

GUESTBOOK SYSTEM FOR LABORATORY SECRETARIAT DURING COVID-19 PANDEMIC

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ABSTRACT

“Go Green Campus” is a university program that requires all elements on campus to minimize the use and waste of paper and plastic. This encourages the transition from paper data collection to digitizing data storage to computer media. The Guest Book web application for Secretariat Lab of Faculty of Computer Science (FIK) Universitas Pembangunan Nasional Veterans Jakarta (UPNVJ) is a website-based software to facilitate the process of collecting visitor’s data who visit the FIK lab secretariat room. This application can replace the previous conventional guestbook to digital. The application built using the Design Research Methodology and using the PHP programming language with the Laravel framework and MySQL database running on a local server. The Guestbook Web-based system for the Secretariat of the Laboratory of the FIK, UPNVJ can gather student’s data who visit the FIK lab secretariat, and the information can be downloaded in pdf and excel form. This web application also provides features such as covid-19 self-screening survey, news information, critics and suggestions, and the activity log list. From all aspects of both visual communication aspects, software engineering aspects, and usability aspects, this Guest Book System is said to be very feasible to use. The system that has been developed has also passed the security aspect test, reliability aspect test, portability aspect test, usage aspect test and is able to carry out the designed process.

Keywords: *guest book system, web, pandemic, covid-19, laravel.*

I. INTRODUCTION

The rapid development of technology certainly has an influence on various aspects of existing life. One aspect that is affected by technological developments is the academic field. The application of technology in the academic field is related, one of which is by storing data from what was originally conventional or recorded on paper to a more modern direction, namely by using a computer as a digital storage medium.

The Faculty of Computer Science (FIK) of the Universitas Pembangunan Nasional Veterans Jakarta (UPNVJ) has a FIK lab secretariat room facility which is in the Ki Hajar Dewantara building. The FIK lab secretariat room has the function and purpose to provide facility services to students in the form of computers that can be used, as well as rooms for group discussions. The difference between the secretariat of the lab and the usual lab room is in the permission to use the computer. In the secretariat room of the FIK lab, all students can borrow computers without a permit, while in ordinary laboratories, students need to have a usage permit to be able to use the relevant laboratory. Because all students can use computers without a permit, the FIK lab secretariat room requires prospective computer users to fill in personal data before they can use the existing computer.

Filling in the personal data used is still conventional, namely by using paper, which contradicts the university program, namely "Go Green Campus" which requires all elements on campus to reduce the use and waste of paper and plastic. Therefore, the use of paper as a place to fill in personal data needs to be changed by applying the digitization of data storage to computer media. Storage of information data in a database in a computer will overcome the problem of paper usage and provide convenience for searching data if needed in the future.

The guest book is a tool to record and find out the number of guests who come to a place. Guest book logging basically records visitors who come to a place [1]. In Web-based applications, the guestbook is a logging system that allows visitors to a site to leave public comments as feedback from visitors [2].

The Electronic Guest Book Application at the STIKOM Dinamika Bangsa Library was developed to make it easier for library guests to fill in visitation data in the guest book, due to long queues so guests tend to be lazy to fill in the guest book. This study resulted in an electronic guest book application that uses barcode technology for the STIKOM Dinamika Bangsa Jambi library which makes it easier and faster to record visitor attendance at the library and is equipped with statistical information on visitor attendance. Criticisms and suggestions are used by visitors to convey related to the quality of services and infrastructure as well as proposals for procurement of

reading materials [1].

The Web-Based System Design at the PTI UNIMUDA Sorong Study Program was developed to simplify and strengthen the security of student attendance data archives at UNIMUDA that still use paper or manuals. Several stages were carried out by researchers to create a web-based attendance system, among others, data collection, planning, development of the initial form of the product, field testing and product revision, and the last is implementation. The results of the assessment resulting from product testing get a good score, with an average of 87.31, so it can be concluded that this web-based attendance system is feasible to use [3].

Petrokimia Gresik Guest Book Information System Using Web-Based or Code is used to receive guests who will visit Petrokimia, without making physical contact with visiting guests so that Petrokimia employees are safer in receiving guests. This system is made using the waterfall method and is made using the PHP programming language with MySQL as the database system. The results of the user acceptance test show that all system features work well and are accepted by users [4].

The information system for members and library books using RFID aims to make it easier to borrow and return library books. In this system, RFID is used as an identifier on a library membership card and an identifier on library books. RFID facilitates the data input process. SMS Gateway is also used as information on the due date for borrowing books, which aims to provide more efficient service facilities. The test results of the system design using RFID make it easier to fill in guest books and carry out book lending transactions without having to write manually so that this can be used to replace the old system [5].

