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Website Based Library Service Development for Elementary School Library Services (Case Study: A Private Elementary School Library in Surabaya)

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ABSTRACT

This study was conducted to develop library services at an elementary school by developing a system using the waterfall method and PHP framework. It is developed to provide website based library. Many users, especially librarian, experience restlessness in cataloging, processing and lending services because all the services had been processed manually. Librarian's workload increased because there is limited number of people work in the library. The purpose of this research is to make librarian easier to provide library services which are packaged in a website based library services. This study uses the waterfall method to develop library services. The results of this study are the creation of a website based library services that has features which are an automatic barcode generator for cataloging and processing books, digital lending services, digital data management, and automatic digital reports. Also, it has library users and book data. So that, the library service can help librarian to provide real time data services and improves effective and efficient library management.

Keyword : Elementary School, Library Services, Technology Education, Information and Communications Technology Skills

INTRODUCTION

The increasingly advanced mindset of society has led to the development of the use of technology in all areas of life, one of which is educational institutions. With the existence of information technology in the world of education, it is hoped that it can help educational institutions to work more effectively [1]. One of the practical example on utilization of information technology at educational institution is library service [2][3]. Every school has library as a place where text books are archived. Library is a place where there are activities of gathering, managing, and disseminating (services) all kinds of information, both printed and recorded in various media such as books, magazines, newspapers, films, tapes, tape recorders, videos [4]. Students and teachers easily access text books easily and free at library. According to [5] the school library stated has functions such as an educational function, an informative function, a function of administrative responsibility, a research function, a recreational function that can lead to students' love of reading. The use of school libraries must also be supported by the quality of library managers, especially manners [6]. Meanwhile, the business processes in the library are carried out manually at several schools in remote areas. So that, the equitable use of technology in regional

libraries needs to be improved. This can be started by developing software for library services in several schools.

The library of an elementary school already has various collections of books, for instance lesson books, fiction books and non fiction books. The basic procedures of library have not been properly integrated. This situation is made worse by limited number of available librarian. Some processes that have not been well integrated are lending service, books' data, users' data, visitors' registration and record, books' catalog. The processes are not well integrated because those processes are done manually. The librarian has to check one by one the availability of the book on bookshelf. In addition, lending service, cataloging books, visitors' registration, and users' data are written in a book. So that, it is difficult to recapitulate annual reports and librarian takes longer time to find the certain data. Those procedures are considered less effective in the use of time and energy. From the users' side, students have to wait some time for borrowing and returning books. To overcome the problems, a website-based library service system is proposed to support library services to be more effective. The system offers an automatic barcode generator for cataloging and processing books, digital lending services, digital data management, and automatic digital reports.

METHOD

The research method developed in this study follows the software development process in which the information system is built using a linear sequential model or known as the waterfall development model. This model mimics a waterfall life cycle process which is one of the earliest formal software engineering life cycle processes. This life cycles are regular in the form in which the life cycle activities flow to the next stage as a series of waterfall stages. The waterfall model was chosen in this study because cycle activities flows to the next stage as waterfall stages [7]. It is started by requirement gathering and analysis and it is ended by maintenance stage. The sequential stages of waterfall model is presented on Figure 1. Requirement analysis is captured and documented in this stage by interviewing or considering a survey directly to the user. It should be documented by using requirement specification document. After completing the requirement analysis then it is followed by system design. The purpose of system design is to help the developer specifying hardware and system requirements. It also defines the system architecture. Third, implementation is conducted according to system design as input. Implementation is started from small units then is carried out until all units are completed. All the units are then integrated to a system. Testing stage is carried out by checking whether there are any faults or failures of each unit implemented. There are two types of testing, namely Whitebox Testing and Blackbox Testing [8]. Whitebox Testing examines the detailed procedures and logic of program code. System testers will look at the program code in detail while Blackbox Testing is based on the interface, application functions and process flow desired by users. The deployment stage is conducted when a system has undergone testing. So, if a system is ready then the system is deployed in user's environment. Last, maintenance is done to enhance the system so a system with better version will be released. The final phase is the maintenance phase. This phase includes: (1) Corrective maintenance, which is correcting errors in the system and only becomes known when the system is used; (2) Adaptive maintenance, i.e. changes are made if there is a new system environment such as new hardware,

new operating systems; (3) Perfective maintenance, namely changes if desired additional system functions to improve system performance [9][10].

