Design of a Student Payment System Based on Virtual Account (Case Study at SMK NU Al-Hidayah Ngimbang)

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ABSTRACT

Payment media is one of the important things that must be considered in the world of education in order to make it easier for students to make payments. In the category of Vocational High School (SMK) education level, not many schools use virtual account-based payment technology. In some schools, payment administration services are still carried out conventionally with various weaknesses including causing many queues that cause health protocol violations, unstructured administration so that errors in reporting often occur and open opportunities for fraud in payments. Based on the various weaknesses above, a payment system is needed that can overcome these problems. The payment model used is a virtual account which is commonly used in the current era. In this study the method used is research and development (R & D). This research resulted in a virtual account-based payment system belonging to Bank Rakyat Indonesia (BRI). The method used in the virtual account is polling with a certain time interval. This payment system is expected to improve service quality and ease of payment.

Keywords: Payment; Virtual Account; Research and Development.

INTRODUCTION

Currently, financial technology (fintech) in Indonesia is developing very rapidly. This development is marked by the increasing number of start-up companies that have sprung up in this field. One of the tangible forms of this online development is in the field of online payments(Juhardi & Khairullah, 2019). In general, people who want to pay for something must go to the cashier's counter to submit payment or proof of transfer, if using a transfer (Riswandhana et al, 2019). Of course this is troublesome for certain interested parties. The definition of payment is a mechanism for transferring funds consisting of 2 (two) or more figures that aim to meet current or future needs and obligations(Rahardja et al., 2018).

Payment systems in modern times have been widely applied to the online business world. This online payment system is called E-Payment, E-Payment is commonly used in E-commerce businesses and is also commonly used for payment activities in different places with long distances(Sha & Mohammed, 2017). With E-Payment, users can easily pay using online banking media and confirm payments directly on their E-Commerce site(Mulyana & Wijaya, 2018). An example of E-Payment is payment for electricity and water. Currently, to pay electricity and water bills, customers do not need to queue long at the counter, just go to the nearest ATM (Automated Teller Machine) machine (Zuhri et al, 2018).

Payment fintech services (e-payment) are one of the most commonly found classifications, and lead the financial market with a percentage of 38% of all financial technology services in Indonesia in 2019(Yahya & Irawan, 2017). Some examples of companies engaged in payment classification are GoPay from Gojek, OVO, Link Aja, and Dana(Abrilia & Sudarwanto, 2020). Based on data from the Financial Services Authority (OJK) as of August 5, 2020, the total number of registered and licensed fintech companies is 158 companies. The world of education is one category that has not been touched by payment start-ups in Indonesia(Padeli et al., 2020). Therefore, during the covid 19 pandemic, it is very effective if payments at schools can be made through virtual accounts with the aim of minimizing the spread of covid 19 through money media/offline payments (Fatoni et al., 2020); (Muhibuddin et al, 2018).

Along with the development of fintech technology, people no longer need to wait in long queues that spend a long time to make payments at the counter or only submit proof of transfer. Fintech

technology used in payments includes virtual accounts, e-money, e-wallet and so on(Irkham, 2020).

In the field of education, fintech technology can be applied by realizing the virtual account concept in the payment mechanism(Rosdwianty et al., 2020). This virtual account is suitable to be implemented for reasons of convenience because there is minimal need, for example, if you use e-money, you need an NFC (Near Field Communication) card, whereas if you use an e-wallet you need a top up mechanism account. Another advantage that is obtained when applying fintech technology in the field of education, especially payments, is to prevent the spread of the COVID-19 virus, which currently has a high prevalence. One of the factors that influence the increase in the spread of COVID-19 is crowding(Fatoni et al., 2020). With the payment of this model, it can reduce or eliminate queues so that it will reduce the level of distribution.

At the NU AL-HIDAYAH NGIMBANG Vocational High School (SMK) it turns out that conventional payments are still the main choice compared to fintech-based payment systems because students and parents are still accustomed to using conventional systems. This can have an impact on the wider spread of the COVID-19 virus. By using the fintech payment system above, it is expected to minimize the spread of the covid 19 virus and payment management can be structured properly and correctly and minimize fraud in payments.

