Development of Website BEM FEBTD Universitas Nahdlatul Ulama Surabaya

Ahmad Muthoharun[1], Rizqi Putri Nourma Budiarti[2*]

[1,2*]*Information Systems Department, Universitas Nahdlatul Ulama Surabaya, Indonesia*

Jl. Raya Jemursari No. 51-57, Surabaya, Indonesia

[1]ahmadmuthoharun043.if19@student.unusa.ac.id, [2*]rizqi.putri.nb@unusa.ac.id

Abstract

   Currently BEM FEBTD UNUSA does not yet have a web-based information system, and only relies on delivering information and documentation through social media, namely Instagram. The drawback is that the management cannot manage the schedule so that information on the progress of each work program is obtained. This causes limited information that can be known by the academic community about work programs from year to year. Therefore, media is needed that can manage the work program of BEM FEBTD UNUSA. The methodological stages used are problem identification, website needs analysis, website design, website creation, website testing, and website testing analysis. The results of this study are the formation of the BEM FEBTD UNUSA website, and the administrators can manage work program schedules well, provide activity information, organizational profiles, facilitate various news search purposes, important information announcements, and activity documentation galleries. Testing is done by Black Box Testing and Usability Testing. The success percentage of Black Box Testing with 117 Test Cases is 100%. Meanwhile, the test results from Usability Testing show that according to the admin and supervisor, they strongly agree if the website is easy to use, fast, memorable, no errors are found, and satisfied when used. Meanwhile, according to administrators and visitors, they agree that if the website is easy to use, fast, memorable, no errors are found, and satisfied when used.

I.   INTRODUCTION

   Information systems currently have a big role in tertiary institutions, including student organizations. The existence of an information system in an organization is not just a support system, but also a system that must exist and determines the success of the organization. Systems supported by Information Technology can provide more value to the organization if it is designed to be an effective and efficient information system [1].

[2*]Corresponding author

The Student Executive Body (BEM) is the highest organizational body in a university. The existence of a Student Executive Board (BEM) in a tertiary institution is very functional, both for the campus itself and for SMEs and the academic community of the tertiary institution [2]. The Student Executive Board of the Faculty of Economics, Business and Digital Technology, Universitas Nahdlatul Ulama Surabaya is a place for faculty students to gather and hold joint activities within the scope of the faculty and has an important role in developing and improving knowledge in the field of organization. However, until now the Student Executive Board of the Faculty of Business Economics and Digital Technology, Nahdlatul Ulama University, Surabaya does not yet have an information system, relying only on the delivery of information and documentation through social media, namely Instagram. Some of the drawbacks are that the board cannot manage the schedule and progress of each work program and the limited information that can be known by the academic community about work programs from year to year. Utilization of social media in the management of student activities is still not so effective, because this social media cannot display more detailed details related to work programs to the results of activities in the field. This is what makes information cannot be conveyed in its entirety regarding the programs and activities that have been carried out [3]. Therefore, media is needed to manage the work program.

There are various previous research studies which explain that some students who want to participate in BEM activities usually experience obstacles such as a lack of activity information [4]. Followed by an explanation [5] in his journal about the information system that was built, among other things, to provide relief for BEM administrators in processing work program/activity data and it is easy to work on activity reports carried out. With the existence of an information system, it is possible to increase management data processing, and work program data to become more effective and efficient. In addition, previous research by [6] said that with an information system students would find it easier to get information related to organizations to student activities.

Based on the description above, it is found that information systems are needed for every organization in managing work programs. However, several matters have not been resolved properly, such as the absence of information/status regarding the progress and scheduling of each work program to be implemented. So that it is not yet clear the process of each work program.

Based on the problems previously described, through this research a website will be created for BEM FEBTD Nahdlatul Ulama University Surabaya. It is hoped that through the establishment of this website, administrators can manage work program schedules well, provide information on activities, organizational profiles, facilitate various purposes of news search, announcement of important information, and galleries of documentation of activities that can be accessed anytime and anywhere.

II.   RELATED WORKS

In the following, the results of previous research are presented which come from various sources of literature studies and are related to the author's research. The first research to be used as literature was research entitled "Development of Website-Based Information Systems (Case Study: Student Executive Board FTK UNDIKSHA)" written by Putu Juniarta Eka Saputra in 2022. This research resulted in an information service system for the Student Executive Body of the Faculty of Engineering and Web-Based Vocational. This information system can make it easier for the academic community, especially FTK, to access information about work programs and get to know the Student Executive Board of the Undiksha Faculty of Engineering and Vocational. The linkage with the research conducted is the website providing information about the work program. The difference with the current research is that the research object is different, the website has features for managing work program schedules and is made using the PHP Laravel programming language framework [7].