In this study, we have done the following waterfall model, the study was started by interviewing the users and visiting a private elementary school library in Surabaya, Indonesia. A librarian and head of elementary school were interviewed at separate times. We paid attention on how did the activities at the library occurred and also we read the documents related to procedures in the library. A system architecture was then designed from requirement analysis. A fishbone diagram was created as visualization to categorize the cause and effect of the problems occurred. After that, a use case diagram was developed to represent the primary processes in a new system and also visualized the observable interaction between users and system [11]. Data Flow Diagram was then created to represent a flow data in processes and it was followed by implementing it on Contextual Data Model which was then converted to Physical Data Model (PDM). This PDM ended system design stage. Implementation stage started by developing a database according to tables from PDM. We used mySQL to develop a database while the library service system was built using PHP and HTML language to build the system. Fourth stage, the testing phase was carried out in order to avoid system failure before they were given to users. Testing conducted in this study was testing using Blackbox Testing. Testers specifically want to know whether the system procedures were running according to what was designed and built. Some test scenarios designed by testers was tried in Blackbox Testing, so that it is easy to know whether the input and output functions are running well or not [12]. The deployment stage was conducted on the elementary school libraries after the library service system has been tested and has passed all the test cases. Maintenance stage will monitor if there are any error or problem when the system is used in a certain time.