METHOD

This development model uses research and development. The research and development model is a research model used to produce certain products, and test the effectiveness of these products. This type of research is different from other research because the goal is to develop products based on trials and then revised to produce products that are suitable for use. Borg and Gall state that research development model is a process used to develop and validate products used in education and learning. In this study the system development method used is the Waterfall method, where this method is carried out from the top to the bottom sequentially as shown below:
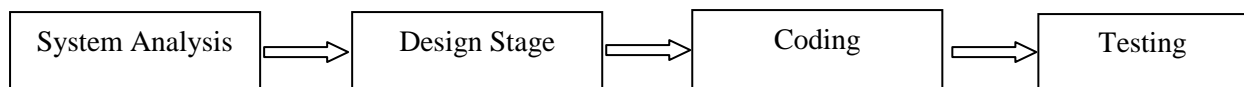


```
System Analysis ⟹ Design Stage ⟹ Coding ⟹ Testing
```

Figure 1. Waterfall Method Flow

From the picture above, it can be described as follows:
- System Analysis
  This stage aims to analyze the system requirements, in this case the researcher conducts a literature study, interviews, and observations of the existing system.
- Design Stage
  The system design designed in this research is to create a context level DFD, Admin Master Flowchart Design, User Flowchart, and Database Design.
- Coding
  This system is built with android framework7 which uses the JavaScript programming language in terms of code implementation and editing using the Sublime Text editor tools.
- Testing
  At this stage, testing of the compatibility and functionality of the system is carried out to review whether the system is running according to the concept and plan.

Data Analysis Technique

Data analysis is a process of systematically searching and compiling data from interviews, observations and documentation by organizing the data and choosing which ones are important and which ones need to be studied and make conclusions so that they are easy to understand. The data analysis technique used in research and development research is qualitative analysis used by researchers as proposed by Miles and Hubberman, namely data collection, data reduction, data presentation and the last step is drawing conclusions. These steps are as follows:
- Data reduction
  Data reduction is a simplification carried out through selection, focusing and the validity of raw data into meaningful information, making it easier to draw conclusions.

- Data presentation

 The presentation of data that is often used in qualitative methods is in the form of a narrative. Presentation of data in the form of a collection of information arranged systematically and easily understood.

- Conclusion

 Drawing conclusions is the last stage in the data analysis that is carried out to see the results of data reduction while still referring to the formulation of the problem in terms of the objectives to be achieved. The data that has been compiled is compared with one another to draw conclusions as answers to existing problems.
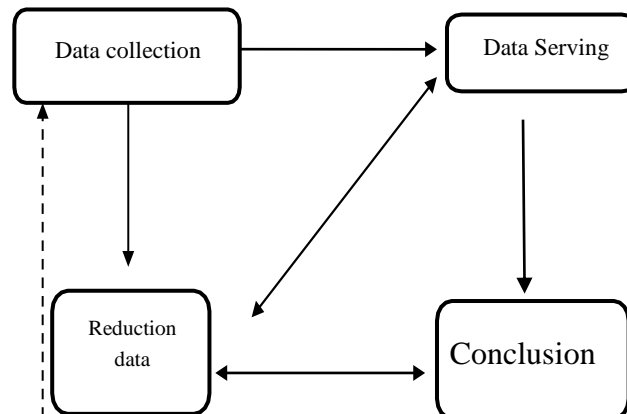

Figure 2. Qualitative Data Analysis Techniques According to Miles and Hubberman

RESULT AND DISCUSSION
Result

 After analyzing the payment system that runs at SMK NU AL-HIDAYAH Ngimbang, there are many shortcomings in the student payment process because they still use the conventional payment system. Then the author will discuss the design of the proposed system to be built. The proposed procedure design aims to improve and provide alternatives in providing information as well as simplifying the admin section in computerized data input, facilitating handling when students make payments, which can be accessed at any time, and making it easier to produce reports.

 The difference between the system that is running and the system to be built will hopefully have a positive impact on those who use it, so that the implementation of payments can be more effective and efficient. The payment system that will be built is integrated with the briva virtual account and e-wallet link. From the results of the analysis of this payment system, it is more effective to use a polling system, namely a technique where an Ajax request is made, the server waits for the requested data to be available with loops or sleeps, the connection will continue to be opened and after the data is available and ready it will be sent to the client so that the client gets an update immediately.