The next research is research entitled "Website Design for STMIK Amikom Yogyakarta Student Executive Board" written by Nila Rohmika F. H. and Fitriyati in 2016. This research produces an information website to provide information to students using the PHP programming language and SQL database. This website was created with the aim of facilitating BEM in conveying information to students. In addition, with this website the delivery of information will be better. The linkage with the research

conducted is the website providing information to students. The difference with the current research is that the research object is different, the website has features for managing work program schedules and is made using the PHP Laravel programming language framework [8].

The next research is research entitled "Design and Build Information System Applications at the STMIK Pontianak Student Executive Board" written by Elian Danu and Ria Risti Astanti in 2018. This research produces a system that can handle problems such as providing information to students or parents of students about various student activities at STMIK Pontianak, and can also be used as a campus promotional medium so that it can be better known by the public through this information system. The connection with the research conducted is that the website can provide information on student activities. The difference with the current research is that the research object is different, the website has features for managing work program schedules and is made using the PHP Laravel programming language framework [9].

The next research is research with the title "Design and Build a Web-Based Padang State University Student Executive Body Information System" written by Irwan Rusda, Legiman Slamet, and Dedy Irfan in 2019. This research resulted in a Padang State University student executive body information system. It can be concluded that the use of the programming language PHP Framework CodeIgniter can be developed on the information system of the Padang State University Student Executive Board to help students easily obtain student information and make it easier for students who want to participate in activities held by BEM UNP. The connection with the research conducted is that the website can provide student information. The difference with the current research is that the research object is different, the website has features for managing work program schedules and is made using the PHP Laravel programming language framework [2].

The next research is research with the title "Creating a Web Profile of the Aisyiyah Pontianak Polytechnic Student Executive Board" written by Ridwansyah, Zulfikar Tri Anggara, Zahra Putri Ariska, Fiolan Rangga Saputa, Aulia Wulandari, and Nada Kharisma in 2022. This research produces a profile website Student Executive Body organization. it is hoped that this website will become a medium for conveying information to students under the auspices of BEM. The connection with the research conducted is that the website is made like an organizational profile website. The difference with the current research is that the research object is different, the website has features for managing work program schedules and is made using the PHP programming language framework Laravel [10].

Subsequent research is research entitled "Web-Based Information System of D-3 Student Association of Informatics Engineering, University of North Sumatra Using PHP and MySQL" written by Linggom Martinus Purba in 2016. This research produces a D-3 Informatics Engineering Student Association Website which functions as online information facility that can be accessed by any party. In addition, the website will provide information related to student activity information. The connection with the research conducted is that the website can provide information related to information on student activities. The difference with the current research is that the research object is different, the website has features for managing work program schedules and is made using the PHP Laravel programming language framework [11].

The next research is research entitled "Design of the Rokan Hulu Student Association Organizational Management Information System" written by Muhammad Hafizh Annur and Vera Irma Delianti in 2020. This research produces an information system for the Rokan Hulu Student Association that helps manage the organization administratively and provides information as well as media to deliver accountability reports of organizational management. The scope of this information system is to manage member data collection, provide information on activity agendas, scholarship information and management accountability reports as well as being a forum for online discussion for each member. The design and manufacture of this information system uses the Yii2 Framework with the PHP programming language and MySQL database. The connection with the research conducted is that the website can provide information on activity agendas, scholarship information and accountability reports. The difference with the current research is that the research objects are different, the methods used are different, the website has features for managing work program schedules and is made using the PHP programming language framework Laravel [12].

The next research is research with the title "Web-Based Design of Information Systems for the Faculty of Engineering and Informatics, University of PGRI Semarang" written by Yudia Feby Sasanti and Bambang Agus Herlambang in 2020. This research resulted in a Lemawa Information System for the Faculty of Engineering and Informatics, University of PGRI Semarang based on website that functions to provide data information on students who are members of Lemawa within the scope of the Faculty of Engineering and Informatics. In making this website using UML system design tools (use case diagrams, Sequence Diagram and Activity Diagram), the PHP programming language with the CodeIgniter Framework and supporting software including XAMPP and MySQL DBMS. This system has a feature to display the Lemawa Members of the Faculty of Engineering and Informatics along with detailed biographical information on students who are Lemawa Members. The connection with the research conducted is that the website can provide information on student activities. The difference with the current research is that the research object is different, the website has features for managing work program schedules and is made using the PHP Laravel programming language framework [13].