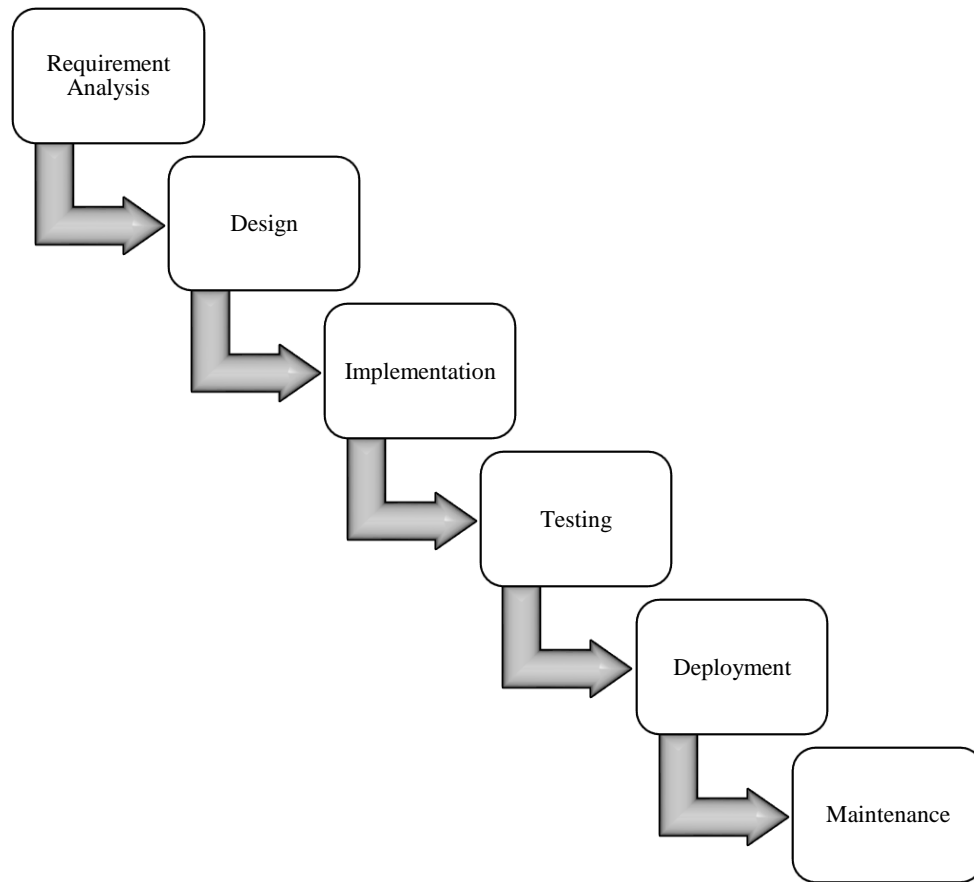


Figure 1 Research Model

RESULT AND DISCUSSION

System Requirements Analyses

System requirements analyses was based on problems arised from existing processes. Some problems before the new system implementation are: (1) The cataloging and processing books still depended on librarian that caused the possibility of job delayed because in the elementary school library there is only a librarian. This causes errors because new books often come in a large quantities; (2) The physical workbooks were archived in a storage cabinet that was getting more and more increasing. This results in difficulties when finding the required data. Also, all the record such as student data, books data, lending transaction and reports were handwritten in workbooks with the possibility of data loss due to fragile and lost workbooks; (3) There is no specific application system that can support the existing work processes, causing many manual processes to be done; (4) Limited human resources in each section results in difficulties. This caused the limited work that can be done at one time.

Use Case Diagram

Use case diagram is developed to summarize the processes on a library service system. The use case diagram of the system can be seen on Figure 2. There are two actors who have access on

system. They are librarian and head of school. The librarian could access cataloging and processing books, lending service, and data management while head of school could access all the process including access the reports.

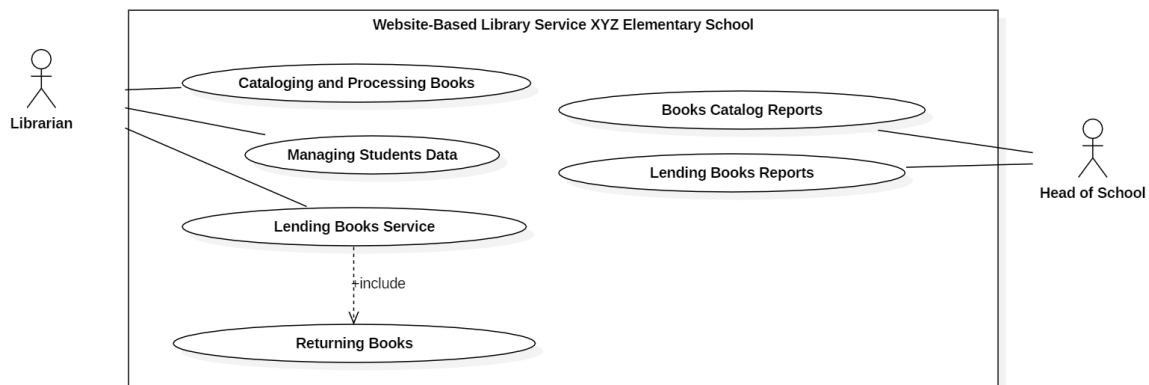


Figure 2 Use Case Diagram

Physical Data Model

The Physical Data Model (PDM) describes how the library service system is implemented using certain Database Management System (DBMS). This PDM helps database programmer to build system easily. From Figure 3, the library service system has X tables. Each table has primary key and some of the table which is connected to other table has its foreign key. In the table itself, there are attributes and data types.

