Design of Management Information Systems Inventory at School Computer Laboratory Web-Based with Waterfall Methods

Shandi Noris
Achmad Udin Zailani
Alvino Octaviano
Hadi Zakaria
Samsoni
Bagas Setiawan

University of Pamulang, Banten, Indonesia

Abstract. Currently, many schools have used computer technology; one of the goals of computer technology is to help increase effectiveness by producing information systems. An inventory inspection information system is very suitable for schools because it makes it easier for computer laboratory officers to manage the available inventory. Computer laboratory officers are expected to quickly and accurately obtain information related to available inventory. Students will no longer experience disappointment when they want to use the available computers because, with this inventory inspection information system, computer laboratory officers can easily check available items. This type is applied research with a qualitative approach. The waterfall method obtains its title from the rung-step fashion by which deployed events ongoing from one phase to another. The final results are: the resulting system is an inventory management information system in a web-based computer laboratory using PHP, HTML, and CSS programming languages. For databases using MySQL with the creation of this system, the authors hope to help computer laboratory staff and schools manage inventory in computer laboratories.

Key words: inventory, management information systems, waterfall, web-based.

Introduction

Currently, many schools have made use of computer technology, one of the goals of computer technology is to help increase effectiveness by producing information systems (National Research Council, 2000: 206). The current information system is very helpful for human work, one of which is to make monitoring easier. Besides that, the progress of human performance today really needs an information system. Because with the existence of an information system, humans can easily get information precisely and quickly (Babaei and Beikzad, 2013: 374), including in obtaining information related to inventory in computer laboratories in schools. However, it is unfortunate that many schools still use paper or book media in managing inventory in computer laboratories. This clearly slows down computer laboratory workers' work in checking items that are still fit for use or are damaged. Also, making notes on paper media can risk being lost or damaged in the book.

Computer laboratory staff, but this weakness is also felt by students, for example when students want to use computers in the computer laboratory, not a few computers are damaged due to the impact of being too slow or inaccurate by computer laboratory staff in updating the available inventory list. This certainly can make students disappointed and might report this to their parents. To solve this problem, schools are obliged to follow developments in information technology at this time. An inventory inspection information system is very suitable for schools because it makes it easier for

computer laboratory officers to manage the available inventory. To solve this problem, schools are obliged to follow developments in information technology at this time (Barta et al., 1995: 9). An inventory inspection information system is very suitable for schools because it makes it easier for computer laboratory officers to manage the available inventory. Computer laboratory officers are expected to quickly and accurately obtain information related to available inventory, and students will no longer experience disappointment when they want to use the available computers because, with this inventory inspection information system, computer laboratory officers can easily check available items (DCSE et al., 2017). In building an inventory checking information system, it uses many programming languages, including PHP, HTML, and CSS, and uses My-SQL as a database which can later be processed as needed (Loizides, 2013: 13).

Theoretical Framework

According to The BC Cook Articulation Committee (2015), inventory of goods is the recording of data related to goods or assets in the organization. Generally, inventory activities are the recording of goods procurement, placement, transfer, and maintenance. Inventory of goods needs to be managed properly so that operational activities can run well too. An inventory information system is a system used to facilitate the inventory process of goods (Susandi and Sukisno, 2018: 46). The information system is an interconnected component that collects (or gets back), processes, prepares, and distributes information to support decision-making and control within an organization (Laudon and Laudon, 2014: 45). The information system is a system within an organization that brings together the needs of daily transaction processing that supports the organization's managerial, operational functions, and strategic activities of an organization to provide certain external parties with the necessary reports (Laudon and Laudon, 2014: 50). Information systems can be said as a system within the organization that functions to change, delete, add and view information to support the organization.

According to Jablonski et al. (2004: 78), PHP is a server-side web programming language that can compete with PHP code from web code with the .php extension, resulting in a dynamic web interface on the client-side (browser) (Huda and Amalia, 2020). PHP is designed to form a dynamic web. This means that PHP can form a view based on demand. PHP has a good ability in terms of mathematical calculations, in terms of e-mail network information, and regular expressions (Greenspan and Bulger, 2001: 3). PHP can be said as a programming language with a braid of Hypertext Preprocessor. PHP functions to make a web dynamic and are stored with the .php extension in a PHP code file (Javatpoint).

