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Utilizing Midtrans as A payment Gateway for Non-Cash Transactions

Mochammad Rizal Aditya[1], Irwan Alnarus Kautsar[2*]

Department of Informatics, University of Muhammadiyah Sidoarjo, Sidoarjo, Indonesia

Corresponding Email: 191080200174@umsida.ac.id[1], irwankautsar@umsida.ac.id[2*]

Abstract. Increasingly, including payments in school e-canteens. One of the payment methods that can be used is to use a payment gateway such as Midtrans. This study aims to evaluate the use of Midtrans as a payment gateway for noncash transactions in school canteens using the waterfall method. This study uses the waterfall method to develop a payment system using Midtrans in the school canteen e-canteen. Data was collected through interviews with schools and e-canteen users as well as observations of the transaction process using Midtrans. Data analysis was performed using a qualitative descriptive method. This information system was built using the PHP programming language with the MSQL programming language and the Laravel framework using the SDLC (Systems development life cycle) method, which is a method that refers to the models and processes used to develop software systems and describe processes.

Keywords: Information systems, SDLC (Systems development life cycle)

1 Introduction

The development of information technology as it is today, it is very easy for entrepreneurs who want to get actual and open information. Therefore, many entrepreneurs utilize information technology. One aspect that needs to be supported by computer technology is the sale and reporting of goods in a computerized manner.

The development of technology is accelerating and covers all activities of human life. In the Industry 4.0 era, the need for transactions in the business world is needed [1]. Conventional transactions are still relevant to use on a micro scale, if a macro scale is applied this transaction will hamper work because there are many transactions that must be processed, starting from the approval of the delivery of goods [2]. system goods and return payments are important components in transactions. If manual payments are still applied, it will interfere with other processes. sellers and buyers to The payment system also plays an important role in supporting the creation of financial system stability and the implementation of monetary policy. In order to ensure the smoothness and security of the payment system, non-cash or electronic payments are the solution[3][4]. Focusing on four main aspects, namely increasing security, efficiency, expanding access to the payment system and paying attention to consumer protection. Cashless transactions or commonly called E-payment is a non-cash or electronic payment system through an internet connection that bridges the payment process from the sales website to a third party online system with a computer system that processes, verifies, and accepts or rejects credit card transactions on behalf of merchants [5]. At this time people can make transactions without using cash such as card payments, bank transfers, direct debit, e-wallets, over the counter and so on with security to means that can compete internationally with payment gateways, one of which is www.midtrans.com which can be a solution in the domain sector [6][7][8].

Midtrans is a payment that has features to make it easier to test payments. By entering the transaction code and pressing the pay button, the transaction has been paid in an easy way[9]. In addition, Midtrans is one of the payment gateways that facilitates the needs of online business people by providing services with various payment methods. These services allow industry players to operate more easily and increase sales.

E-cash is a hosting and domain sales system that can be accessed online through a website. This system is provided for students who are still using localhost on programs that will be tested during the TA / Thesis trial. The payment system used must support the transaction process to run more effectively and efficiently [10]. So the concept is used to make the payment system at iPanda online by using Midtrans payment as a payment system where in this transaction hosting and domain buyers on the iPanda website have been provided with various effective and efficient payment methods by www.midtrans.com.

Based on the 2 (two) problems that can be solved using the Midtrans payment system on the E-kant website, it can be concluded that:

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Midtrans is an online payment gateway to facilitate payments by providing various secure and convenient online transaction methods for hosting and domain buyers on the E-kantin website (11).

The existence of the Midtrans payment system on E-kantin, the flow of payments can run more easily and be well recorded, thereby minimizing problems in the process of recording reports on the purchase of goods and food products on the E-kantin website. For the admin, it can help to find out transaction data through the purchase report provided by Midtrans (12).

This study aims to evaluate the effectiveness of using the waterfall methodology in developing the Midtrans payment system in E-kant. This research involves user requirements analysis, system design, implementation, testing, and evaluation of system performance. The results showed that the waterfall methodology can produce online payments, by promoting good documentation and a step-by-step approach. This research shows the use of the waterfall method in utilizing midtrans as a payment gateway for non-cash transactions. Although the study did not specifically mention minimizing these problems in E-kantin, the waterfall methodology can be applied well in the development of the E-kantin application. it can be a reference material for further researchers, in the website created. the author took the initiative to add features to the E-kantin application. this will also facilitate transactions with customers that are more detailed and obtain information from a customer's data and goods that are faster and more accurate. The type of research conducted in this study is a qualitative method which is research on descriptive research and tends to use process analysis and meaning is more highlighted in qualitative research. The theoretical foundation that is used as a guide so that the focus of research is in accordance with the facts in the field. And the author's system development method uses the SDLC method, which is a method that refers to the model and process used to develop software systems and describe the process.