Research by Muhammad Sazili Alfian, and Dinny Komalasari discusses designing an application that functions to help process and generate guest data reports more quickly and efficiently by using the Sharp C programming language and PhpMyAdmin as a place to store guest data. The results of the study are in the form of a guest book application to simplify and minimize the risk of errors in guest data processing [6].

Research by Budi Yanto, and Abdi Setia Putra discusses the front-end Guest Book information system at the Central Statistics Agency which aims to assist in recording visitor data, by providing an Android-based mobile device that is in the service section, then visitors simply fill in their personal data according to with guidance and face recording by using the front camera on the device and the data is stored in a database. The system helps the service department to direct visitors based on the data entered. The Head of the Central Statistics Agency can see the progress of visitors and their destinations on a regular basis based on reports that can be viewed and printed [2].

The process of storing guest book data for the FIK lab secretariat visitors requires visitor data such as name, NIM, reason for visiting and planned length of visit. To implement this in computer media, the author designed a website-based system using the PHP programming language with the Laravel framework, as well as data storage media in the form of a MySQL database. The system designed will have two target users, namely visitors and admins. Students who make visits will be designated as visitors, and users who have access to data and information will be designated as admins. This system is only used for the FIK lab secretariat room as a data storage medium for student visits who come to the lab secretariat room. In addition, the digital system is expected to be able to help independently check the condition of guests during the COVID-19 pandemic as it is now before using the FIK lab secretariat room services.

II. METHOD

The research method that will be used in this research is Design Research Methodology by Blessing & Chakrabarti [7] which is adapted to the research objective, namely to design a Guest Book Web Application for the Laboratory Secretariat of the Faculty of Computer Science UPNVJ.

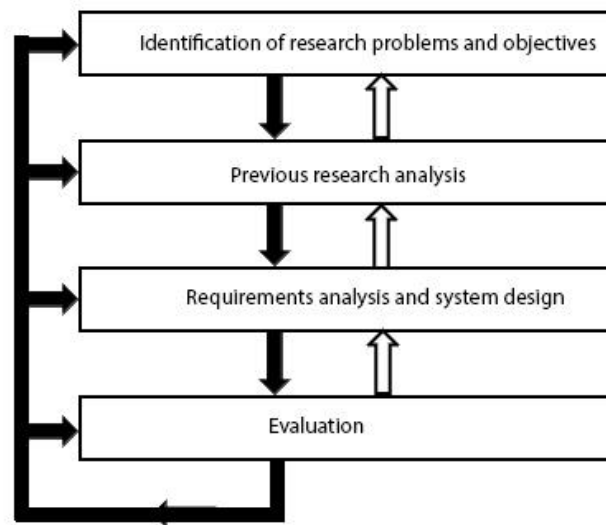


Fig. 1. Research Methods [7]

The research method that will be used in this research is Design Research Methodology by Blessing & Chakrabarti [7] which is adapted to the research objective, namely to design a Guest Book Web Application for the Laboratory Secretariat of the Faculty of Computer Science UPNVJ.

The stages in this research are depicted in Figure 1. and can be repeated repeatedly according to changes that occur in the research process. The identification stage aims to collect facts and problems that can be raised as problems in the research. This stage goes through the literacy study process to find evidence and references that support the problems to be researched and ensure that the research to be carried out is useful and possible to do.

Subsequently, a literature study was conducted which focused on studies related to knowledge of Web-based Application Development, and the Guest Book of the Laboratory Secretariat of the Faculty of Computer Science UPNVJ which enabled the achievement of research objectives.

Furthermore, a needs analysis is carried out to produce the design to be achieved in the research objectives using the outputs in the previous stage. The results of this stage are used to answer the problems raised in the first stage. The design of this system includes Unified Modeling Language (UML), database, and display (user interface). After the design is done, the next stage is the implementation or creation of program code, from the design that has been made previously applied to the form of a programming language (coding).

In the development of this Guestbook, the code is implemented into the PHP programming language based on the Laravel framework and the MySQL database. Sublime Text 3, XAMPP, and the google chrome web browser are software used to help. At this stage, it is hoped that all functions will run according to plan and refer to the designs that have been made previously. The expected results of the research are the Guest Book Web Application of the Laboratory Secretariat of the Faculty of Computer Science UPNVJ.

The system design that has been developed will be tested to see its suitability with the research objectives in answering the problems raised. Application testing is done through 5 testing steps, namely security aspect test, reliability aspect test, efficiency aspect test, portability aspect test, usability aspect test. After being said to be feasible, it is continued with a trial of use on lab staff and students as end users. End user opinions and suggestions can be used as a benchmark for continued product improvement.

