Utilization of E-money for School Payments Using Web-Based RFID Sensors

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Abstract. School payments are a very important issue to support a school that is used to meet infrastructure and other needs. Therefore, if there is an error in writing or the loss of payment data, a difficult problem will arise. Because the payment process is still manual using a notebook.By utilizing E-money and RFID Sensors in the school payment process, it will be very helpful to create an effective and efficient payment process. In this work we develop an application that uses a school student card as a personal identity in searching for data that will be linked to a web as a basis. In paying school fees, you can also use E-money for the payment process. Therefore, the author will use electronic money to process the payment. That is by utilizing server-based electronic money in the form of applications such as OVO and DANA. Because it is easier and has been registered with Bank Indonesia, it will be guaranteed safe. The way it works is the first by installing an RFID sensor on the student card which functions as a means of finding personal data or identity so there is no need to search for data one by one manually. Then it will be connected to the website as a payment basis, which when the RFID sensor is successful in scanning student data, a payment option will appear, which can pay directly or via OVO and DANA electronic money which is already available in the application we made. This will make it easier for students to process school payments

1. Introduction
Technological development is a series of activities that are carried out continuously and aim to achieve a state or condition that is better than before[1]. At this time world civilization has shown technological developments, along with these technological advances, humans are required to work more effectively and efficiently in order to obtain faster, precise and accurate results[2]. One technology that is currently developing is E-money[3]. According to Wikipedia E-money or electronic money (digital money) is money used in internet transactions by electronic means. E-money is also often referred to as Electronic Cash, Digital Money, Digital Cash, Electronic Currency and Digital Currency. E-money can be safe to use because electronic money is very difficult to hijack or hack. So there is no worry when using this money[4]. Some examples of E-money applications are OVO, Dana, Gopay, Link Aja, Brizzi BRI.

RFID sensors are used because they are more durable and not easily damaged, considering that students are still junior high school students who are sometimes careless and less careful. Because if you use other sensors such as barcodes, it will be a problem if the barcode is damaged, the student card will no longer be able to be used to make school payments. While the RFID sensor will be more durable because the sensor is located inside the card so that if the card is scratched or damaged on the outside, the RFID sensor will still function[5].

By utilizing school student cards as self-identity in finding data that will be linked to the web as a basis. In paying tuition, you can also use E-money for the payment process. In this work, we develop an application that uses electronic money to process payments. By utilizing server-based electronic money in the form of applications such as OVO and DANA. Because it is easier and has been registered with Bank Indonesia, it is guaranteed to be safe [6]. The first way it works is by installing an RFID sensor on the student card which functions as a means of searching for personal data or self-identity so that there is no need to search for data one by one manually. Furthermore, it will be linked to the website as a basis for payment, where when the RFID sensor is successful in scanning student data, a payment option will appear which can be paid directly or through the available OVO and DANA electronic money.

2. Methods

a) Understanding E-Money

The meaning of e-money refers to a definition issued by the Bank for International Settlement (BIS) in one of its publications in October 1961. In that publication e-money is defined as "a viable or prepaid product stored in which records of funds or available to consumers stored on a consumer's electronic device" (stored or prepaid product where the monetary value is stored in a person's electronic media). It is further explained that the value of money in e-money will decrease when consumers use it for payments. The electronic money discussed here is different from other "single prepaid cards" such as telephone cards, because the electronic money referred to here can be used for various types of payments (multipurpose). E-money referred to here is also different from other card-based electronic payment instruments such as credit cards and debit cards. Credit and debit cards are "prepaid products" but are "access products"[7].

