

WEB DEVELOPMENT BASED ON SDLC CONCEPT APPROACH IN E-COMMERCE AT BASUKI JAYA PHARMACY

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Abstract

E-commerce is a very rapid development of trade in various fields, including pharmaceuticals. One process is the provision of prescription or non-prescription drugs from pharmacies. The management practice is still done manually, which involves the buying and selling process in person. Besides, processing and drug supplies are also done manually. These reasons make the process less effective and efficient, so it is necessary to develop an information system in buying and selling (e-commerce), improving performance, and reaching the target market. This system development uses the SDLC (System Development Live Cycle) concept and e-commerce, specifically in the pharmaceutical sector. This process is carried out from requirements to testing. The development is an e-commerce website that can help in the pharmacy's buying and selling process. Besides, the website is capable of connecting with customers. The system can integrate existing supplies into a pharmacy information system. The design of this system uses the programming languages PHP and MySQL. The results were tested using the Black Box method with the results that all processes and functions performed were carried out correctly. The developed website can be implemented in e-commerce at the pharmacy.

Keywords: E-commerce, Information System, PHP Programming, SDLC, Website.

I. INTRODUCTION

Computer-based data processing is currently overgrowing with the development of information and communication technology. It is influential in various fields, especially in the health sector. Data management is very much needed in helping work [1] - [3]. One of them is at the pharmacy. A pharmacy that plays a role in providing health supplies and supplies to the public. So, we need data collection management that can provide services in serving the community.

Pharmacies provide many contributions in serving the community related to drugs, even medical devices [4]. At Basuki Jaya Pharmacy, currently, there is a need to develop a system for managing data. This pharmacy only received its operating license in March 2018. So that many activities are carried out manually, including managing drug data. Even though it is only two years old, this pharmacy has many medicinal capabilities and is very helpful for people who need it.

The current system is still manual by way of bookkeeping. Bookkeeping is carried out by recording each sales data and drug supply. Over time, the number of drugs is increasing, and transactions are increasing, so many data logbooks are needed—the results in a long process for transactions and checks of drug stocks. Officers also have difficulty finding data and controlling drug expiration, so it is necessary to apply computerized-based technology.

There are many computerized applications in inventory [5] - [7] and e-commerce [8] - [10]. The process that occurs digitally, making it easier for every

activity. It can also be done online via website and easy access anywhere and anytime [11].

There have been much researches on the application of websites in drug management in pharmacies. Implementation of system development using PHP and MySQL programming [12] - [14]. The development concept uses the waterfall method. In this study, only procurement and sales at pharmacies and still limited to design and implementation. What distinguishes this research is the case study, testing system, and the concept of development.

Lombardo et al. [15] explained that selling drugs via the web could increase pharmacists' knowledge of drugs and the web, as well as about counterfeit drugs, and suggested community pharmacies as a significant component of an integrated system aimed at controlling counterfeit drugs.

Therefore, the development of e-commerce for Pharmacy Basuki Jaya needs to be appropriately done to present and process data to provide the required information. Besides, human resources' quality is also an important factor, apart from good cooperation for the wrong purpose.

II. METHOD

The research uses a system development method, namely the System Development Life Cycle (SDLC). SDLC is used to develop an e-commerce website at the Basuki Jaya pharmacy. The SDLC concept in system development has five stages [16], namely planning and needs analysis, defining needs, designing, developing, testing, implementing, and maintaining. This concept is the same as using the waterfall method [17] in

system development. The concept of SDLC is shown in Fig. 1.

In this study, the service process using several stages is based on the SDLC concept. The stages start from problems, data, design, system creation, implementation, and system testing. The results obtained will be evaluated and reported.