Dissemination of questionnaires using a Likert scale, sourced from users (lab staff and students) is the data collection technique used in this study. Quantitative descriptive statistical analysis technique is an analytical technique used in this study, by describing the implementation of the system in the finished product and conducting feasibility level testing and product trials.

The scoring system captures respondents' responses to the options strongly agree (SS), agree (S), disagree (KS), disagree (TS) with the highest to lowest score weights, namely: 4, 3, 2, 1. The data obtained is then calculated the average answer is based on the answers obtained by respondents with the formula.

$$\bar{x} = \frac{\sum x}{n} \quad (1)$$

Information:

\bar{x} = Average score of respondents

x = Total score

n = Number of respondents

If the average result is obtained, then continue to interpret the results of the instrument measurements that have been filled in. The category of measurement results uses a Likert scale based on Table 1 which is the average category score used to interpret the feasibility of the product [8].

TABLE I
CONVERSION OF QUANTITATIVE TO QUALITATIVE DATA [9]

No	Score result	Eligibility category
1	$x \geq \bar{x} + 1 \cdot SBx$	Very acceptable
2	$\bar{x} + SBx > x \geq \bar{x}$	Acceptable
3	$\bar{x} > x \geq \bar{x} - 1 \cdot SBx$	Not feasible
4	$x < \bar{x} - 1 \cdot SBx$	Very unfeasible

III. RESULTS AND DISCUSSION

The analysis phase was carried out after conducting observations, distributing questionnaires and interviews to several lab officers and students at the Faculty of Computer Science UPNVJ. Researchers conducted observations, distributed questionnaires, and interviews to obtain data on needs analysis, as well as identify factors that cause problems in the field.

The results of the needs analysis were obtained through observation, interviews and distributing questionnaires about needs analysis regarding the need for a Guest Book Information System at the website-based Secretariat of the Computer Science Faculty UPNVJ Lab. Based on the results of observations in the Faculty of Computer Science UPNVJ, there were several problems identified, namely the guest book in the secretariat room of the UPNVJ FIK lab which has been running until now, which is still using the conventional system by recording using paper. Visitors from the secretariat room of the FIK UPNVJ lab are the main target users of the guest book who will use the guest book by filling in data such as name, NIM, reason for visiting and planned length of visit. The website application designed in this practical work was created to overcome the problem of using conventional paper where it is wasteful to use paper which is not in line with the goals of the university program to implement the "Go Green Campus" to reduce paper use and waste, to save physical storage space and to facilitate storage. and search for guest book information for visitors to the secretariat room of the UPNVJ FIK lab.

This website application has two types of users, namely visitors to the FIK UPNVJ lab secretariat room, namely students as the main target users and administrators of the application and database. Then the admin is divided into two, namely superadmin and admin. Superadmin has more advantages in access rights than some menu features where none can be accessed by admin. Then the superadmin can also access the menu feature to display a list of activity logs carried out by all users and can also add new users. The admin has the right to use the basic features according to the function of this web application, namely, to display the contents of the data inputted by visitors and to download visitor table information.

Then for visitors, namely students, they do not require a user to login. To make it easier for students not to need to remember accounts anymore and so that the data entry process does not need to take a longer time to login and logout. So, the web application is designed so that students only need to fill in their personal data and then they can take turns with other queues. By facilitating and speeding up the filling process, students who visit the secretariat room of the UPNVJ FIK lab are expected not to feel burdened by time to fill in data when making visits. From the description above, it can be concluded that there are three types of users of this web application who can perform activities based on their respective functions, namely superadmin, admin, and visitors or students. The needs of each user role in the application are identified in table 2 below:

TABLE II
SYSTEM REQUIREMENTS

No	Action	Super-Admin	Admin	Visitors/guests
1	Survey COVID-19 Self Screening	-	-	V

No	Action	Super-Admin	Admin	Visitors/guests
2	guest book data input and suggestions critics	-	-	V
3	View the Guestbook data view and Suggestion critics	V	V	-
4	Input, edit and delete news	V	V	-
5	View news content	V	V	V
6	Downloading Guestbook data	V	V	-
7	Viewing the Activity Log List	V	-	-
8	Add User admin	V	-	-

Based on the results of the identification of problems and needs, the researchers continued to design the system to be developed. The design stage provides a product description model that will be made from the analysis of problems and needs. At the design stage, the processes carried out include the design of use case diagrams and database design. The use case diagram of the UPNVJ FIK secretariat lab secretariat guest book system is shown in Figure 2.