The next research is research entitled "Web-Based Student Organizational Activities Management System at Muhammadiyah University of Magelang" written by Muhammad Latif Mubarok in 2020. This research resulted in a management system for student organization activities at Muhammadiyah University of Magelang. This LPMA system can make it easier for Student Organization, LPMA staff and the Chairperson of LPMA to find activity data without having to look for hard files that can be lost or damaged. In addition, the system can display reports so that they can be used for evaluation and for making reports quickly. This report can be printed directly by the user, namely LPMA. In addition, the system can display the amount of activity budget usage used by Student Organization and the number of activities carried out in graphical form. So that it can make it easier for users to read data. The connection with the research conducted is that the website can store activity report data. The difference with the current research is that the research object is different, the website has features for managing work program schedules and is made using the PHP programming language framework Laravel [14].

The next research is research entitled "Design of Information Systems for the Information Systems Study Program Student Association using the Waterfall Method" written by Weni Triyono in 2022. This research produces an information system in the Information Systems Study Program to assist HMPS SI in managing every activity that will held. This system is expected to be able to assist HMPS SI in managing every activity that will be carried out or in the future and assist leaders in overseeing every activity carried out at HMPS SI. And in order to make it easier for HMPS SI to collect data on activities up to an annual accountability report. The link with the research being conducted is the website managing every activity that will be carried out or in the future. The difference with the current research is that the research objects are different, the methods used are different, the website has features for managing work program schedules and is made using the PHP Laravel programming language framework [15]

The next research is research with the title "Design of the Mobile Web for Informatics Engineering Student Association (HMTI) STMIK Palangkaraya" written by Lili Rusdiana, Heri Hermawan, and Siti Maryamah in 2022. This research produces a Web that can be implemented and accessed online based on mobile . The web can be used to manage information related to activities carried out at the Informatics Engineering Student Association student body at STMIK Palangkaraya. The link with the research being carried out is managing every activity that will be carried out or in the future. The difference with the current research is that the research objects are different, the research objects are different, and the website has features for managing work program schedules [16].

The next research is research with the title "Community Service at Islamic Boarding School At-Tahririyah Making Web Profiles Using the Laravel Framework" written by Agus Hermanto, Roenadi Koesdijarto, and Geri Kusnanto in 2019. This research produces web profiles of Islamic boarding schools which function as a means of establishing communication and publication of information between Islamic boarding schools and the community. The web profile was created using the Laravel prototyping method and framework. The reason for using the Laravel framework is that it is very beneficial due to its many features that can simplify and expedite the system coding process and display the user interface. The link with the research conducted is that the website was created using the PHP Laravel programming language

framework. The difference with the current research is that the research objects are different and the website has features for managing work program schedules [17].

The next research is research with the title "Designing a Company Profile by Submitting Deposits and Credit at PT. BPR Guna Yatra Using the Web-Based PIECES Analysis Method Using the Laravel Framework" written by Muqit Nur Salam Marsam and Aries Dwi Indriyanti in 2021. This research produce a web-based Company Profile that has company profile features, product introductions, online deposits and credit applications, company news, prospective customer services, promotional publications, and job vacancies. The existence of this system will increase the effectiveness and efficiency of services and save on marketing costs. The system/website design uses the Laravel framework, the PHP programming language, MySQL database with the help of XAMPP as a local server. The reason for using the Laravel framework is that Laravel has comprehensive and active documentation, as well as a large user community, making it easier for learning and developing web applications. The link with the research conducted is that the website was created using the PHP Laravel programming language framework. The difference with the current research is that the methods used are different, the research objects are different, and the website has features for managing work program schedules [18].

The next research is research with the title "Design of Website Information Systems for the UNUSIA Informatics Engineering Study Program Using the Waterfall Method and the Laravel Framework" written by Handy Fernandy and Arifin A Abd Karim in 2022. This research produces a website-based information system that can make it easier for students, lecturers, students and the general public in obtaining information related to activities or activities in Informatics Engineering, Faculty of Engineering and Computer Science, University of Nahdlatul Ulama Indonesia. The website information system as a dynamic source of information will continue to display the latest or updated news related to the department or study program. Making a website information system using the PHP Laravel programming language framework and JavaScript with a database using Lite Speed and other supporting software. The reason for using the Laravel framework is its elegant and expressive syntax, which allows developers to write clean and maintainable code more efficiently, enhancing the overall development process. The link with the research conducted is that the website was created using the PHP Laravel programming language framework. The difference with the current research is that the research objects are different and the website has features for managing work program schedules [19].