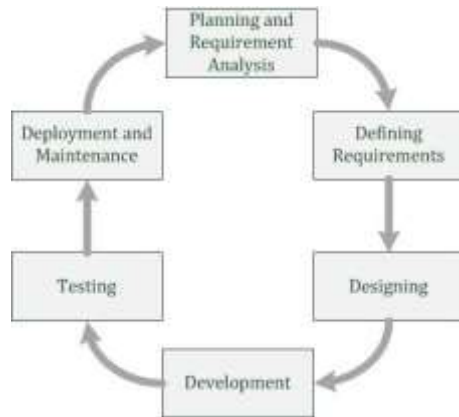


Fig. 1. The SDLC process stages are used in developing the prototype of an e-commerce website

In the old system, there was a need for a system that could check drug transactions and data storage. The system is currently running manually, namely by recording documentation with a book (log book). This system needs to be developed by sampling. The sample data is analyzed so that it has a relationship with the system being made. The reference-based analysis is based on a literature review from journals, books, and other research related to e-commerce pharmacies. Besides, researchers conducted interviews with the Basuki Jaya Pharmacy to obtain information about the system's development.

After the needs are met, next is the system design process. This design is designed according to the needs that have been analyzed, such as drug data, transactions, and others. The design is done using DFD (Data Flow Diagram) [18], [19]. Besides, database design is also carried out for data storage required in the system. Database design is adapted to the conditions of the system being developed.

System development requires equipment that can support the system according to needs. The equipment needed includes hardware and software. So, making applications in this study is using the PHP programming language and MySQL database.

The system that has been developed is implemented and tested. This process aims to see whether the system that has been developed is following the existing functions and needs. Besides, in this testing process, the system can run according to the process and solve e-commerce pharmacies' problems.

A pharmacy is a pharmaceutical service facility and a place to practice pharmacy [20]. The processes

that exist in a pharmacy are procurement, storage, distribution, and reporting.

Besides, sales are also made in pharmacies. Selling is an effort or concrete steps taken to move a product, either in the form of goods or services, from producers to consumers as the target [21]. In sales, it needs inventory, inventory of raw materials, and finished products in the production system at once, which acts as a buffer in trade. Also, inventory can ensure the smooth running of after-sales service activities and determine the procurement schedule and the number of orders according to company needs [21].

III. RESULTS AND DISCUSSION

The research results discuss the system's analysis, the system that is currently running, and the proposed system. Apart from analysis, there are design, implementation, and testing systems.

A. System analysis, ongoing concepts, and proposed)

System analysis in this study includes the material contained in the application. The purpose of this analysis process is for consideration and reference in application design. The analysis document obtained can be used as a tool for standardization based on the theory and methods used. This analysis can also provide clarity on the description of the application being designed.

Among the analysis carried out are when the system is running. The system process that is run in general is illustrated with a flow chart (as in Fig. 2). The process starts with the buyer who requests drugs to the pharmacy and is served by the officer. The officer checks the honorarium of the medicine, whether it is available or not. If the drug is available, it can carry out the sales process. Besides, if the medicine is not available / runs out, the officer will buy it to increase the stock. In addition to transactions, officers can print all reports and drug data information in the pharmacy.