2 Methods

2.1 Research Title Research Methods

The type of research conducted in this study is a qualitative method which is research on research that is descriptive and tends to use process analysis and meaning is more emphasized in qualitative research.

2.2 System Development Method

According to Simarmata (2010: 39), SDLC refers to the model and process used to develop software systems and outlines the process, namely the developer accepts the move from problem to solution. Development of information systems engineering (*system development*) and or software (*software engineering*) can mean compiling a system or software that is completely new or that more often than not improves the previous one (Nugroho, 2010: 2).

a. The initial stage, namely planning, involves the study of user requirements (user specification), feasibility studies both technically and technologically as well as scheduling an information system or software project. At this stage too, in accordance with the tool (tool) that the author uses, namely UML.
b. The second stage, namely analysis, is the stage where we try to discuss all the problems that arise in users by decomposing and realizing further use case diagrams, regarding system or software components, objects, relationships between objects and so on.
c. The third stage, namely design, where the author tries to find solutions to problems obtained from the analysis stage.
d. The fourth stage, namely implementation, where the author implements system planning into real situations, namely by selecting hardware and compiling application software (coding).
e. The fifth stage, namely testing, which can be used to determine whether the system or software made is in accordance with user needs or not, if not, the next process is iterative, namely returning to the previous stages. And the purpose of testing itself is to eliminate or minimize program defects (defects) so that the developed system will really help users when they carry out their activities.
f. The sixth stage, namely maintenance, or maintenance where at this stage the system operation process begins and if necessary makes minor repairs. Then if the system usage time runs out, it will re-enter the planning stage.

From the above opinion, it can be concluded that the *System Development Life Cycle* (SDLC) is the whole process of building a system through several steps.

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2.3 Data Collection Method

To obtain the necessary data more accurately, the data collection model is carried out in the following ways:

a. Observation: Researchers made direct observations to (PT LAKUREK MEDIA SUKSES) SIDOARJO. The results of this observation are Observation is carried out by directly reviewing PT LAKUREK MEDIA SUKSES) to obtain information data about the identity of Midtrans and the data needed in making the system.
b. Library Study: search and analyze research related to the information system for payment of ekantin transactions.
c. Interview: Researchers conducted question and answer activities directly to the data source and there was a process of conveying to obtain the data needed to one of the leaders of PT LAKUREK MEDIA SUKSES about the problems faced in the process of e-kantin transaction transactions in midtrans.

2.4 System Requirements Analysis

A. Functional Needs

Login is a way to enter the system (*users* and shop owners / administrators) system processing is the management of various data systems such as *user data,* sales data and transaction data.

a. The initial page contains a *default* page display where when consumers or customers who want to open the A&N bag shop website, the first thing that will appear is the *default* section.

B. Non-Functional Needs

Non-functional needs aim to fulfill the functional needs above, this berikit is the non-functional needs of the information system:

b. Software needs that function to assist in doing the work, namely:
    1. Windows 10 operating system
    2. *Text* Editor (Visual Studio Code)
    3. PHP is a programming language in the form of scripting, the work system of this program is as a book interpreter as a compiler [11].
    4. MYSQL is software used to build databases that are often used in the linux environment. MySQL is opensource software which means it is free to use. Apart from the linux environment, MySQL is also available in the windows environment [12].
    5. XAMPP is a stand-alone local server (Localhost) which consists of the Apache HTTP Server program, MySQL database, PHP and Perl. The XAMPP application is provided under the GNU General Public License and is free, is a web server that is easy to use and can serve dynamic web displays. To get it, you can download it from the official website [13].
c. Hardware requirements (*Hardwere)*, namely:
    1. HP laptop (ram 4)
    2. 1000 GB hard drive
    3. Internet connection
    4. Android phone

Functional needs, namely the facilities needed and what activities are carried out by the system in general, including:

a. *Login* is a way to enter the system (*user* and shop owner / admin) system processing is the management of various data systems such as *user data,* sales data and transaction data.
b. The initial page contains the *default* page display where when consumers or customers who want to open the A&N bag shop website, the first thing that will appear is the *default* section.