From all the research above, it can be concluded that the Student Executive Body Website technology is very useful in assisting administrators in managing work program data and facilitating the generation of reports on executed activities. The existence of an information system enables an improvement in data management processing, making work program data more effective and efficient. Certainly, this also helps students to obtain information about ongoing activities. This research used the PHP Laravel programming language framework to develop the Student Executive Body Website. The decision to use Laravel over other frameworks can be attributed to several factors. Laravel is a highly popular and powerful framework known for its elegant syntax and comprehensive features, making it easier for developers to build complex web applications. The framework provides a rich set of tools for tasks such as database migrations, routing, authentication, and templating, which are highly beneficial in creating information systems like the Student Executive Body Website. Additionally, Laravel's active community and comprehensive documentation provide strong support and resources for developers throughout the development process. The combination of these features and community support likely influenced the researchers' choice to use Laravel as their preferred framework for building an efficient and effective website in managing work program schedules and providing valuable information for students.

III. METHODS

The research methodology will explain the stages of research implementation. The research stage described in detail the website design process starting from the initial creation to obtaining a website testing analysis. The stages of research work are shown in Figure 1.
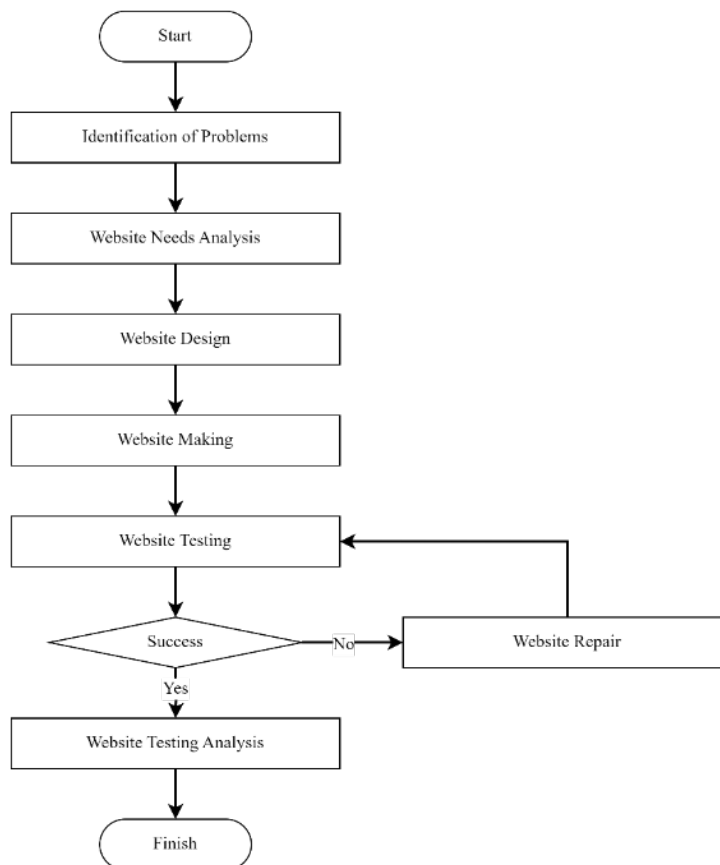

Figure 1. Research Methods

A. Identification of Problems

In the first stage, namely identifying problems in the Student Executive Board of the Faculty of Business Economics and Digital Technology, Nahdlatul Ulama University, Surabaya, which are related to how to manage work program schedules that have been carried out so far. Identification of the problem is done by way of interviews and observations.

B. Website Needs Analysis

The next stage is to analyze the website requirements needed to achieve the research objectives. At this stage interviews will be conducted with the Trustees, BPH, and Heads of Departments of the Student Executive Board of the Faculty of Business Economics and Digital Technology, Nahdlatul Ulama University, Surabaya. The interview aims to find out their needs in managing work program schedules. Then the results of the needs analysis will be synchronized with the results of problem identification which will be used to become the features of the website.

C. Website Design

At this design stage, the implementation of the needs analysis becomes a design that will be implemented on the website to be built. The steps taken are to carry out the design or modeling process of data structures, software architectures, interface representations and logic designs. In carrying out the design process it is grouped into 3 stages, as follows:

1)   System Flow Design

The process that needs to be done at this stage is to design the flow of the system using UML modeling, such as Use Case Diagram, Activity Diagram, and Sequence Diagram.

2)   Database Modeling

The process that needs to be done at this stage is to do database modeling to determine the database design to support the data management of a system. At the database modeling stage to determine the database flow using Entity Relationship Diagram (ERD).

3)   Interface Design

The final stage in website design is interface design. At this stage the researcher designs the interface of the new system that will be built in the design stage. This stage is used to determine how the system will look when it runs later. At this stage the researcher used the Figma application tools to design the system interface.