 The following is a picture of the BRI API response:

```
{
    status: true,
    responseDescription: "Success",
    responseCode: "00",
  - data: {
        institutionCode: "J104408",
        brivaNo: "77777",
        custCode: 1618029497,
        nama: "M.Syahrul Alim",
        amount: "265000",
        keterangan: "lks, spp, kalender",
        expiredDate: "2021-04-11 10:00:00"
    }
}
```

Figure 3. Response to create API BRI

```
{
    status: true,
    responseDescription: "Success",
    responseCode: "00",
  - data: {
        institutionCode: "J104408",
        BrivaNo: "77777",
        CustCode: "1618029497",
        Nama: "M.SYAHRUL ALIM",
        Amount: "265000.00",
        Keterangan: "LKS, SPP, KALENDER",
        statusBayar: "N",
        expiredDate: "2021-04-11 10:00:00",
        lastUpdate: null
    }
}
```

Figure 4. Read (unpaid status) BRI API

```
{
    status: true,
    responseDescription: "Success",
    responseCode: "00",
  - data: {
        institutionCode: "J104408",
        BrivaNo: "77777",
        CustCode: "1618029497",
        Nama: "M.SYAHRUL ALIM",
        Amount: "265000.00",
        Keterangan: "LKS, SPP, KALENDER",
        statusBayar: "Y",
        expiredDate: "2021-04-11 10:00:00",
        lastUpdate: null
    }
}
```

Figure 5. Read (already paid) BRI API

```
{
    status: true,
    responseDescription: "Success",
    responseCode: "00",
  - data: {
        institutionCode: "J104408",
        brivaNo: "77777",
        custCode: "1618029497"
    }
}
```

Figure 6. Delete API BRI

Discussion

The following is the payment system database table:

Table 1. "Student" Database

Column Name	data type	Long	Information
id_siswa	Varchar	50	Primary key
nama_siswa	Varchar	50	
jenis_kelamin	Enum	-	
no_hp	Varchar	50	
alamat	Varchar	100	
status	Enum	-	
password	varchar	50	

Table 2. Database "Student Details"

Column Name	data type	Long	Information
id_detail	Varchar	100	Primary key
id_jurusan	Varchar	100	Foreign key
tingkat	Varchar	100	
kelas	Varchar	100	
ta	Varchar	50	

Table 3. Database "Department"

Column Name	data type	Long	Information
id_jurusan	Varchar	50	Primary key
nama_jurusan	Varchar	100	

Table 4. Database "School Year"

Column Name	data type	Long	Information
ta	Varchar	50	Primary key
keterangan	Varchar	100	
status	Varchar	100	

Table 5. "Payment Items" Database

Column Name	data type	Long	Information
id_item	Varchar	50	Primary key
nama_item	Varchar	100	

Table 6. "Billing" Database

Column Name	data type	Long	Information
id_tagihan	Varchar	50	Primary key
id_item	Varchar	50	Foreign key
tingkat	Varchar	50	
ta	Varchar	100	Foreign key
nominal	double		
cicil	doubel		

Table 7. Database "Transactions"

Column Name	data type	Long	Information
id_transaksi	Varchar	50	Primary key
id_siswa	Varchar	50	Foreign key
nama_siswa	Varchar	100	
total	Int		
keterangan	Varchar	100	
tagihan	float		
tgl_expired	Date		
status_bayar	Enum		
channel	Varchar	100	

Column Name	data type	Long	Information
id_teller	Varchar	100	
no_rekening	Varchar	100	
metode_bayar	Enum		

CONCLUSION

Based on the results of research and observations that have been made by the author on the student payment administration system, the conclusions are as follows:

- The current student payment administration system is still done conventionally in terms of recording data using a ledger and Microsoft excel.
- Constraints contained in the current running system regarding payment administration which often takes a long time when the payment queue process every month. And sometimes it can result in miscalculation of data in report generation. The results of the reports presented are less than optimal because they are still stored in a book and the admin section has to sort one by one from all existing data until the desired data is found when making the results of the report which will be given to the principal. In addition, the guardians of the students also cannot know whether the payment given has been paid by their children to the school or not. So that the current system is not yet effective and efficient.
- Designed a computerized and integrated payment system through briva and links so that students can easily make payments anywhere.

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