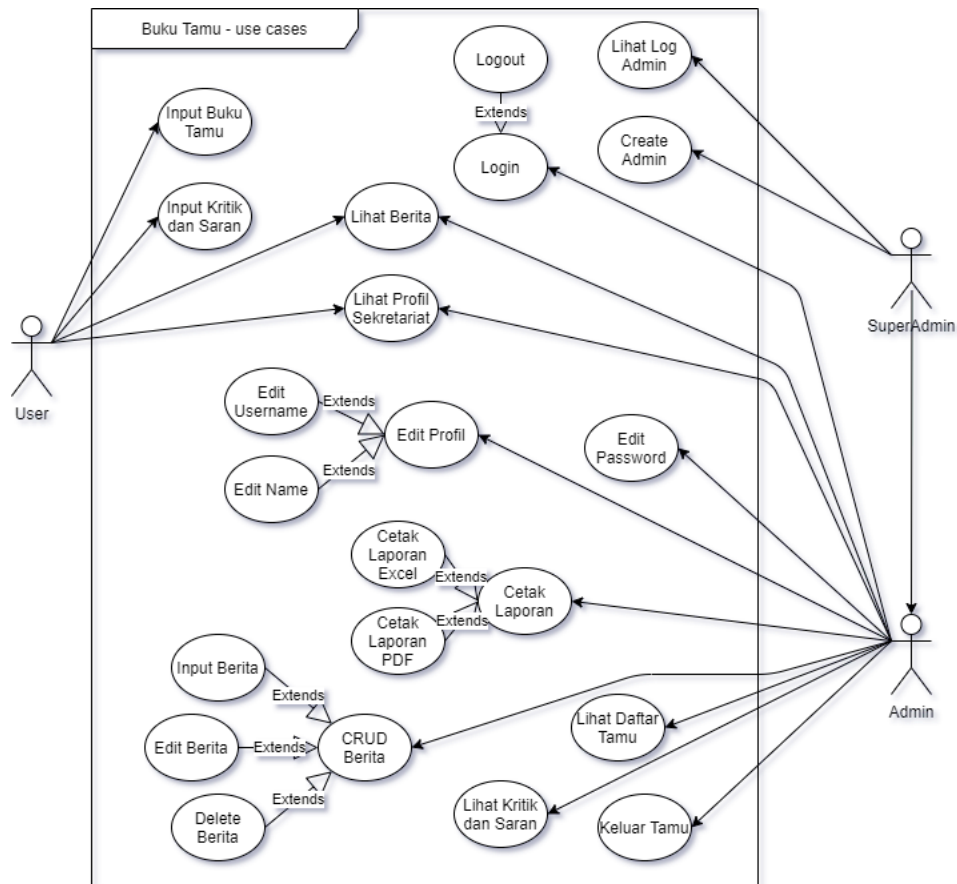


Fig. 2. Use case of UPNVJ FIK Lab Secretariat Guest Book System

For the database design, it can be seen in Figure 3. In the database design, interrelated tables are created. In general, the tables created are tables to manage user data, news, critics suggestions, access rights and questionnaire data.

