369/pseudocode.2.1.37-44
6. Wicaksana, A. (2016). Sistem Keamanan Data Menggunakan Algoritma Blowfish Dengan Kunci Simetrik. *Https://Medium.Com/*. https://medium.com/@arifwicaksanaa/pengertian-use-case-a7e576e1b6bf