b) School Payment

"SPP (Education Support Contribution) is a monthly fee or payment from students which is an obligation for students at school. The tuition fee is taken based on the agreement of the school committee meeting and the parents of the students. Tuition fees are shown to support improving the quality of education related to teaching and learning activities facilities and infrastructure"

c) RFID Sensor

RFID (Radio Frequency Identification) technology is a technology used for identification and verification using radio waves that do not require direct contact between the object and the reader[8]. RFID is a technology that can identify several objects at once without direct physical contact. RFID technology requires three main components, namely the RFID Tag which is in the form of a thin and small chip, the RFID Reader which is used to read the data on the Tag, and an application that processes the data obtained through the Reader. The components contained in RFID are:

RFID Tag, based on the type of tag, RFID is divided into two, namely:

(a) Active This tag uses battery power and has a longer reading distance, from 20 meters to 300 meters. This tag does not reflect the radio signal, but instead sends the radio signal.

(b) Passive Passive Tag is a conventional tag that reflects the signal given by the reader. Passive tag reading distance is relatively short. This tag has a shape like a chip sheet so it is easy to apply in various media. Passive tags can operate at low, high, and ultrahigh frequencies.

RFID Reader RFID Reader is used to send and receive signals from tags. RFID Reader can read tags roughly (RAW) and has no computational capabilities. Middleware Middleware is an application that receives data from the reader and processes it to suit system requirements. Middleware can do any work such as filtering RAW data and monitoring the state of the reader.

d) **WEB**

The website is: "The web can be interpreted as a collection of pages that display text data information, image data, animation data, sound, video and a combination of all of them, both static and dynamic which form a series of buildings that interconnected, each of which is linked by hyperlinks[9]. The web is: "A collection of pages consisting of several pages that contain information in the form of digital data in the form of text, images, video, audio, and other animations provided through an internet connection"[10].
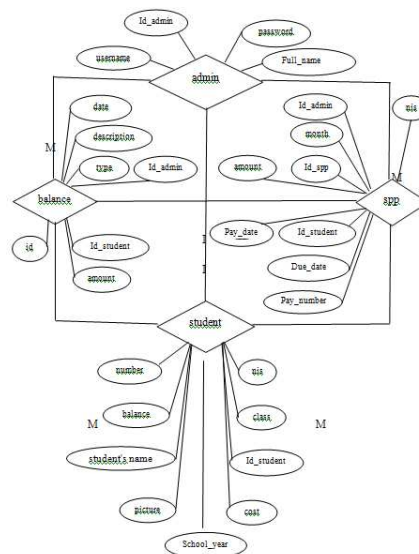
e) **ERD**

Figure 1.Entity Relationship Diagram

The picture above is an entity relationship diagram. The entity relationship diagram describes how a field and a table are related. There are several tables in the database.

3. **Results and Discussion**
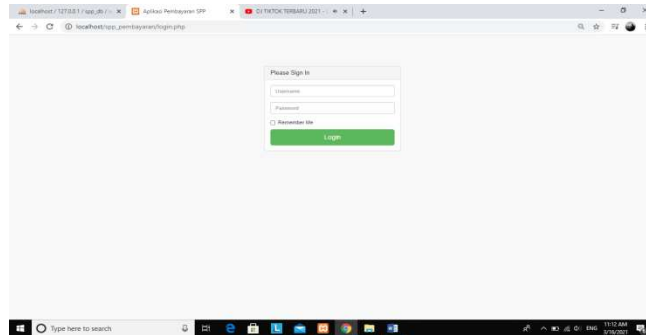   Program Implementation

a. Login View

Figure2. Login View

Login or sign in is a term in terms of computer security, namely in the form of an entrance process for users to access computer systems. Login is intended to manage the identification process. Therefore admins are required to login first in order to start school payment transactions.
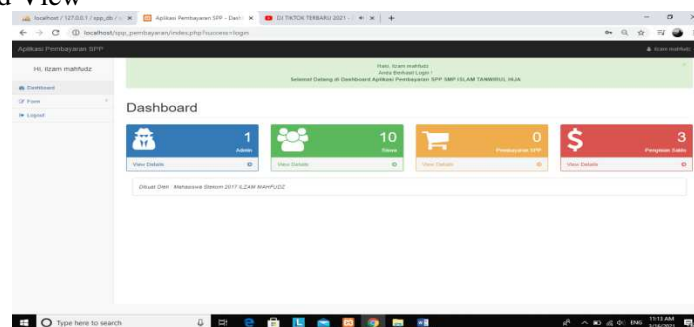
b. Dashboard View