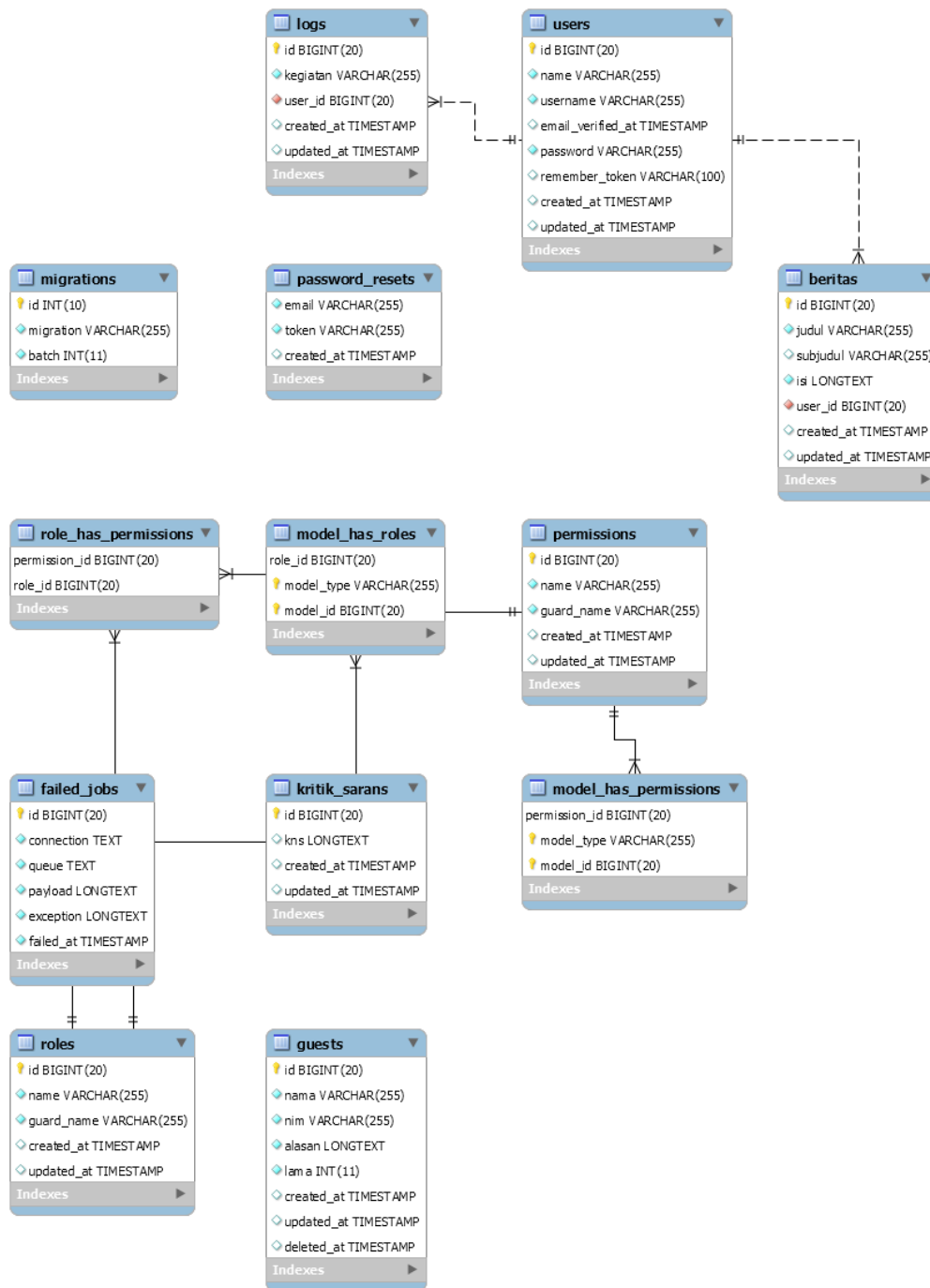


Fig. 3. Design of Guestbook System Database for Lab Secretariat FIK UPNVJ

Furthermore, implementation is carried out where at this stage it is necessary to ensure compliance with system requirements from the results of the previous design stages as a benchmark. In Figure 4 you can see the COVID-19 Self Screening Survey Page. This page will be displayed when a visitor uses the guestbook website. Visitors are asked to fill out a questionnaire to determine whether visitors are allowed to enter or not. Contains the answer yes or no. If a visitor shows signs of a COVID-19 carrier, the visitor cannot fill out the guest book and may not use the room.