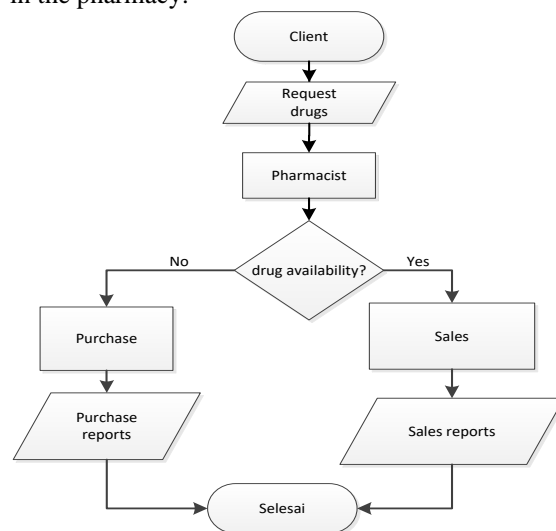


Fig. 2. The system flowchart that is currently running

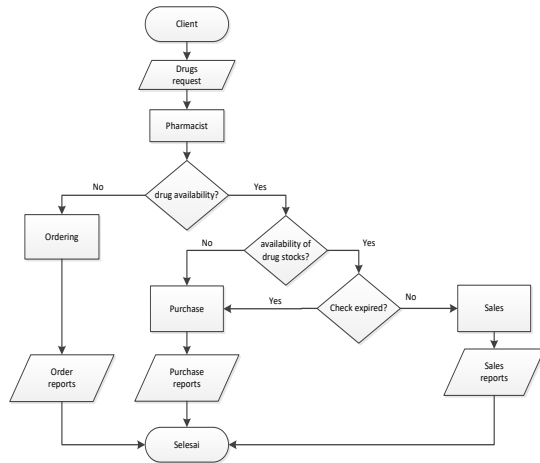


Fig. 3. The system flowchart that is proposed for development

The development process is shown in Fig. 3. The difference in the current system is the process of checking stock and expiration with the system. Besides, the system can also order drug services before buying. Also, there are two concepts of analysis of its function, namely functional and non-functional.

The functional analysis used in this study includes all system features and capabilities. The results of this analysis are in the form of activities such as the following:

1. Adding drug data and Displaying drug data
2. Adding data for pharmacy employees
3. Displaying pharmacy employee
4. data Adding supplier data
5. Conducting drug sales transactions
6. Displaying drug sales
7. Data displaying drug ordering data and adding ordering data medicine drug
8. Display purchase data drug purchase
9. Add data
10. Display purchase and sales data
11. Perform returns
12. View expired drug data
13. Display cash or sales profits
14. Print sales, purchase, ordering, and reporting reports of cash or profits

Meanwhile, the non-functional analysis includes hardware and software used in the development of this system. In detail, these non-functional requirements are as follows:

1. Operating system Microsoft Windows 7, 8, or 10.
2. Browsers such as Google Chrome, Mozilla Firefox, or Microsoft Edge.
3. Xampp Application.
4. Sublime Text.
5. 1 LED monitor, mouse and keyboard.
6. Computers CPU with specifications:
 - RAM 2 GB
 - Intel Core 2 Duo Processor
 - HDD 160 GB.
7. Hosting with a capacity of 750 MB and a .xyz domain.

A. System design (data concepts and diagrams)

System design is carried out to develop e-commerce applications using data concepts and diagrams. The design carried out produces DFD, described starting from the context diagram to DFD level 2.

The whole system process can be shown using a context diagram, as shown in Fig. 4. In this diagram, the external entities used are system users and pharmacy facility owners. Users, as external entities, consist of admins/pharmacists, managers, and cashiers. In general, the processes include entering master data in the database. Besides, there is a time limit from the drug's identity to determining expired item data. Every transaction is stored in the database system to search and display them and create reports with the system.

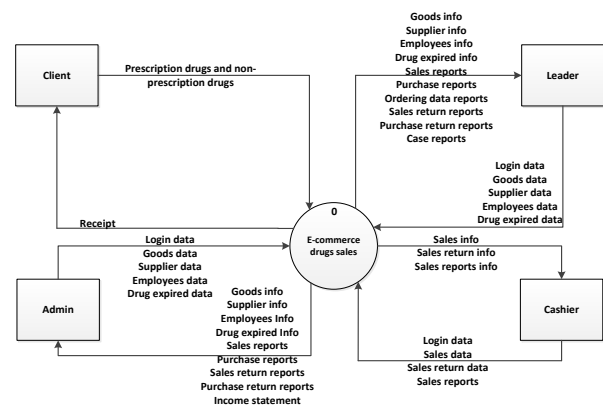


Fig. 4. Context diagram of the e-commerce drug sales

The system is based on the designed system. The processes in the system are described by a tiered diagram concept (Fig. 5). In this diagram, several processes include the master recording process, expiration reminders, transactions, and reports.

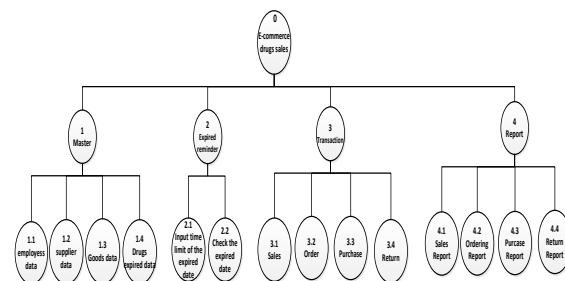


Fig. 5. A tiered diagram of all processes in system design

Each process is derived again by the process described in each level in DFD. This system has two levels in the description in DFD.