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5. XAMPP is a stand-alone local server (Localhost) which consists of the Apache HTTP Server program, MySQL database, PHP and Perl. The XAMPP application is provided under the GNU General Public License and is free, is a web server that is easy to use and can serve dynamic web displays. To get it, you can download it from the official website [13].

b. Hardware requirements (*Hardwere)*, namely:
   1. HP laptop (ram 4)
   2. 1000 GB hard drive
   3. Internet connection
   4. Android phone

3 Result and Discussion

3.1 Needs Analysis

The initial stage carried out by the author, namely analyzing existing problems, identifying the main problems of paying for school e-canteen transactions, utilizing midtrans as a non-cash transaction payment gateway (Case Study of payment for school e-canteen transactions), at this stage the researcher identifies user needs for the system must be able to increase payment efficiency in school e-canteens by adopting non-cash transactions using Midtrans MAINTAINING MIDTRANS AS A PAYMENT GATEWAY NON-CASH TRANSACTIONS. (CASE STUDY: PAYMENT GATEWAY TRANSACTIONS E-KANTIN SCHOOL WATERFALL METHOD), by conducting interviews with pt leaders, observations on the system that is running in midtrans school e-canteens and parties directly or indirectly related to school e-canteens.

3.2 System Design

System design is how the author designs the system to be implemented in E-kantin, by utilizing whimsical software to create an E-kantin website design display, as well as how the author makes the display and system easier to understand by the E-kantin admin and users. At this stage the author makes coding using the PHP programming language and MSQL database. At this stage the author applies the analysis that has been made in the first stage, at this analysis stage if there is an error in the analysis, the system design cannot be continued, because it must repeat from the first stage, and must be corrected at the analysis stage.

3.3 Analysis Design

System design is an initial description of the system to be created. The system design will show the flow or process that occurs in the system. The design of this web-based newspaper craft sales information system has two users, namely admin and buyer. the process that occurs in this system is that the admin uploads goods and manages orders, buyers choose the items they want to buy and order goods then make payments.

Solving problems in this web-based E-cash Application Design uses a problem solving framework, namely the uses case diagram. The picture below is a use case diagram of the information system for selling food products and goods.

3.4 Program Design

A. Activity Bese Data Design

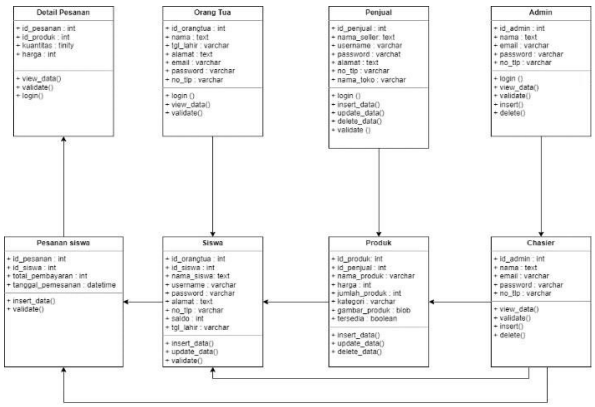

Figure 1. Database Design

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This design shows the entities, relationships and attributes that will be used in the database design. There are also one to many and many to one relationship, this design will make it easier for database makers to know what they have to fill in so that the program has a complete database place and will make all transaction data in the cashier application well stored and organized.

B. Entity Relationship Diagram

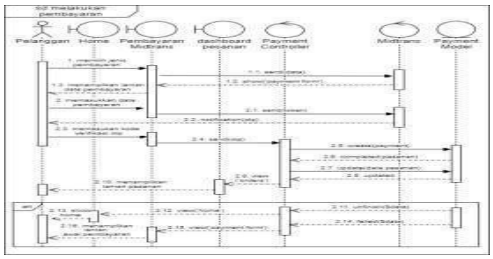

Figure 2. Payment Sequence Diagram

3.5 Program Display

A. Default Page Display

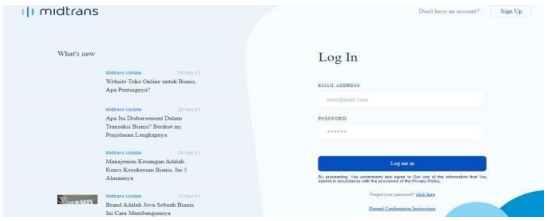

Figure 3. default page view

This page is used as a default page where when consumers or admins who want to open the midtrans shop website, the first thing that will appear is the default page.

B. Customer Login Page View

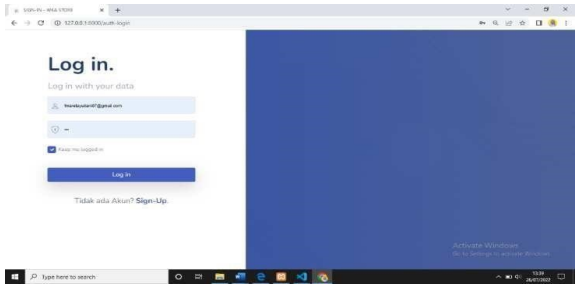

Figure 4. customer login page display

This login page appears to fill in the username and password

C. Midtrans dashboard page display

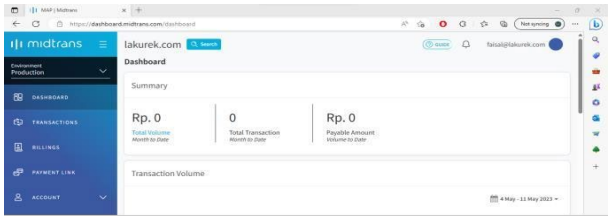

Figure 5. Midtrans dashboard page

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The Midtrans dashboard page is used by users to manage transactions and access payment-related information. Some features that can generally be found on the Midtrans dashboard page