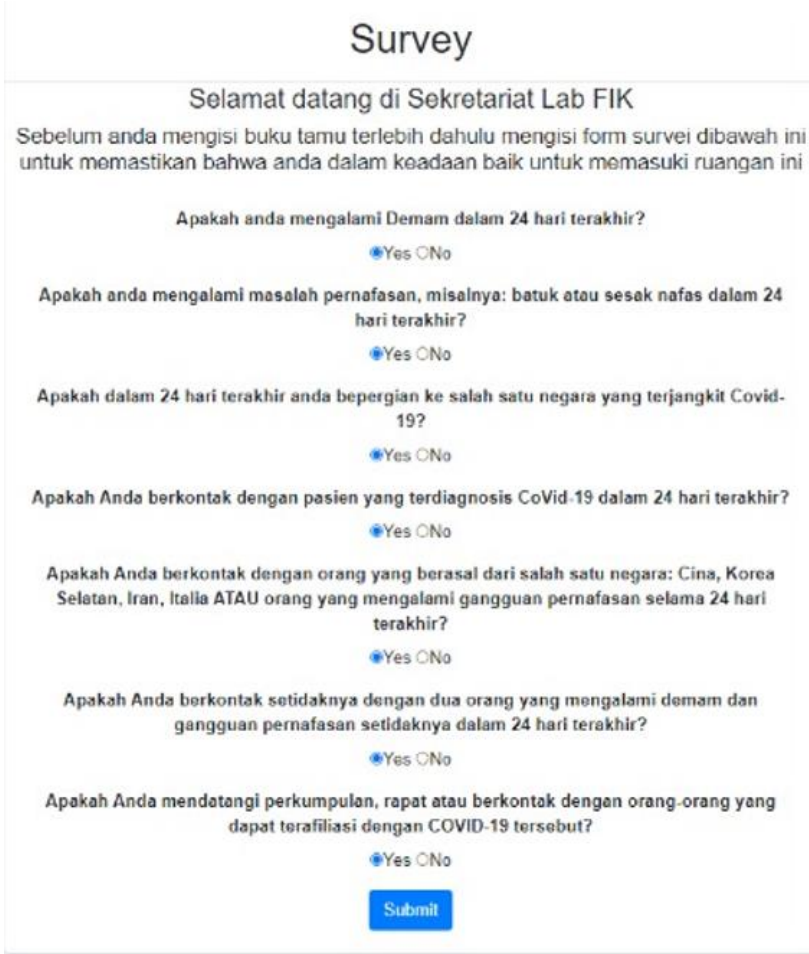


Fig. 4. COVID-19 Self Screening Survey Page

As in Figure 5, the main page is the first page displayed on the website which contains all the information that can be linked to others such as a list of features that can be used by visitors/students, a login button for admin. Visitors do not need a login to be able to use and access features on the visitor's main page and login as admin can only be used by admin and superadmin who have accounts.




Fig. 5. Main page

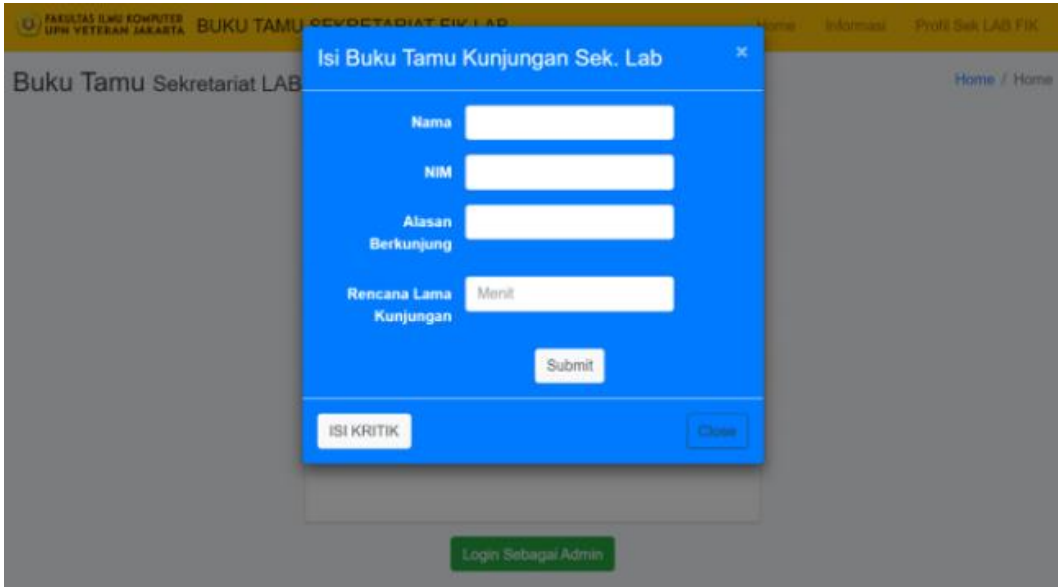


Fig. 6. Guestbook Filling

When pressing the Guestbook Fill button, a pop-up modal will appear with a personal data form to be inputted so that it is recorded as shown in Figure 6. In addition to submitting guestbook data input, visitors/students can also press the button for direct criticism and suggestions which can be viewed in Figure 7.



Fig. 7. Critics and Suggestion Filling Page

Furthermore, visitors can see news information about the secretariat of the FIK lab written by the admin. Visitors/students can see a list of news information such as titles, subtitles, content highlights, the author, namely the admin user, the time of publication and the link that will lead to displaying the complete news content on a new page as shown in Figure 8.

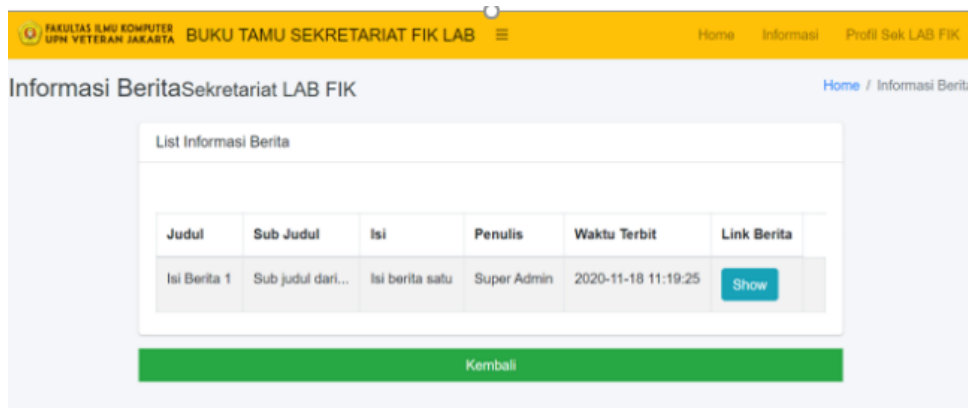


Fig. 8. Latest Information Page

Next is the page that can be accessed by admins and superadmin. As in Figure 9 there is the main admin page. This page will display overall information on the admin's access rights system starting from viewing the guest list, CRUD features (Create, Read, Update, and Delete) news information, criticism and suggestions, admin user profile, manage admin account, change password, print reports, admin log lists and there is also information on visitor data for one week in graphical form. In addition, there is a navigation bar that can be pressed to bring up the side bar and also a button to logout. Especially for the admin log feature, it can only be accessed by the superadmin.