HTML is a collection of symbols or tags written in a file used to display a page in a web browser. HTML stands for Hyper-Text Markup Language. Called hypertext because in HTML a plain text can function differently. We can make it a link that can move from one page to another by clicking on the text. CSS can control image size, body-color in the text, table color, border size, hyperlink color, mouse over color, spacing between paragraphs, spacing between text, margins, and other parameters. CSS is a style sheet language that is used to control the appearance of the document. With the CSS it allows us to display the same page with different formats. In other words, CSS is a programming language that stands for Cascading Style Sheets that governs the entire web design, for example, adjusting text colors, adjusting text size, adjusting table colors, and so on (Nanyang Technological University, 2015).

MySQL is a multi-user database that uses a structured query language (SQL). MySQL in client-server operations involves the MySQL demon server on the server-side

and various programs and libraries that run on the client-side. MySQL is capable of handling large amounts of data. The company that developed MySQL, namely TEX, claims to store data from more than 40 databases, 10,000 tables, and about 7,000,000 rows totaling approximately 100 Gigabytes of data (Ostezer and Drake, 2019). MySQL is quite widely used by web-based application programmers released by Michael "Monty" Widenius, David Axmark, and Allan Larson in 1995. MySQL uses the standard language SQL (Structured Query Language) as an interactive language in managing data. SQL commands are often called Queries (Hidayatullah ans Kawistar, 2016; Husain, 2017: 102). MySQL is a robust and stable database to be used as a data storage medium. This database is most popular among web programmers because it is a database server capable of properly managing databases. In other words, from https://dev.mysql.com/, MySQL is a database developed by a company called TEXT. MySQL is currently most favored by most programmers as their database because MySQL can store many data stably (Ostezer and Drake, 2019).

Material and Methods

This study is applied research, aiming to solve the problem which is being faced clearly, and the results can be used as a basis for solving corrective phases (Supranto and Limakrisna, 2019: 3). The research method uses a qualitative approach to make this inventory management information system using a waterfall model because it has sequential phases. The model is meant as a design of thru definite parameters that are fathomed into form, structure, number, content, and meaning with boundaries (Husain, 2019: 1). The phase of the Waterfall Model can viewed from:
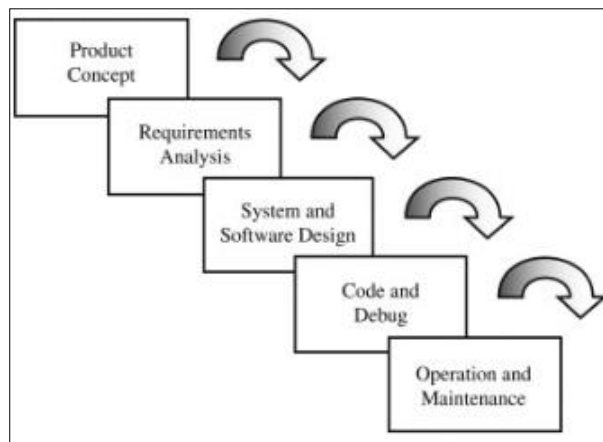

Fig. 1. The Waterfall Model. *Source*: Barker (2003)

The waterfall method obtains its title from the rung-step fashion by which deployed events ongoing from one phase to another. This deployment method regards that overall or most of the essential information about user necessity is available to the team's design at the project starting. The development team (normally cross-functional) then attends the phases from idea to deploy, with each phase building on the forward and not really backward (Barker, 2003).

Explanations:
1) System Requirements Analysis
   The first phase in this method analyzes the system's requirements both from the administrator side and from the end-user side.
2) Design

At the design phase, make a design using a system tool, namely the design of data flow diagrams (DFD), entity relationship diagrams (ERD), and logical relationship structures (LRS) to map the needs and needs of each entity.

3) Code Generation

After the system tools have been designed, the next step is to translate the design into programming language coding and create a system user interface.

4) Testing

Testing is the phase where tests are carried out on the system being bolted/designed. This is done to determine the system's feasibility so that the system is free from errors, both logical and syntax errors.