Figure3. Dashboard View

Dashboards is a user interface that is quite unique, located between data and design. Displays various metrics, numbers or data visualizations. The main purpose of dashboards is to help users to make accurate and fast decisions based on existing data.
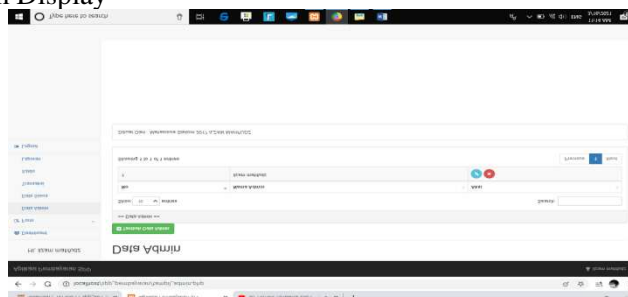
c. Admin Form Display

Figure4. Admin Form Display

The admin form functions to display admin data, at the same time in this form you can also change or add admin data.
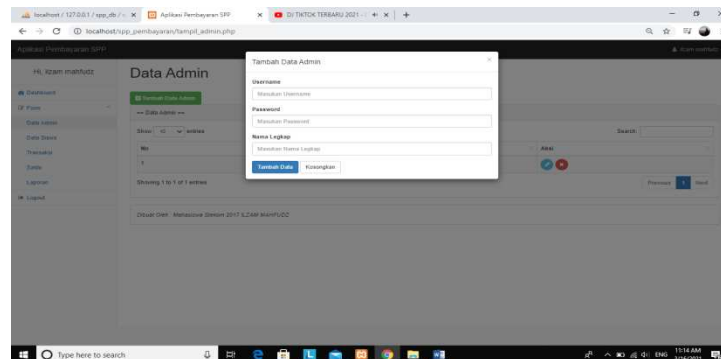
d. Display Add Data Admin Form

Figure5. Display Add Data Admin Form

The add admin data form functions to add admin data including a username and password that works when logging in. Full name serves to find out the admin's name

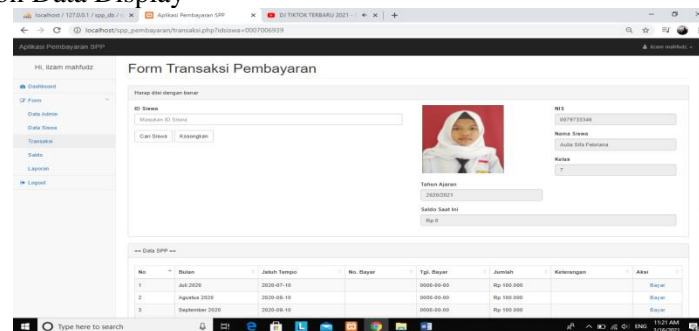e. Transaction Data Display

Figure6. Transaction Data Display

The display of the form above will appear after the rfid card is read, the data will appear which will display personal data as well as spp data showing spp payment data.

4. Conclusion

The conclusions made refer to the purpose of making this research and after direct research is carried out, the following conclusions can be drawn:

Currently, SMP X students don't have to worry about making payment transactions that are difficult and inefficient. Because now in carrying out tuition payments it is easier and faster to use e-money, students just scan the barcode and send proof of payment to the admin, the payment has been completed.

Concerns about the school's data loss and difficulties in finding tuition payment data will be resolved. Because with the database, every payment will be stored and maintained and there is no need to be difficult to find it. Because on every student card there is already a student ID which, when affixed to the rfid sensor, will display clear and simple payment data.

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