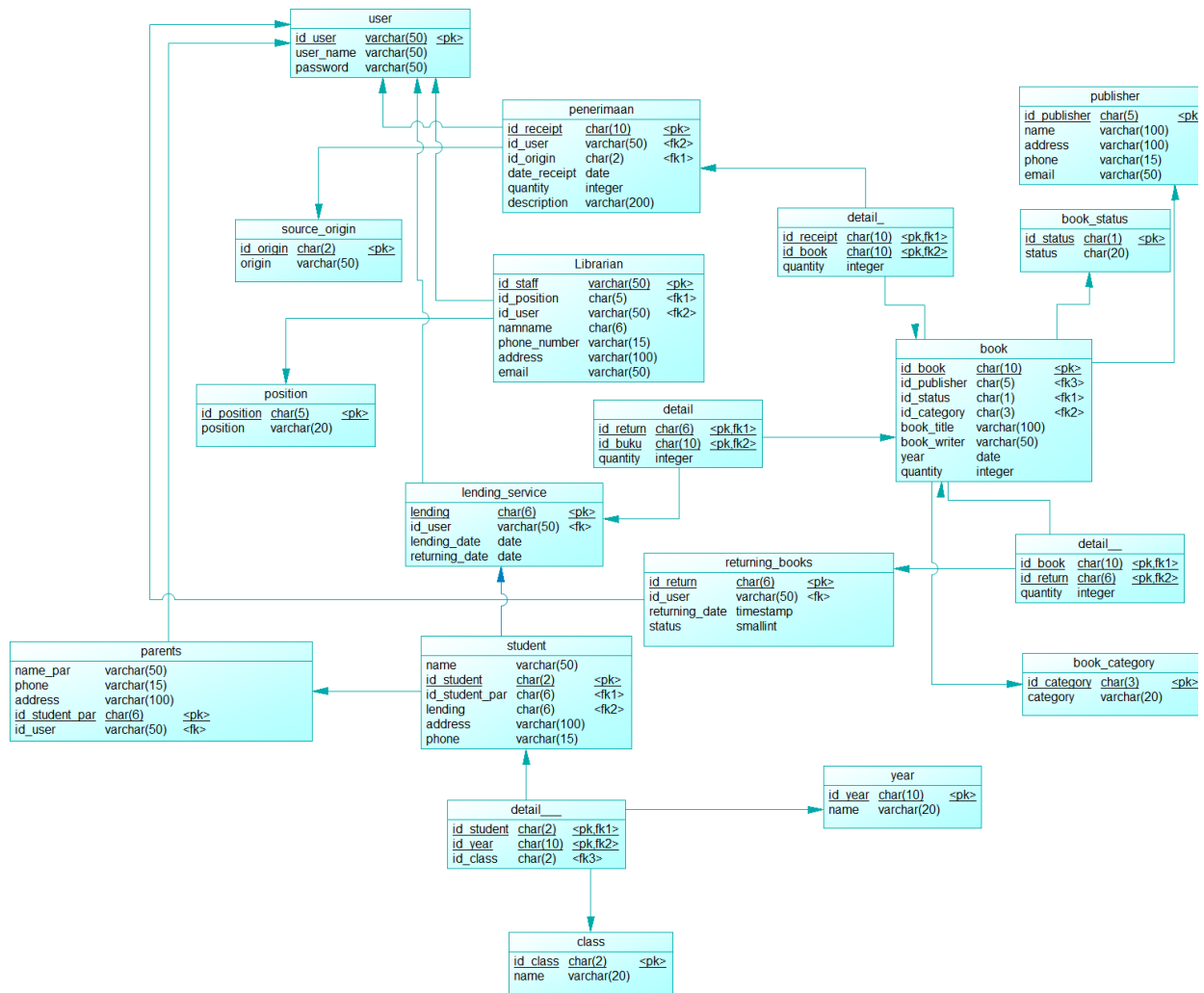


Figure 3 Physical Data Model

Interface of the system

Figure 4 shows the management of books's data. It is completed by books' ID and it is followed by its barcode of each book. A text book often has several numbers of duplicates so that every students could borrow the book without putting students on waiting list. In contrast to fiction or non-fiction book, the quantities are limited. The physical condition of each book is always updated on the system so if the condition is poor and cannot be repaired then the book is thrown away. Meanwhile, when new books arrived then the librarian could input the books' data on the system and the system generates barcode automatically. The barcode is stucked behind books as identification of each books.