DFD level 1 describes the entire process with four main processes and has a data storage database. Every activity at this level has content with a context diagram. It is just that this diagram is more detailed. In Fig. 6, it can be seen that the DFD level 1 is equipped with a data storage table. Besides, all major processes

in the system are described in detail. In this application, users can carry out four main processes according to their access rights. Besides, each process is derived in detail to see the processes that are in that process.

In detail, process 1 has the details of the process shown in Fig. 7. This figure has three processes: data input for employees, suppliers, and goods/drugs.

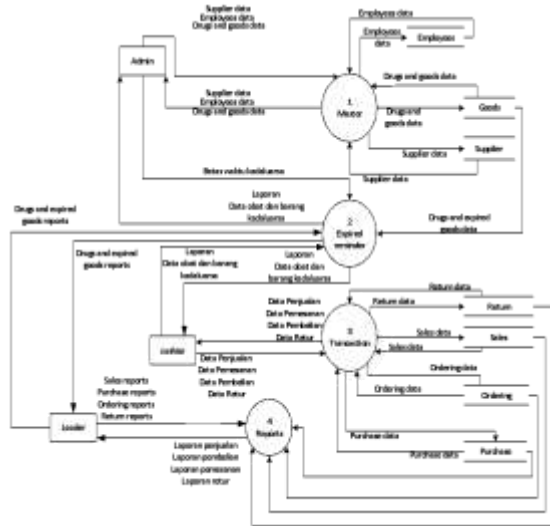


Fig. 6. DFD Level 1

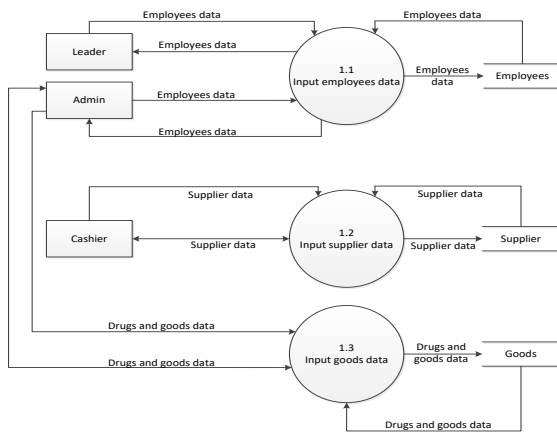


Fig. 7. DFD level 2 process 1

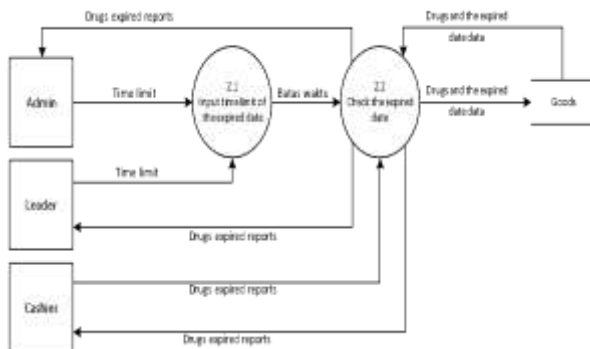


Fig. 8. DFD level 2 process 2

Like the previous process, Fig. 8 details the second process of DFD level 1. This diagram only has two processes: inputting the expiration time limit and checking the expiration time by all users. The relationship with this process is data goods/drugs.

