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Elementary School Library Automation System Implementation

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Abstract: *A library is essential in education, especially in elementary schools. SD Negeri Rambutan 03 Pagi Jakarta is a public school in East Jakarta with a library. The school library was managed manually, where books with detailed information were stored on a spreadsheet. Some library processes could not perform well, such as tracing how many books were on loan. Based on this situation, a library management system was required to support library activities. Sampoerna University had several collaborations with SD Negeri Rambutan 03 Pagi Jakarta for community services, a workshop, and an internship. In this community service opportunity, We used a qualitative method with internal discussions and literature reviews. We provided a dedicated server machine to be placed on-premise. This machine will be a library automation system over the school's Local Area Network (LAN). Senayan Library Management System (SLiMS) was chosen to be installed on the server because it has the required features to support the school library. One of the essential things is that SLiMS is free and open source. The library automation system has been successfully implemented, and there will be future community service activities to continue the library system development.*

Introduction

A library plays an essential role in education, especially in elementary schools. Textbooks, ebooks, magazines, and other collections in a library require to be recorded for administrative purposes, and these items need to be reported to the school principal for valuation. Library visitors must be registered to show pupils' interest in the library in statistical

analysis. A library automation system can support many library activities, from analog to digital, from manual to automated, to make library operations more effortless, with many advantages that can be earned.

SD Negeri Rambutan 03 Pagi Jakarta is a public school in East Jakarta with a library, and the library name is Perpustakaan Insan Cendikia. Sampoerna University had several collaborations with SD Negeri Rambutan 03 Pagi Jakarta for community services (Matahari, et al., 2021), a workshop, and an internship. One of the Computer Science - Sampoerna University students' activities was to input the books' data into a library automation system. This book's data input was stopped because of the Covid-19 Pandemic years back.

The school library was managed manually, where books with detailed information were stored on a spreadsheet. This condition was sufficient for recording book information, but some library processes, such as tracing how many books were on loan, could not perform well. Based on this situation, a library management system was required to support library activities.

In this community service opportunity, we provided a dedicated server machine to be placed on-premises. This machine will be a library automation system over the school's LAN. There are considerations for distributing the service locally, and broadening the network scale will be planned for future development. Not only a server machine but library system pieces of equipment are also provided to support the system implementation.

Implementing a library management system requires analysis (Rahmawati & Bachtiar, 2018). Senayan Library Management System (SLiMS) was chosen to be installed on the server because it has the required features to support the school library (Senayan Library Management System, 2021). One of the essential things is that SLiMS is free and open source. SLiMS is also a web-based (Ula & Hasbi, 2021) library system with a barcode feature, a similar concept to Noor et al. (2020) but a different application. This library management system has also been implemented at the high school level (Hasan Syaiful Rizal et al., 2022; Purnomo & Arifin, 2021). SLiMS also have opportunities to develop plug-ins (Abdurrahman & Prabowo, 2021); this means SLiMS is huge and appropriate to be implemented at the elementary school level.

Method

This community service program in SD Negeri Rambutan 03 Pagi Jakarta used a qualitative method with internal discussions and literature reviews for January-June 2022. To see the entire activities, following Figure 1 shows the community service activities plan:

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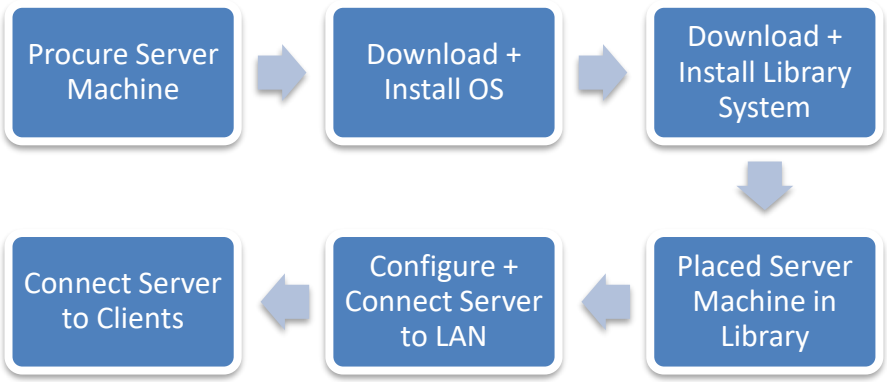