5) Support and Maintenance

The last phase of the waterfall method is support and maintenance were; at this phase, preparing the devices (hardware and software) needed to support system performance (Hartati and Sintawati, 2020: 106).

Results and Discussion

The final yields of this research, the study have determined the application of an inventory management information system in a web-based using the programming language PHP, HTML, and CSS and using MySQL as a database. Making this application only focuses on inventory management. In this computer laboratory, the inventory management information system is built using the programming languages PHP, HTML, CSS and uses MySQL as the database.

After obtaining all the information data from the school computer laboratory staff and getting an overview of the results of the research, the resulting application is a web-based inventory management information system (output program with Indonesia language captions) that can be used in the discussion as follows:

1) *Officer and Admin Login Page*

Before the officer enters the next page, the computer laboratory officer must log in first (Fig. 2).

Fig. 2. Officer Login

Before admin enters the dashboard page, admin is required to log in first (Fig. 3).
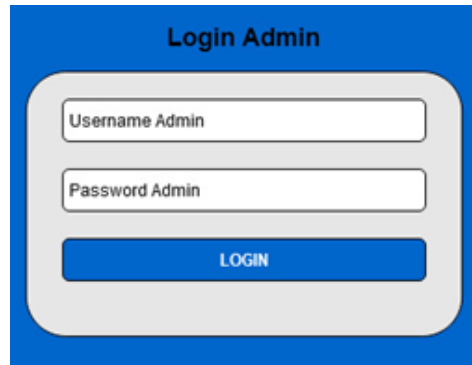
Fig. 3. Admin Login

2) *Item Data Table Page*

This page or menu serves to make it easier for officers to view and print data on available goods (Fig. 4).

Fig. 4. Inventory List Table

3) *Admin Dashboard*

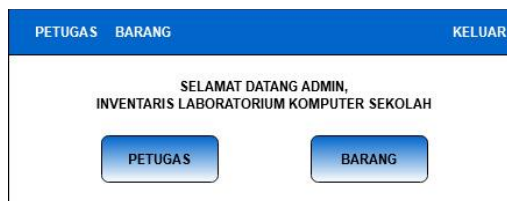After the admin has successfully logged in, the admin will go to the dashboard page (Fig. 5).

Fig. 5. Admin Dashboard View

4) *Item Data Table Page at Admin*

This page contains data on items that are in the computer laboratory and the available data can be managed by the admin or the school (Fig. 6).
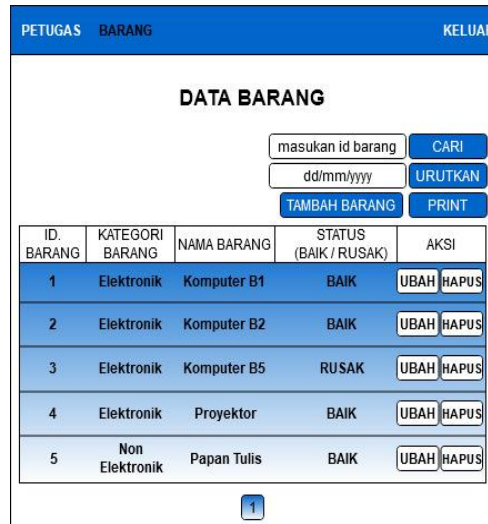
Fig. 6. Data Item (Admin)

5) *Add and Change Item Data Page*
   This page displays the added item data form (Fig. 7).
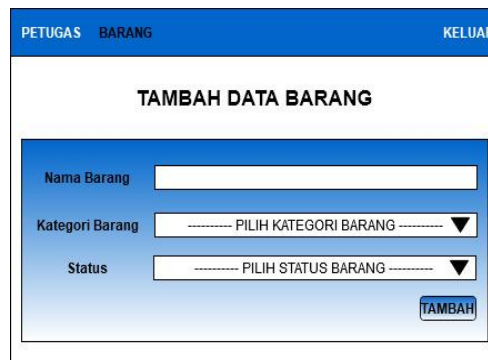
Fig. 7. Add Data Item

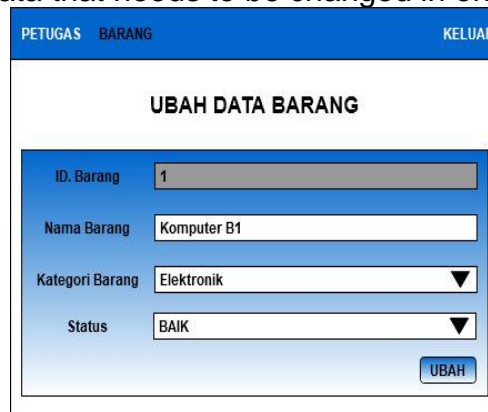This page displays data that needs to be changed in one item data (Fig. 8).