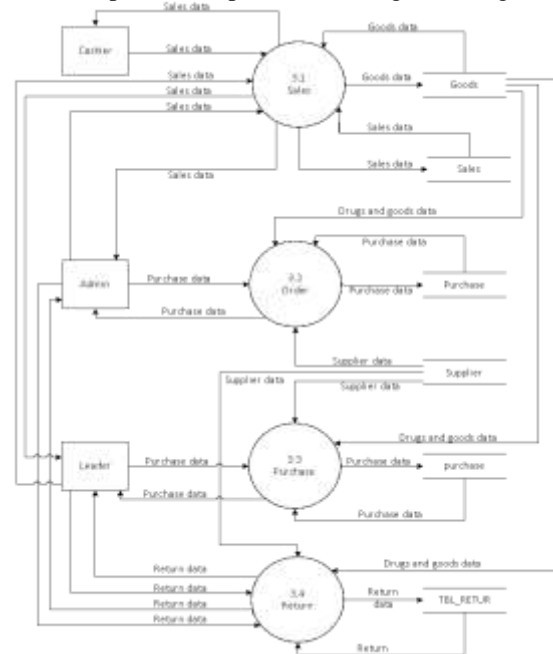


Fig. 9. DFD level 2 process 3

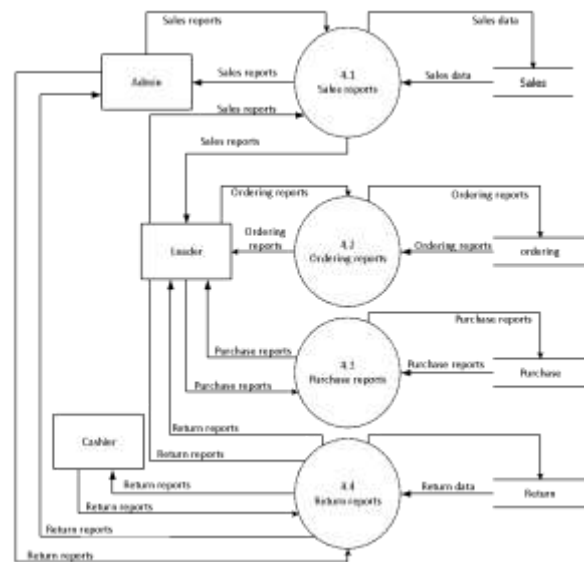


Fig. 10. DFD level 2 process 4

Fig. 9 is a process derived from the DFD level 1 process 3. Details that can be done in this process include sales, ordering, purchasing, and up. Meanwhile, Fig. 10 is a detail of process 4 from DFD level 1. In this process, it is only used to display reports of all existing processes and data. So, everything in the system can all be reported and can be stored in the database. This design can provide benefits in the implementation of an e-commerce website creation system.

B. E-commerce website

The design is implemented using the PHP programming language and MySQL database. The e-commerce website that has been developed consists of three systems based on its users, namely administrators, employees/cashiers, and leaders. So, the system has a login page, as shown in Fig. 11. This implementation uses Indonesian for any information seen by the user.



Fig. 11. Login page for application users

Like login in general, the page used to enter the system is following their access rights. If the login is successful, the system is open and can access according to the user. The main page of this system is shown in Fig. 12.



Fig. 12. DFD level 2 process 4

By user rights, the application can be run according to the rules of the user. Admin users can access the menus in the system in total. Meanwhile, employees and leaders follow the DFD design made and arranged from the Basuki Jaya Pharmacy. On the menus on the main page, the system has menus such as master, transactions, and cash—the permissions on each user, as shown in Table I.

TABLE I. MENU APPLICATION USER ACCESS RIGHTS ECOMMERCE WEBSITE

User Access Rights	Table Columns Head of		
	Data Input	Transaction	
Admin Menu	Drugs; Employees; Supplier; Expired drugs	Sales; Purchase; Orderring; Sales return purchase; Cash	Sales; Purchase; Orderring; Cash

User (transaction)	Menu	Sales; Sales return	Sales; Sales return
Leadership Menu	Drugs; Employees; Supplier; Expired drugs	Sales; Purchase; Orderring; Sales return purchase; Cash	Sales; Purchase; Orderring; Cash

Based on the existing master data, there is data that can be placed by a drug user, suppliers, employees, transactions, and reports. An example of a drug data application page can be seen in Fig. 13. Apart from the drug data, other data pages have a similar pattern.

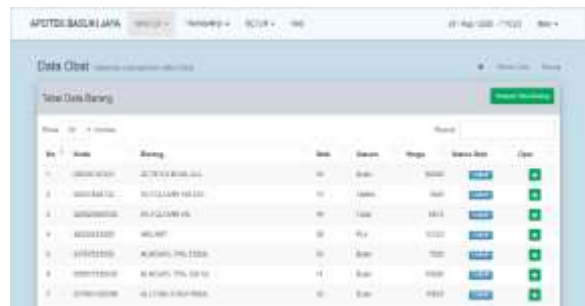


Fig. 13. Drug data page

The data can be manipulated by adding, updating, and deleting, as well as viewing the details.