Figure 1. Community Service Activities Plan

The activity started with procuring an HP machine from the campus auction for a desktop PC (CPU only) with good specifications. This machine then became a desktop server to be placed in the school library. An Ubuntu operating system was then downloaded and installed on the server machine. Ubuntu 20.04 LTS (Download Desktop | Download) was chosen as an appropriate operating system with its performance, stability, and security. Ubuntu operating systems also listed names of desktops that are certified (Certified Hardware).

The next activity was downloading and installing a library automation system with some required software (database, web service, et cetera). Restoring the database from previous work was part of this activity. More information about this activity is explained separately by the Information System study program.

This server was then placed in the library room in the school with a monitor, keyboard, mouse, and network. The server machine was put in the library room for a future assessment of the library with a proper library system installed with its machine. A wired UTP cable has been pulled from the nearby switch for this machine. The existing network used an active DHCP for a more straightforward configuration. However, static with IPv4 C class address is manually configured in the empty range that the server can use to avoid IP conflict.

After this server has been connected to the Local Area Network, this server machine is also accessible from client desktops and laptops. The wired-Wireless network implementation concept is shown in Figure 2 below:

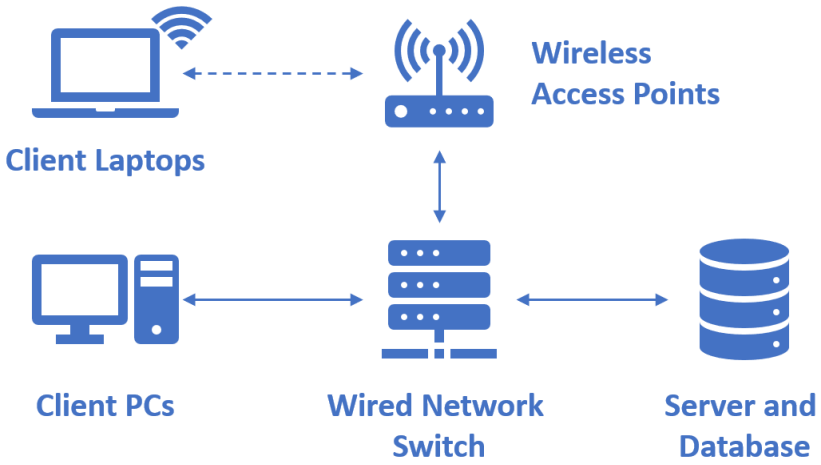

Figure 2. Network Implementation Concept

A server with its database and the required service is placed in the library. A wired UTP cable is connected to an available port in the nearby switch device. There are switches installed in the school, and some extend the network coverage with wireless technology. In the concept, only 1 SSID name was used in the school with one password only to be used by the management, teachers, and staff in the school environment.

Result

The library automation system has been installed and implemented into the server machine with adequate performance. Books data from the previous internship works have been imported and recovered very well. User databases need to be built with the concept from the last internship activity, which has already been discussed.

The system was first tested locally by accessing localhost from the Internet Browser to a specific folder defined during the Apache service activation. Shown in Figure 3 is how SLiMS version 9 can be accessed from the Ubuntu – Firefox Web Browser:

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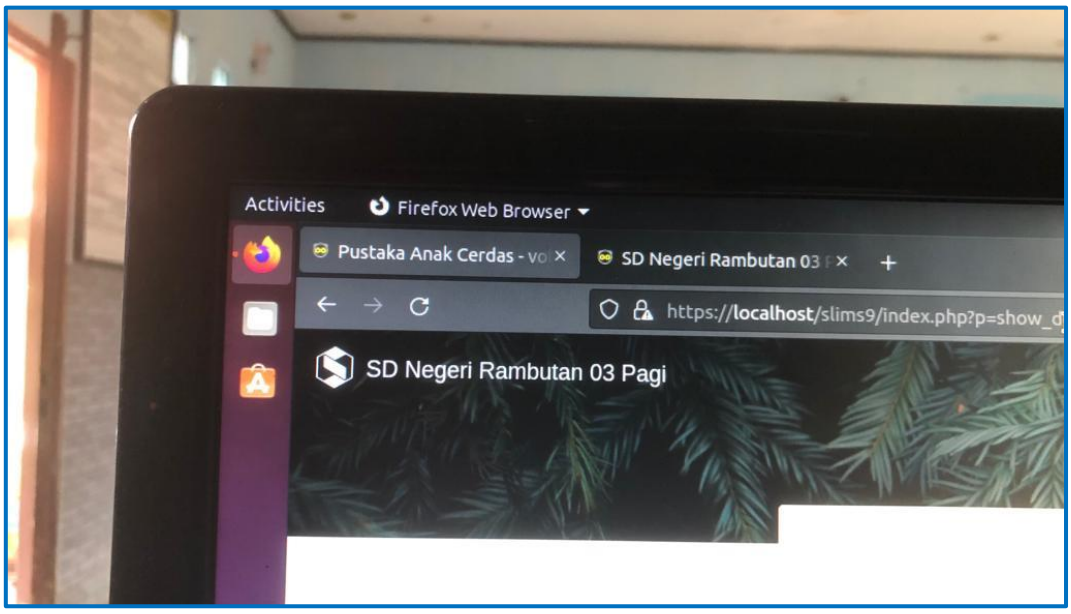

Figure 3. Accessing Library Automation System from the Server

Client-Server simulation also has been tested via wireless, and the library system shows no problems from the software point of view. For simulation purposes, the client machine (a laptop) used a Chrome browser and accessed the library server with the provided IP address. Soon the library server machine will not be placed in the library, but the system will be accessible from anywhere in the school as long as connected via wired-wireless LAN.

Discussion

This library automation system was implemented in July 2022 in the school library with the momentum to support the school library assessment by the government in the early school activities at the beginning of the academic year 2022/2023. Community service activity status shown on the following Table 1:

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Tabel. 1 Community Service Activities

#	Activity	Status
1	Procure Server Machine	Achieved
2	Download and Install OS	Achieved
3	Download and Install Library System	Achieved
4	Placed Server Machine in Library	Achieved
5	Configure and Connect Server to Local Area Network	Achieved
6	Connect Server to Clients	Achieved

(Source: Author)

As shown in Table 1, all activities 6 out of 6 (100%) were accomplished. The most time-consuming parts of the activities were the library system installation and connecting the server to the Local Area Network. The library automation system installed on top of the Ubuntu 20.04 operating system was the first experience for the students. Attaching the library system with a laser printer and barcode scanner would be a good idea to be implemented. Also, generating a library user database with teachers, staff, and students would be a concise agenda that need to be planned.

Connecting the library server to the LAN requires future community service activities to generate a wired-wireless computer network blueprint for the school. Redesigning the computer network to an appropriate scale will optimize the library server and other network devices to make it more accessible to internal users.

Conclusion

The Library automation system has been successfully implemented to support the school. The Library automation system is now accessible from server-localhost and the client-side. Lecturer-Student collaboration is an effective and efficient way to implement this in a limited time with intensive communication via Microsoft Teams. This library implementation phase has not yet required lots of human resources. However, more library activities, such as training (Wandy, et al., 2021), require more human and technology resources in the next phase. Making the wired-wireless LAN more appropriate will be the future work on the plan.

Acknowledgment

These Community Service activities were a collaboration between the Computer Science and Information System study program – Faculty of Engineering and Technology. This community service was also a collaboration between Computer Science Lecturers and Computer Science Students. SD Negeri Rambutan 03 Pagi fully supported this library automation system implementation.

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