D.   Website Making

At the website creation stage, the researcher will code the designs that were made in the previous stage. This stage is carried out so that the website can be used by users and can achieve the objectives of the research. At this stage the researcher will create a website using a framework from PHP, namely Laravel and in order to have an attractive appearance and a responsive site layout, the researcher uses bootstrap as the interface design. Researchers also use Apache as a web server that is used to run the website.

E.   Website Testing

At this stage testing of the coding that has been completed is carried out. The device needed is a computer/laptop that has a browser installed, XAMPP and a website. In this study, researchers also used 2 testing methods, namely black box testing and usability testing methods. In black box testing, it is carried out from a developer's point of view by means of which the developer will check the features that have been built so that when given to users the system is error-free and ready to use. Furthermore, in terms of users using system testing usability testing. Testing usability testing This aims to ensure whether the information system that has been built is appropriate and makes it easy for users.

F.   Website Testing Analysis

After testing with the method black box and usability testing, in the final stage an analysis of the test results is carried out black box and usability testing. The results of the research analysis will be provided to the Student Executive Board of the Faculty of Business Economics and Digital Technology, Nahdlatul Ulama University Surabaya to be used and carry out further development of the website that has been created. If the results of the test show that the website is not suitable for use, then repairs will be made accordingly until the website can be used.

IV.   RESULTS AND DISCUSSION

A.   Identification of problems

At the problem identification stage carried out are:

1)   Interview

Conducting interviews for current conditions related to the work program management process and information dissemination at BEM FEBTD UNUSA.

2)   Observation

Observations were made by means of researchers going directly to BEM FEBTD UNUSA to see the current conditions related to the work program management process and information dissemination at BEM FEBTD UNUSA.

Table 1. Current Process Details

Process	System Used	Weaknesses/Problems
Managing Work Programs	The calendar design is in the form of pictures, the Work Program is only written in Microsoft Office Word.	Only present schedule information within a period of only a month. Meanwhile, when only using Microsoft Office Word, administrators have difficulty monitoring the progress of each work program.
Dissemination of Activity Information	Instagram social media	Instagram requires an account to access its activity information, and it is very limited.

B. Website Needs Analysis

After knowing the system for managing work programs and disseminating activity information that is currently used, a new system is needed to fix the problems that exist in the current system. Therefore, researchers mapped out the need to create a new system functionally and non-functionally. The mapping can be seen in Table 2 and Table 3 as follows:

Table 2. Mapping the Functional Requirements of the New System

Business Process Modeling	Legacy System Analysis	New System Requirements	Usage
Managing Work Programs	Schedule information within a period of only a month and difficulties in monitoring the progress of each work program.	1) Recording of the list of work programs 2) Recording of period lists 3) Add Comment	1) To record a list of work programs 2) To record a list of periods 3) To make it easier for each user to provide suggestions and input for each work program
Dissemination of Activity Information	Not everyone uses Instagram	1) Information on the latest agenda/activities	1) To provide activity information without logging in/account registration

Table 3. New System Non-Functional Requirements

Hardware	Software
1) Laptop 2) Internet Network	1) Windows 10 Operating System 2) Browser Google Chrome 3) Text Editor Visual Studio Code 4) XAMPP as localhost database and application 5) Hosting 6) Domain

Table 3 is a plan designed to identify the components needed to support the new system to be built. Non-functional requirements are divided into two parts, namely hardware and software requirements. Required hardware includes a computer or laptop and internet access. While software requirements include browsers, text editors, domains, and hosting. To ensure that the system runs optimally, both types of requirements must be fully met.

C. Website Design

At this design stage, the implementation of the needs analysis becomes a design that will be implemented on the website to be built. The steps taken are to carry out the design or modeling process of data structures, software architectures, interface representations and logic designs. In carrying out the design process it is grouped into 3 stages, as follows:

1)   System Flow Design

The process that needs to be done at this stage is to design the flow of the system using UML modeling, such as Use Case Diagram, Activity Diagram, and Sequence Diagram. Use Case Diagram is one type of

diagram used in the website design process. Use case diagram is a visual representation of the interaction between the system and users or actors from outside the system.