D. Transaction page display

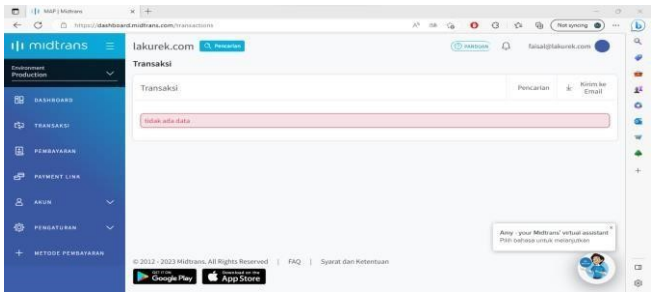

Figure 6. Transaction page view

The appearance of the Midtrans Transaction Page may vary depending on who uses Midtrans to integrate payment services into a website or application.

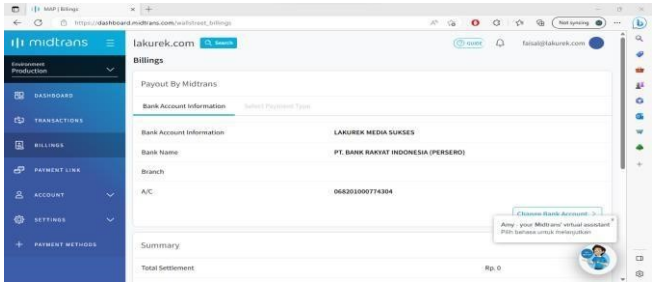

Figure 7. Bilings Page Display

Midtrans Bilings page may vary depending on the preferences and needs of the business.In general, the appearance of the billing page

E. Transfer Page Display

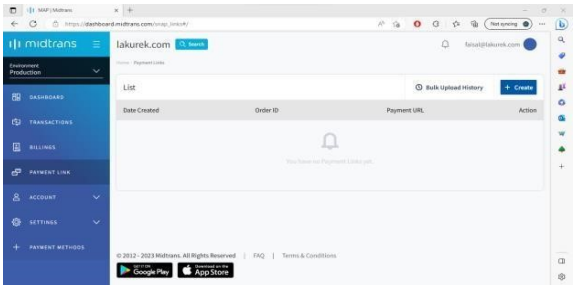

Figure 8. Transfer Page Display

Payment Link Page View created by midtrans or businesses to send payment links to customers. This page allows customers to make payments easily through the link sent.

F. Order Page View

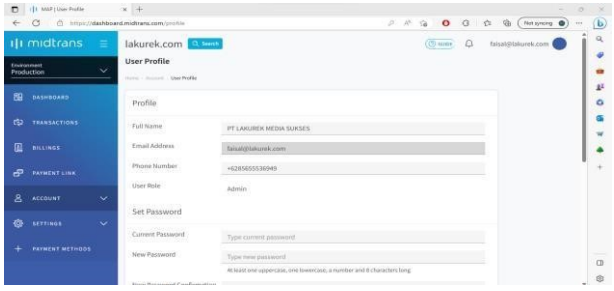

Figure 9. Admin Order Page View

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Payment accaount page view This admin account manages their payment settings and features. Some of the things that can be done by the admin account on the Midtrans dashboard

G. Ip Whitelist Menu Page Display

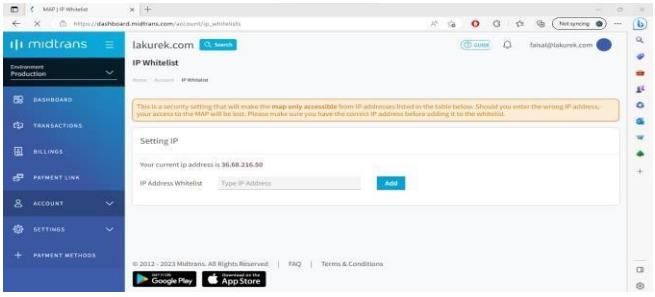

Figure 10. Display of ip whitelist menu page

The IP Whitelist menu in the Midtrans dashboard provides an IP Whitelist feature to manage access to the Midtrans API based on the IP list.