Fig. 8. Change Data Item

6) *Officer Data Page*
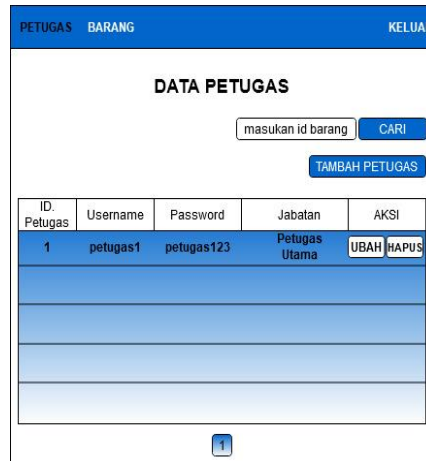   This page contains available officer data (Fig. 9).

Fig. 9. Officer Data Page

7) *Add and Change Officer Page*
This page displays the added form of the officer who will be on duty (Fig. 10).
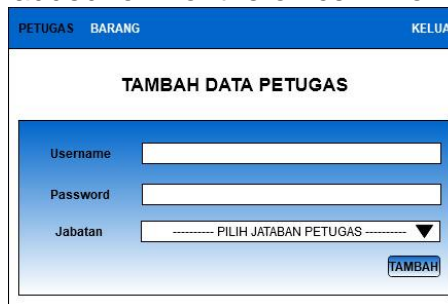

Fig. 10. Add Data Officer

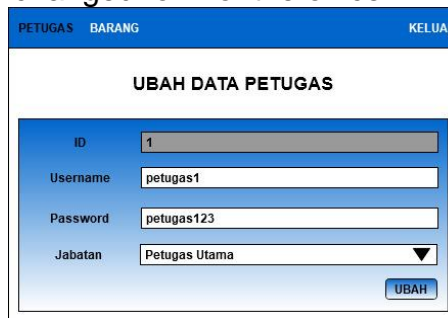This page displays the changed form of the officer who will be on duty (Fig. 11).

Fig. 11. Change Data Officer

Conclusion

This study's conclusions are 1) The resulting system is an inventory management information system in a web-based computer laboratory using PHP, HTML, and CSS programming languages. In addition, for databases using MySQL; and 2) With the creation of this system, the authors hope to help computer laboratory staff and schools manage inventory in computer laboratories.

References

Babaei, M., Beikzad, J. (2013). Management Information System, Challenges and Solutions. European Online Journal of Natural and Social Sciences, 2(3s), 374-381. Available at: http://european-science.com/eojnss_proc/article/download/3705/1427

Barker, T. T. (2003). in Encyclopedia of Information Systems. In Documentation for Software and IS Development (pp. 683-693). USA: Elsevier Inc. https://doi.org/10.1016/B978-0-12-407773-7.00007-7

Barta, B.-Z., Gev, Y., Telem, M. (1995). Information Technology in Educational Management. In M. Telem, & B.-Z. Barta, Chapter 2: Information Technology Assimiliation in Schools: A Theoretical and Practical Framework (pp. 9-14). Boston, MA: Springer Science + Business Media Dordrecht. https://doi.org/10.1007/978-0-387-34839-1_2

DCSE, FMIPA UGM. (2017). Computer System and Networking Research Lab. Retrieved March 6, 2021, from Department of Computer Sciences and Electronics: http://dcse.fmipa.ugm.ac.id/site/en/computer-system-and-networking-research-lab/

Greenspan, J., Bulger, B. (2001). MySQL/ PHP Database Applications. New York: M&T Books. Available at: http://web.deu.edu.tr/doc/misc/ebook_PHP_MySQL_PHP_Database_Applications_IDG_Books_Jay_Greenspan.pdf