a. Use Case Diagram

Use Case Diagram is one of the types of diagrams used in the website design process. It is a visual representation of the interactions between the system and the users or actors from outside the system.
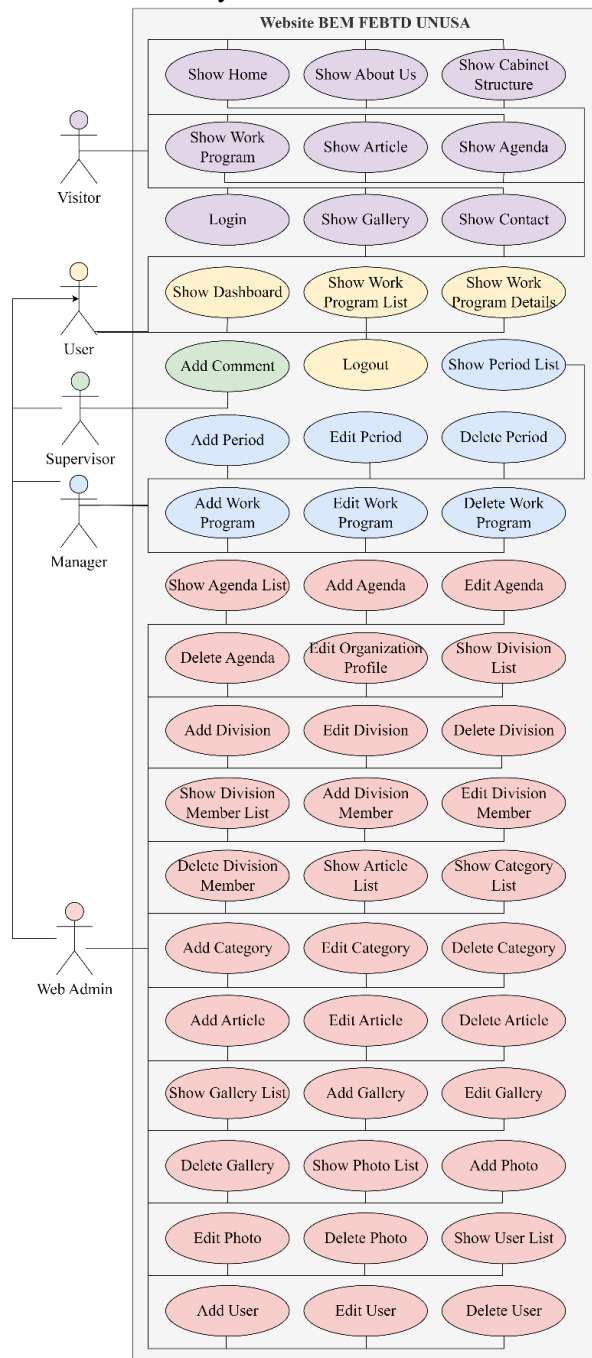

Figure 2. Use Case Diagram BEM FEBTD UNUSA Website

In Figure 2, there is a Use Case Diagram that illustrates the actions or activities that can be performed by actors on the website. There are 4 actors in the built website, namely: Admin, Manager, Supervisor, and Visitors.

2) Database Modeling

In Figure 5 there is a database modeling to determine the flow of the database using an Entity Relationship Diagram (ERD) which shows the relationships between entities and their attributes. The Entity Relationship Diagram (ERD) in Figure 5 has 12 entities.
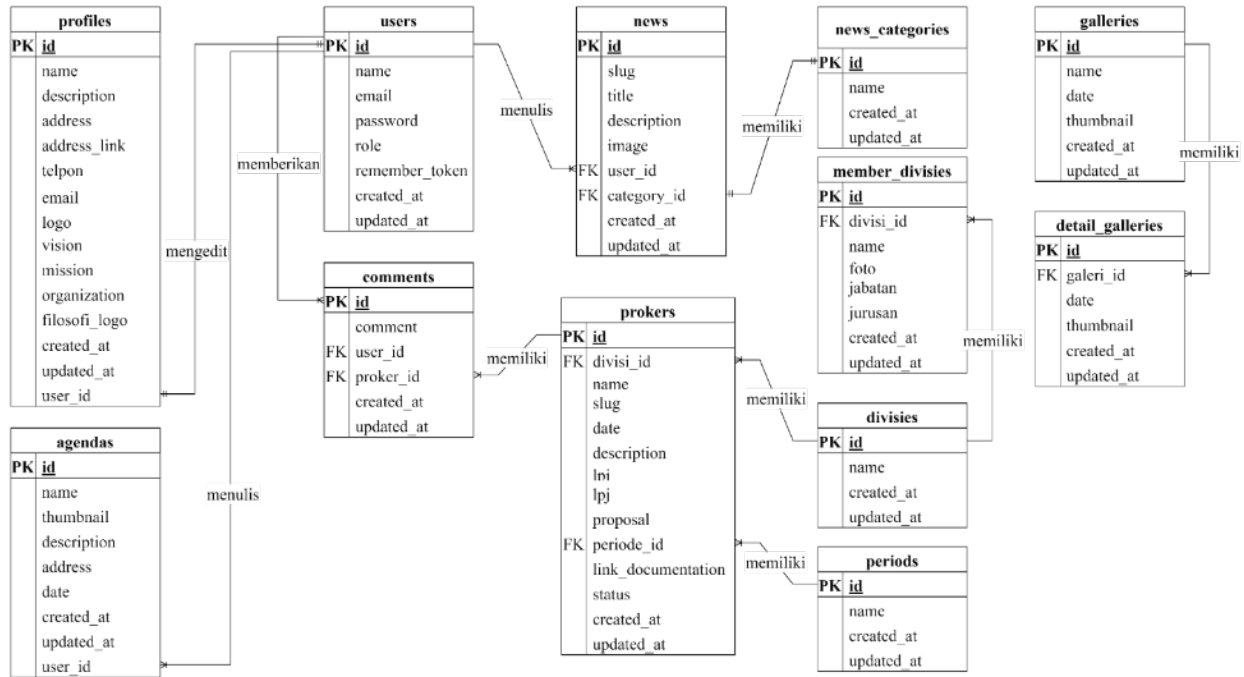
Figure 3. Entity Relationship Diagram (ERD)