H. User Manager Page Display

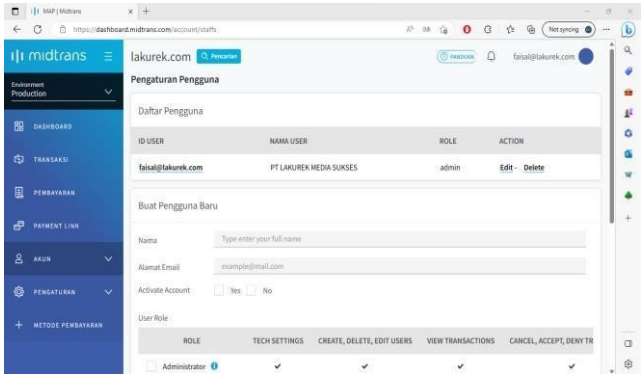

Figure 11. User manager page

The Midtrans user manager page provides a user management feature to manage user access permissions for using Midtrans payment services.

I. Activity Log Menu Page Display

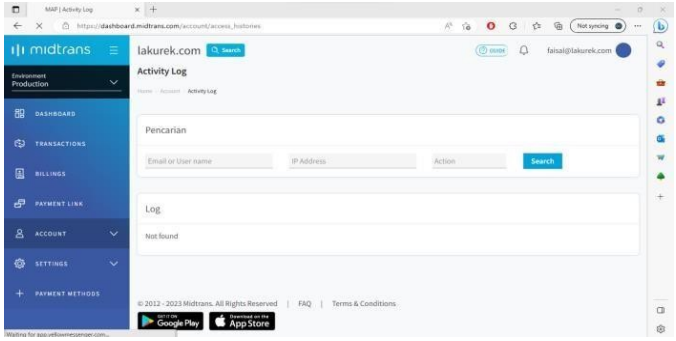

Figure 12. Activity Log Menu Page

The Activity Log Menu page in the Midtrans dashboard is a page for viewing and monitoring activity logs or transaction history that occurs through the Midtrans system. This activity log includes various information related to payment transactions, payment status, notifications, and other activities that occur in the Midtrans account.

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J. General Setting Menu Page

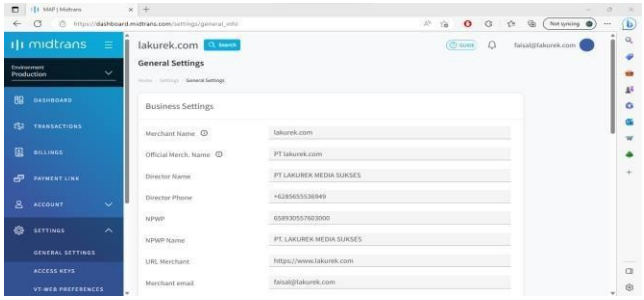

Figure 12. General setting menu page

The General Setting Menu page in the Midtrans dashboard is a page for configuring general settings related to the use of Midtrans payment services. On this page, merchants can customize various settings that affect the way their business interacts with the Midtrans system.

K. Access key menu page

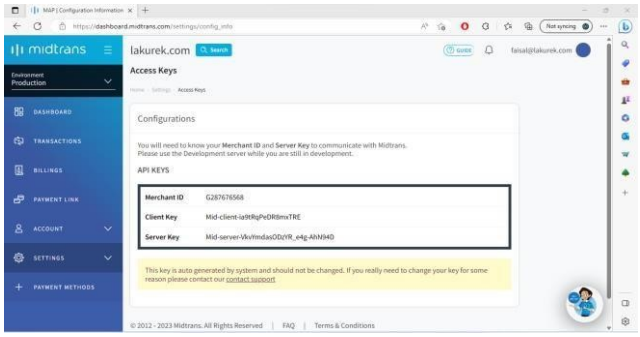

Figure 13. Access key menu page

The Access Key Menu page in the Midtrans dashboard is a page for managing API access keys used to connect their business systems with Midtrans. It displays a list of access keys such as Name, Description, Access Type, and Status which displays information about each existing access key.

L. Display of vt- preference Menu Page

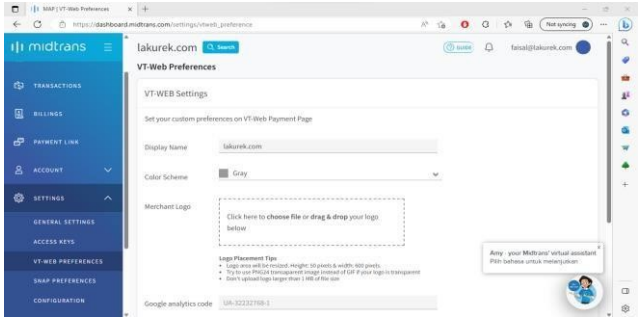

Figure 14. vt- preference Menu Page

The VT-Preference (Virtual Terminal Preference) Menu page in the Midtrans dashboard is a page that allows merchants to set preferences and configurations related to the Virtual Terminal feature. Virtual Terminal is a feature that allows merchants to make payments manually through the Midtrans web interface.