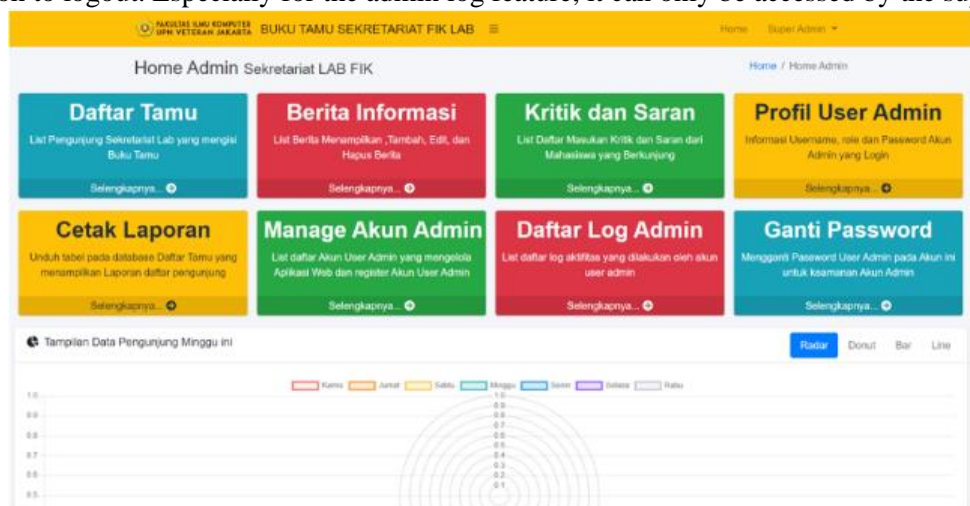


Fig. 9. Admin Main Page

Furthermore, system testing is carried out to evaluate the success of a product being developed. The testing phase includes testing the security aspect, testing the reliability aspect, testing the efficiency aspect, testing the portability aspect, testing the usability aspect.

Testing the security aspects using software called Acunetix Vulnerability Web Scanner. The result is a total alert level 1 (low), from these results in accordance with the research of Maharani et al. [10] it can be concluded that the guest book system can be said to function properly and is safe from vulnerabilities or errors. The test results are presented in Figure 10.



Fig. 10. Security Test Results

Furthermore, testing the reliability aspect using the WAPT Pro software with the number of users 25 people for 30 minutes. The results can be seen in table 3.

TABLE III
 RELIABILITY TEST RESULT

Profile	Guestbook Web System
Successful sessions	26
Failed sessions	0
Successful Pages	50
Failed pages	0
Successful hits	1774
Failed hits	0

From the results of table 3, the success rate of successful sessions, successful pages and successful hits if added up is 1850. While the failure rate for sessions, pages, and hits if added up is 0. Furthermore, reliability can be calculated using the reliability value calculation formula adopted from the model Nelson [11].

$$R = 1 - \frac{n-f}{n} = 1 - \frac{f}{n} = 1 - r \quad (2)$$

Information:

R = Reliability

f = Total failure

n = Total test case (workload unit)

r = Error rate

The results of the calculation with the formula above, it is obtained 100% which can be interpreted as having reached the standard recorded on the Telcordia standard. From the description above, it can be concluded that the Guest Book System passed the test in reliability testing using the WAPT Pro software based on the guidelines [12], [13], where the reliability test value of 95% or more of all test cases planned for the system test met the success standard. reliability testing is in accordance with Telecordia standards, which means the website meets Telecordia standards or in other words passes the reliability test. Then the efficiency test is carried out using the help of the GTmetrix tool to check the speed of the website. The results obtained are shown in Table 4.