Transactions can be carried out by employees using the application page, as shown in Fig. 14. This implementation is a sample of sales transactions. This transaction is carried out by employees to sell drugs to clients. The process is carried out by entering all data, and the total purchase is indicated by the nominal that must be.



Fig. 14. Sales transaction page

Other transaction pages also have a pattern similar to this transaction. Besides, there are also reports related to data and transaction processing. The resulting report is shown in Fig. 15, which is a report on purchases of goods. All existing reports can serve to provide reports and details related to activities and data.

No	Faktur	Tanggal Pembelian	Supplier	Cara Bayar	Tanggal Jarak Tempo	Status	Total
1	8565000	21/06/2020	Health Indonesia (Pegadaian)	Cash	--	lunas	Rp.160.000
2	804000000	21/06/2020	Karya Farma (Pegadaian)	Cash	--	lunas	Rp.272.800
3	888888888	21/06/2020	Health Indonesia (Pegadaian)	Utang	2020-09-20	belum lunas	Rp.375.500
4	888888888	21/06/2020	Health Indonesia (Pegadaian)	Utang	2020-09-20	belum lunas	Rp.375.500
5	3333333	21/06/2020	Karya Farma (Pegadaian)	Cash	--	lunas	Rp.10.000
6	1234567	21/06/2020	PT Monier (Pegadaian)	Utang	2020-12-31	belum lunas	Rp.50.000
7	1234567	21/06/2020	PT Monier (Pegadaian)	Utang	2021-01-31	belum lunas	Rp.50.000
Total							Rp1.493.869

Fig. 15. Sample goods purchase reports

C. System testing using the black box method

The system testing process uses a black-box testing method based on Equivalence Partition [22]. The process is carried out by testing the data inputted with the data contained in the database. It has been determined by the examiner and produces the same response. The modules tested are log in, Drug Data, Employee Data, Supplier Data, and Transactions. The test results are shown in Table II.

TABLE II. TESTING OF E-COMMERCE APPLICATIONS ON EACH WEBSITE PAGE WEBSITE

Checking Section of Pages	Unit testing		
	Parameters input data	Scenario Testing	Results (Information)
Login	Two input: Username; password	Check with appropriate and unsuitable data	Success and following conditions
Drug Data	Three input: Goods; Amount; Unit price	Entered with each valid and valid data	Success and according to conditions
Employee Data	Six input: Name; Telephone; Address; Photo; Username; Password	data entered can be stored and validated according to	Success and according to conditions
Supplier Data	Six input: Name; Address; City; Telephone; Contact person; Email	The data input process is following the conditions so that it can be received and stored	Successfully and according to the conditions
Sales transaction	Three input: Item code; Price; Total	All transaction processes can receive, and the results are according to	success and according to the conditions of
Purchase transaction	Six input: Supplier; Invoice;	All input processes and calculations	Success and according to conditions

	Name; Amount; Unit price; Subtotal	according to logic and results are correct	
Ordering transaction	Four input: Supplier; Name; Amount; Description	Data can be placed according to logic and stored	Success and according to conditions
Sales return in	Three input: Sales number; Amount; Total pay;	The withdrawal process in the database is appropriate and can run well	Successful and following the conditions
Purchase return	Four items: Purchase number; Description; Amount to pay	The process is inputted and stored successfully.	Success and according to conditions based

In this test process, it is stated that all processes are following the desired logic and conditions. This e-commerce web application can be implemented at the Basuki Jaya Pharmacy; the black box system test calculation can be said to be successful.

IV. CONCLUSION

Based on the observations and research that has been done, designing an e-commerce model can minimize recording errors. E-commerce can provide reports related to the identification of expired drugs, monitoring sales results, stock quantities, and invoices. Acceptance of black-box testing, in general, accepts all test results. The test results of the e-commerce website show that the system developed can accept all orders and can be implemented. In the future, the system will be developed with integration with freight forwarding. The system in the future is also equipped with an inventory of pharmacies as a whole, not only e-commerce.

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