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M. Display of snap preferences Menu Page

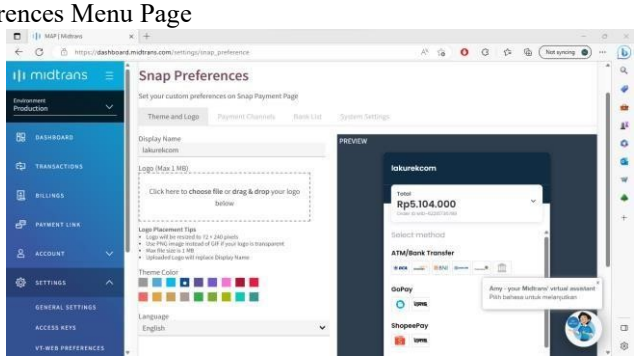

Figure 15. Snap preferences menu page

The Snap Preferences Menu page in the Midtrans dashboard allows to set preferences and configurations related to the Snap integration. Snap is one of Midtrans' products that allows merchants to provide a seamless checkout experience.

N. Configuration Menu Page Display

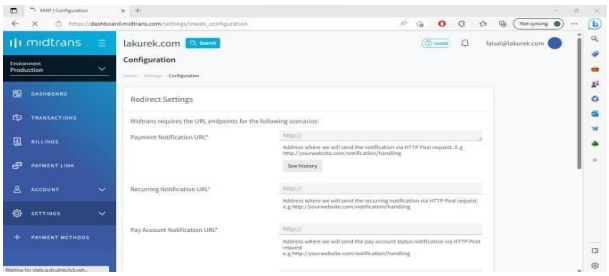

Figure 16. Configuration Menu Page

The Midtrans Configuration Menu page in the dashboard is a page for setting various configurations related to the Midtrans integration. While I can't provide a view here is some information that may be in the view

O. Display of billing setting menu page

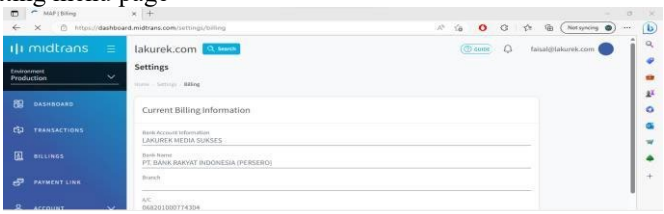

Figure 17. Billing settings menu page

The Midtrans billing settings menu page is generally part of the control panel or dashboard provided by Midtrans to users.

P. Email notification menu page display

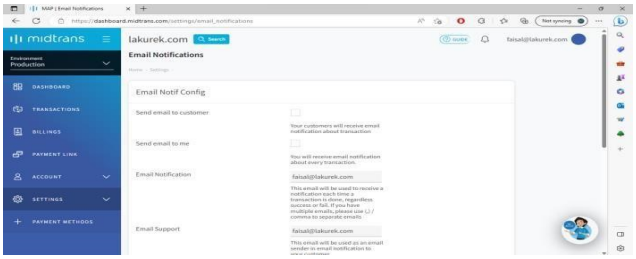

Figure 18. Email notification menu page

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The email notification menu page is usually part of the control panel or dashboard provided by a platform or service. In it, you can set preferences and settings regarding the email notifications you will receive.

Q. Payment link menu page

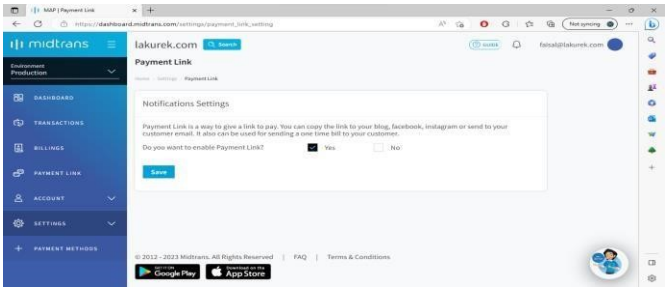

Figure 19. Payment Link Menu Page

The Payment Link Menu Page may vary depending on the payment platform or service.

R. Daily report Menu Page Display

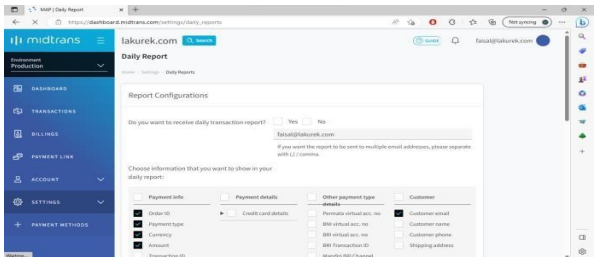

Figure 20. Dally Report Page

The appearance of the Daily Report Menu Page may vary depending on the platform, system, or service used to generate daily reports.