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ONLINE

Buku

Data Buku

Tambahkan Data Buku Baru

Show 10 entries






#	ID Buku	Barcode	Judul Buku	Kategori Buku	Penulis Buku	Penerbit Buku	Tahun Terbit	Jumlah Eksemplar	Status Buku	
1	200jkfh001		hjpgcfjkds	Agama	jkfhuei	PT Elex Computindo	2012	76	Baik	Edit Delete
2	300frvd002		dsfergtr	Ilmu - Ilmu Sosial	frvtb	PT Elex Computindo	0	2	Baik	Edit Delete
3	600JerM010		Matematika rumus terapan	Ilmu - Ilmu Terapan	Jerome Polin	Balai Pustaka	2021	23	Rusak	Edit Delete
4	800ivam009		menari di ujung menara	Kesusastaaran	iva nur annisya	Balai Pustaka	2021	70	Rusak	Edit Delete
5	300beni011		ilmu sosial masyarakat desa	Ilmu - Ilmu Sosial	benjamin	pt gramedia	2019	8	Baik	Edit Delete

Figure 4 Books' Data

Lending service at the library is recorded in a particular web page as seen on Figure 5. Librarian could see the identity of the students who borrow books and the returning date is also displayed. So that, if the students is returning books then the librarian could find and record it directly. The system saves time efficiently and reduces librarian's workload.

System Testing

At the system testing stage, system testing was carried out with the librarian and head of school as users to test the feasibility of the system being run. Test cases document was given to users and the users write the test result to check whether the results meet the normal condition or not. Also, feedback forms were given to users so that they could write their response and their suggestion to library service system.

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Search

Dashboard

Data Master

- Data Buku
- Data Kelas
- Data User
- Data Pegawai
- Data Penerbit

Data Transaksi

Data Peminjaman

Buat Peminjaman Cetak Data Peminjaman

Show 10 entries Search:

#	Id Peminjaman	Tanggal Pinjam	Tanggal Kembali	Peminjam	Petugas	Jumlah Buku	
1	PJM00001	2021-04-07	2021-03-29	habibi	habibi	1	Detail Peminjaman Edit Delete
2	PJM00002	2021-03-30	2021-04-05	habibi	habibi	1	Detail Peminjaman Edit Delete
3	PJM00003	2021-04-06	2021-04-09	habibi	habibi	2	Detail Peminjaman Edit Delete

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Search

Dashboard

Data Master

- Data Buku
- Data Kelas
- Data User
- Data Pegawai
- Data Penerbit

Data Transaksi

Data Pengembalian

Buat pengembalian Cetak Data Pengembalian

Show 10 entries Search:

Id Pengembalian	Id Peminjaman	Tanggal Pengembalian	Petugas	
KMBL00001	PJM00002	2021-01-06	habibi	Detail Pengembalian Edit Delete
KMBL00002	PJM00003	2021-01-07	Suhartini Wati	Detail Pengembalian Edit Delete
KMBL00004	PJM00004	2021-04-27	habibi	Detail Pengembalian Edit Delete
KMBL00005	PJM00004	2021-04-27	habibi	Detail Pengembalian

Figure 5 Lending Service

CONCLUSION

Based on the development and application testing results that have been found through the entire research process, the following conclusion can be drawn: (1) the system could record all the users' and books' data in a database so that the availability of each book is easily to be found; (2) the system could generate automatic barcode for each book so that the librarian does not need to write it manually when processing books; (3) the system records all the activities of lending service so that the system could notice if there are books that have not been returned by the users; (4) the reports automatically send to head of school monthly/annually. The software testing results shows that the system runs well as expected and the interfaces of the system are user friendly. The additional suggestion from the user is the integration of the system and instant messenger on each

student will complete the features so the notification of new books or books return due date will be sent via instant messenger.

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