TABLE IV
RESULTS OF TESTING ASPECTS OF EFFICIENCY WITH GTMATRIX

No	Web Page	Page Load (Second)	Page Size (Mb)	Page Speed Grade	Yslow Grade
1	COVID-19 Self Screening Survey Page	3.1	11.4	F(0%)	C(72%)
2	Visitor Main Page	3.2	11.4	F(0%)	C(72%)
3	Admin and Superadmin Homepage	3.2	11.4	F(0%)	C(72%)
4	Guestbook Filling	3.5	11.4	F(0%)	C(72%)
5	Filling Critics and Suggestions	3.4	11.4	F(0%)	C(72%)
6	News Feed / Information	3.5	11.4	F(0%)	C(72%)
Average		3.31	11.4	F(0%)	C(72%)

Based on table 4, the average grade from YSlow, obtained a value or number of 72% which occupies grade C or Lower based on the percentage formula and interpretation that has been set by the Yahoo Developer Network. While testing using the Page Speed application from Google, the results were 0% and the average response time was 3.31s. Based on the interpretation of the response time of 3.31s, it does not meet the website access speed standards. The results of the efficiency test above are in accordance with the results of research by tika [12] and it can be concluded that the guest book system has not met the efficiency aspect.

Furthermore, testing the portability aspect to evaluate the portable level of a website. Cross browsing compatibility testing with the help of the site <https://www.browserling.com/> is used to test the portability aspect. Researchers tested the Guest Book System with different web browsers. The results can be seen in table 5.

TABLE V
PORTABILITY ASPECT TEST DATA

Browser Category	Browser Name	Version	OS	Note	Criteria
Desktop Browser	Google Chrome	91	Win10 Pro	Not Error	passed
	Mozilla Firefox	84	64	Not Error	passed
	Microsoft Edge	91		Not Error	passed
	Safari	61		Not Error	passed
	Opera	72		Not Error	passed
Mobile Browser	Google Chrome	86	Android	Not Error	passed
	Default Browser	12.10	8.1.0	Not Error	passed

Based on the portability aspect test, it is known that the guest book system software (website) can run on various desktop or mobile web browsers. By looking at previous research conducted by Ahmad Faiq [14], this condition informs that the website meets the portability aspect or has good portability.

TABLE VI
TESTING DATA ASPECTS OF USE (USABILITY)

No	Respondent	Total	Category
1	Lab Officer 1	84	Very acceptable
2	Lab Officer 2	81	Very acceptable
3	Lab Officer 3	89	Very acceptable
4	Lab Officer 4	94	Very acceptable
5	Lab Officer 5	100	Very acceptable
6	Lab Officer 6	91	Very acceptable
Average		89.8	Very acceptable

Table 6 is a user assessment of lab staff. The average result of the assessment of the six lab staff users obtained a value of 89.8 which is in the interval $x \geq 75$ which means that it is in the 1st category, namely "Very Eligible". This Guest Book system from all aspects of both visual communication aspects, software engineering aspects, and usability aspects, the product is said to be very feasible to use. This is in line with previous research conducted by Hamka et al.[15] which has a feasibility value of 79% which means it is very feasible to use.

TABLE VII
STUDENT USER TEST

Total Scores	Average score	Category
4360	76.4	Very acceptable

The average result of the assessment of 57 student users resulted in a score of 76.4 which was in the interval x 75 which means it was in the 1st category, namely "Very Eligible". From all aspects of both visual communication aspects, software engineering aspects, and usability aspects, this Guest Book System is said to be very feasible to use. This is in line with previous research conducted by Hamka et al. [15] with 84% feasibility value which means it is very feasible to use. Units

IV. CONCLUSION

The Web-based system of the Guest Book of the Laboratory Secretariat of the Faculty of Computer Science, UPNVJ has been successfully built and is able to carry out the processes that have been designed. The system that has been developed has passed 4 tests out of 5 test steps to see its suitability in answering the problems raised. The tests carried out are the security aspect test, the reliability aspect test, the efficiency aspect test, the portability aspect test, and the usability aspect test. The results of testing the security aspects obtained total alert level 1 (low), it can be concluded that the guest book system can be said to function properly and is safe from vulnerabilities or errors.

The Guestbook System passed the reliability test where the reliability test value was more than 95% of all planned test cases, the system met the reliability test success standard according to the Telecordia standard. The results of the efficiency test above can be concluded that the guest book system has efficiency that is not good enough or does not meet the efficiency aspect. From testing of the portability aspect, it can be concluded that the guest book system software (website) can run on various desktop or mobile web browsers. The results of the user assessment of this Guestbook System, both lab staff and students are in category 1, namely "Very Eligible" from all aspects of both visual communication aspects, software engineering aspects, and usability aspects. Suggestions can be done to develop features by completing the QRcode so that visitors simply complete the data on the reasons for visiting and the planned length of visit.

ACKNOWLEDGMENT

The research team would like to thank the Institute for Research and Community Service (LPPM) Universitas Pembangunan Nasional Veterans Jakarta (UPNVJ), Faculty of Computer Science UPNVJ, Informatics Engineering Study Program and UPNVJ Information Systems Study Program for providing funding support and assisting the implementation of this research. Conclusion

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