S. Payment Methods Menu Page Display

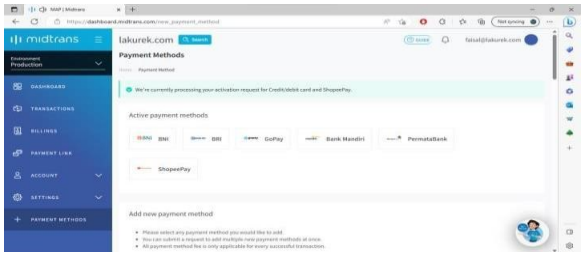

Figure 21. Payment Methods Page

The Payment Method Menu Page display may vary depending on the platform or service used.

T. Payment Methods

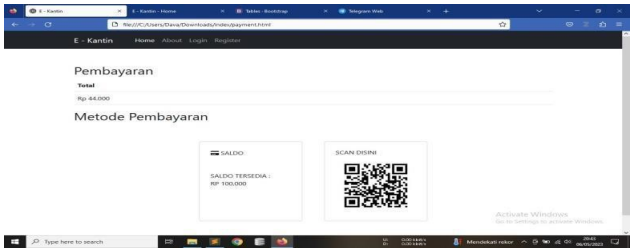

Figure 22. Payment Page

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Provides payment methods using barcodes as one of the supported standard payment methods. Midtrans focuses more on integrating and supporting payment methods such as credit cards, bank transfers, digital wallets, and other electronic payment methods.

U. E-kantin

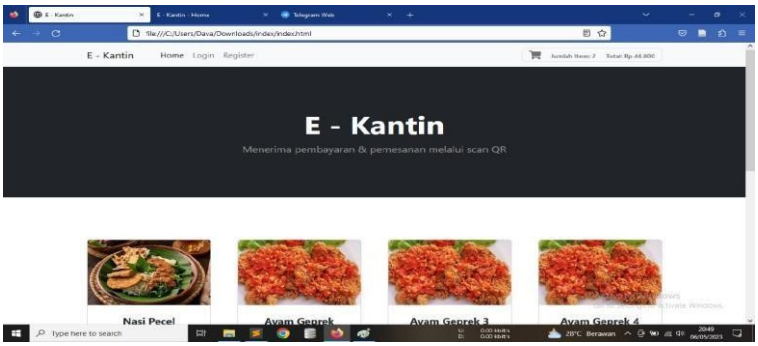

Figure 23. E-canteen page

E-canteen design on midtrans web sub system

V. Shopping Cart

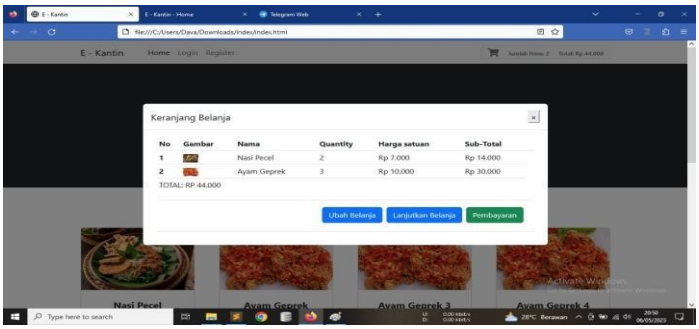

Figure 24. Shopping Cart Page

After confirming the payment, it will display a payment information page containing the amount to be paid, the payment due date, and the virtual account or payment code.

3.6 System Testing

Implementation of web-based newspaper craft sales system testing is done using the blackbox testing method. The blackbox testing method is a program testing stage that prioritizes testing the function requirements of a program. Testing of this blackbox testing is to find bugs or problems in a program. The following are the stages of system functional requirements to see the application whether the program produces the output that the user wants.