The Entity Relationship Diagram (ERD) in Figure 6 has 12 entities. In addition, each entity has attributes in it that are described in Table x

Table 4. Entity and Attributes Entity Relationship Diagram (ERD)

No.	Entity	Attribute
1.	agendas	Id, name, thumbnail, description, address, date, user_id, created_at, dan updated_at.
2.	comments	Id, comment, user_id, proker_id, created_at, dan updated_at.
3.	detail_galleries	Id, galeri_id, image, caption, created_at, dan updated_at.
4.	divisies	Id, name, created_at, dan updated_at.
5.	galleries	Id, name, date, thumbnail, created_at, dan updated_at.
6.	member_divisies	Id, divisi_id, name, foto, jabatan, jurusan, created_at, dan updated_at.
7.	news	Id, slug, title, description, image, user_id, category_id, created_at, dan updated_at.
8.	news_categories	Id, name, created_at, dan updated_at.
9.	periods	Id, name, created_at, dan updated_at.
10.	profiles	Id, name, description, address, address_link, telpon, email, logo, vision, mission, organization, filosofi_logo, user_id, created_at, dan updated_at.
11.	prokers	Id, divisi_id, name, slug, date, description, lpj, proposal, period_id, link_documentation, status, created_at, dan updated_at.
12.	users	Id, name, email, password, role, remember_token, created_at, dan updated_at.

3) *Interface Design*

The final process in website design is interface design. At this stage the researcher uses the Figma application to design the website interface. The following is an Interface Design Image from the BEM FEBTD UNUSA Website in terms of Admin, Managers, Supervisor, and Visitors.
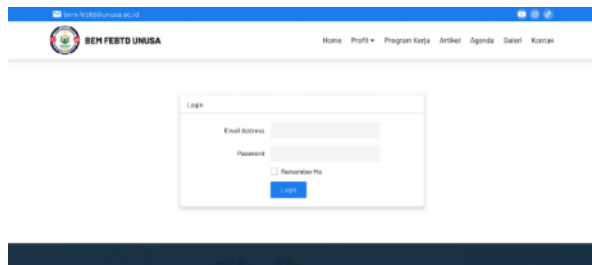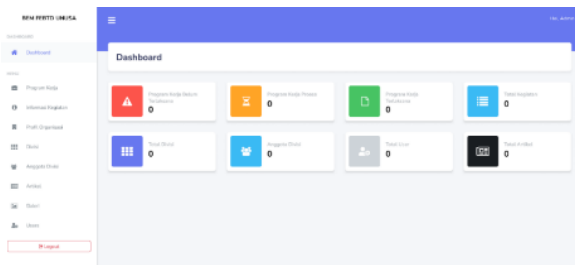

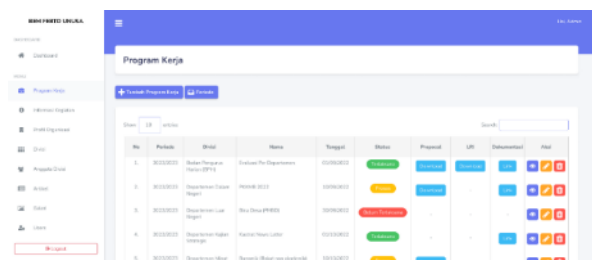**Figure 4.** Login Interface Design

Figure 5. Dashboard Interface Design

Figure 6. Work Program List Interface Design

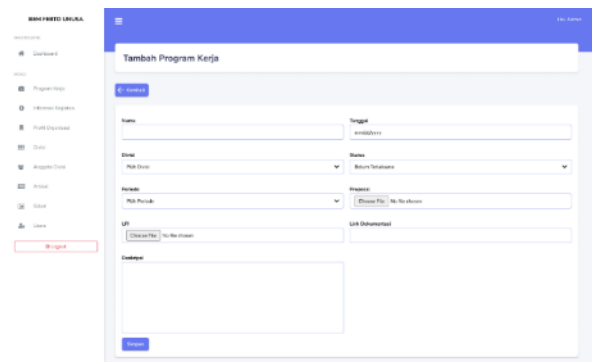**Figure 7.** Period List Interface Design