Hartati, T., & Sintawati, I. D. (2020). Implementasi Metode Waterfall pada Perancangan Aplikasi SIPSIBA. REMIK (Riset dan E-Jurnal Manajemen Informatika Komputer), 5, 105. https://doi.org/10.33395/remik.v5i1.10711

Hidayatullah, P., Kawistar, J. K. (2016). Pemrograman WEB (1st ed.). Bandung: INFORMATIKA. Available at: http://scholar.google.com/scholar?cluster=13499088556013311762&hl=en&oi=scholarr

Huda, N., Amalia, R. (2020). Implementasi Sistem Informasi Inventaris Barang pada PT.PLN (Persero) Palembang. Jurnal Sisfokom (Sistem Informasi dan Komputer), 9(1), 13-19. https://doi.org/10.32736/sisfokom.v9i1.674

Husain, T. (2019). An Analysis of Modeling Audit Quality Measurement Based on Decision Support Systems (DSS). European Journal of Scientific Exploration, 2(6), 1-9. Available at: https://www.syniutajournals.com/index.php/EJSE/article/view/128/118

Husain, T. (2017). Analisis Dan Perancangan Sistem Informasi Penjualan Produk Kesehatan Pada PT. ABC. ULTIMA InfoSys, 8(2), 101-106. https://doi.org/10.31937/si.v8i2.645

Jablonskillia, S., Petrow, I., Meiler, C., Mayer, U. (2004). Basic Programming Concepts for Web Applications. In Chapter 5: Guide to Web Application and Platform Architectures (pp. 77-98). Berlin, Heidelberg: Springer-Verlag. https://doi.org/10.1007/978-3-662-07631-6_5

Javatpoint. (n.d.). PHP: Hypertext Preprocessor (earlier called, Personal Home Page). Available at: https://www.javatpoint.com/php-full-form

Laudon, K. C., Laudon, J. P. (2014). Management Information Systems: Managing the Digital Firm (13th, Global ed.). Londong: Pearson Education, Ltd. Available at: https://repository.dinus.ac.id/docs/ajar/Kenneth_C.Laudon,Jane_P_.Laudon_-_Management_Information_Sysrem_13th_Edition_.pdf

Loizides, A. (2013). Development of a SaaS Inventory Management System. Business Information Technology. Tornio, Finland: Kemi-Tornio University of Applied Sciences. Available at: https://core.ac.uk/download/pdf/38091171.pdf

Nanyang Technological University. (2015). HTML and CSS Basics. Retrieved March 2020, from 1. Introduction to HTML/CSS: https://www3.ntu.edu.sg/home/ehchua/programming/webprogramming/HTML_CSS_Basics.html

National Research Council. (2000). How People Learn: Brain, Mind, Experience, and School. In Chapter 9: Technology to Support Learning (Expanded ed., p. 384 | 6 x 9). Washington, DC: The National Academies Press. https://doi.org/10.17226/9853

Ostezer, Drake, M. (2019). SQLite vs MySQL vs PostgreSQL: A Comparison Of Relational Database Management Systems. Available at: https://www.digitalocean.com/community/tutorials/sqlite-vs-mysql-vs-postgresql-a-comparison-of-relational-database-management-systems

Supranto, J., Limakrisna, N. (2019). Petunjuk Praktis Penelitian Ilmiah untuk Menyusun Skripsi, Tesis dan Disertasi (5th ed.). Bogor: Penerbit Mitra Wacana Media. Available at: https://scholar.google.co.id/scholar?hl=en&as_sdt=0,5&cluster=7335295410788344435

Susandi, D., Sukisno. (2018). Sistem Informasi Inventaris Berbasis Web di Akademi Kebidanan Bina Husada Serang. JSiI (Jurnal Sistem Informasi), 5(2), 46-50. https://doi.org/10.30656/jsii.v5i2.775

The BC Cook Articulation Committee. (2015). Basic Kitchen and Food Service Management. In Chapter 10: Managing Inventory Control and Procurement (1.0 ed.). Pennsylvania: Pennsylvania State University. Available at: https://opentextbc.ca/basickitchenandfoodservicemanagement/chapter/basic-inventory-procedures/