Table 1. System Testing

No	Tested Function	Testing Method	Expected Result	Status
1	*Login*	Admin and customers enter *Username* and *website Password*	Display the main page on	OK
2	Biodata	Customers fill in their biodata	Displays complete identity results	Okay
3	Cart button	Customer selects a sale	Displays order details	Okay
4	Add product data	Admin enters the main product name, product price product stock to be displayed in the main menu	Display products in the menu	Okay

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5	Add Account No. Data	Admin enters the number in the midtrans display to appear in the payment option E-cash payment	Displays the account number through Midtrans	Okay
6	*Login* With Same Email	When *logging* in fill in with your same email	The system will notify that using the same email	Okay
7	Click the save button	The data is saved into the database and appears on the existing data	The save button is as expected	Okay
8	Click the edit button	Can enter the data edit form	Edit button as expected	Okay
9	Click the check out button	Data is saved into E-cash and total price data and next steps appear. next steps	Save button as expected	Okay
10	Check Customer data, product data, stock data, and item category data	Customer data, product data, stock data, and item category data are displayed.	As expected	Okay
11	Click check out	Display the total price of goods, message code and next steps	Check as expected	Okay
12	Delete product data, category data, stock data	A question will appear "sure the data will be deleted"	Delete data as expected	Okay
13	*Logout*	Customer or admin logs out of the website	Display the website *ounboart* page	Okay

System Usability Scale (SUS) Analysis| Page

Testing the E-Marketing website using *System Usability Testing* with 10 questions. Questions from the questionnaire are as follows:

a. Q1. I think I will use this midtrans.
b. Q2. In my opinion, the sales information system in this e-kantin is too complicated to use.
c. Q3. In my opinion, this E-kantin sales information system is easy to use
d. Q4. In my opinion, in using this school e-kantin sales information system requires assistance from other people or technicians
e. Q5. In my opinion, the features of the e-kantin sales information system run properly
f. Q6. In my opinion, the e-canteen sales information system is inconsistent (not harmonious on this system)
g. Q7. I think other people will understand how to use the bag sales information system quickly
h. Q8. In my opinion, the midtrans payment system is confusing
i. Q9. In my opinion, there are no obstacles in using the sales information system
j. Q10. In my opinion, it is necessary to learn many things first before using the sales system.

The total respondents from the SUS questionnaire distribution were 10 users. User characteristics are male gender as many as 3 people and female 7 people. The occupation of the respondents is 4 *artshop* owners, 4 general public users and 2 crafters. Based on the results of distributing SUS questionnaires, the results are obtained in Table 2 below.

Table 2. System Usability Scale (SUS) Test Results of sales applications

Respondent	**Question Item**										**Total**	**Score (Total*0.25)**
	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**		
1	2	3	2	3	2	3	3	3	2	3	26	65
2	4	4	4	2	4	4	4	4	2	3	35	87.5
3	3	4	4	0	4	4	4	4	4	1	32	80
4	3	3	3	3	3	3	3	3	2	1	27	67.5
5	4	4	4	4	4	4	4	4	4	4	40	100
6	2	3	3	3	3	2	3	3	3	3	28	70

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7	4	3	4	2	4	3	4	3	4	2	33	82.5
8	3	2	3	2	3	3	2	3	3	2	26	65
9	3	1	3	1	3	1	3	1	3	1	20	50
10	3	3	3	3	3	3	3	3	1	2	27	67.5
Average System Usability **score Scale (SUS)**												**73.5**

Based on the results of table 2 of the *System Usability Scale* (SUS) test, it can be concluded that the total average score of the respondents is 73.5 and it can be concluded that the sales application is good according to its function and usefulness.

3.7 Comparison of Results

Comparison of the results of using the SDCL (*Systems development life cycle*) method in this study with other studies that use the SDLC (*Systems development life cycle*) method as follows: a. Entitled "Web-based online shop information system with sdlc method" produces research results The filling of order data at the tassia store was changed from a manual method to a web system and in this web-based online sales can make it easier for customers to find information about products sold at the tasia store.Penginputan sales data and a well-structured *database*. [14]. b. Research entitled "Web-Based Bag Sales Information System at Ud Bag Shop. A&N Collection Tanggulangin With WATERFALL Method Design of information systems for the sale of decorative lamp handicrafts on web-based purnamo shop" produced the results of research This information system can help easily in recording sales transaction data and effective promotional media for the development of the PurnamaShop trade business. Where in this information system is very important for the means of selling goods easily and also reducing the work of sellers who initially sellers are very bothered in recording transaction data, stock data and to promote merchandise that sellers business. [15].

4 Conclusion

The conclusions that can be drawn from the problems that exist in designing e-commerce information systems at A&N Stores are as follows:

a. By creating a website-based sales system, midtrans can make it easier for shopkeepers to sell the e-kantin they produce.
b. Customers can order midtrans anywhere if the gajet is connected to the internet network. Customers only need to open the e-kantin website to select products and place orders without the need to come to the store.
c. Customers can make online transactions to midtrans and payments can be transferred directly to the account that has been prepared by the school e-kantin owner.
d. not only buy e-kantin, customers can also facilitate purchases via online.
e. The System Usability Scale (SUS) results show the total average score of 10 respondents who filled out the questionnaire obtained a score of 73.5 which indicates that the sales application is good according to its function and usefulness.

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