Figure 8. Add Work Program Interface Design
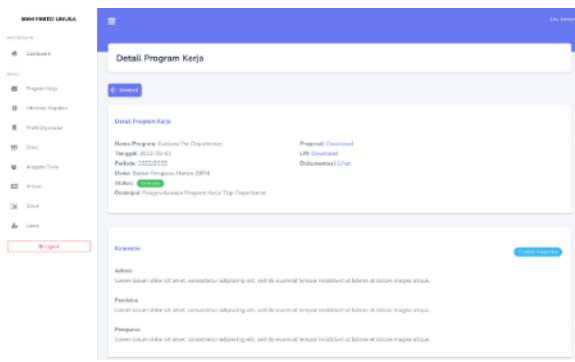

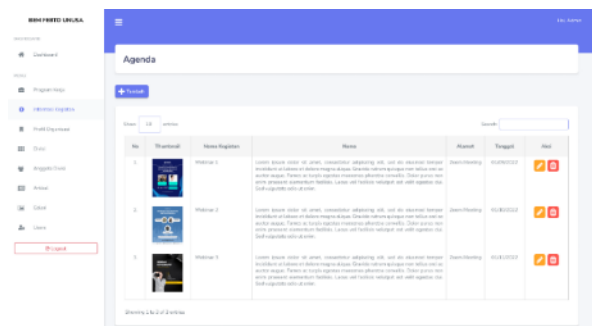**Figure 9.** Work Program Detail Interface Design

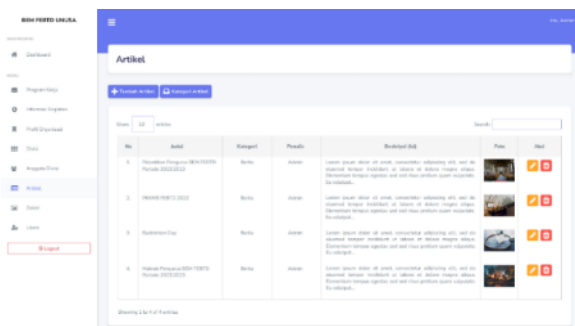
Figure 10. To-do List Interface Design

Figure 11. Article List Interface Design

D.   Website Making

  This stage is the implementation of the system design which will be coded into the PHP programming language. In creating the website, the researchers used the Visual Studio Code application for coding, the Laravel framework with the PHP programming language and the system admin interface display using Stisla Bootstrap. As for the results of the coding based on the design made, the website can be run and the results of the website interface display that has been made can be seen below.
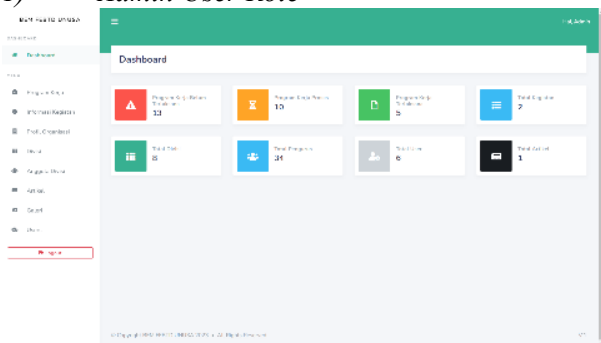
1)   Admin User Role
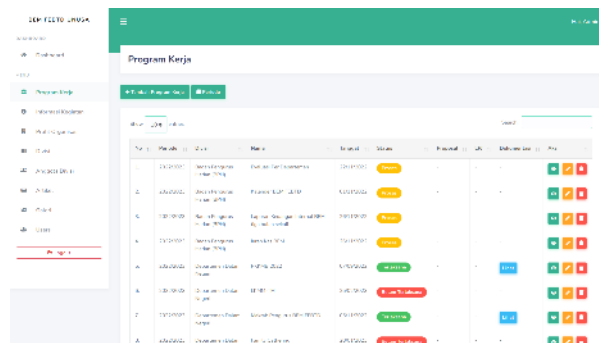

Figure 12. Admin Dashboard Page
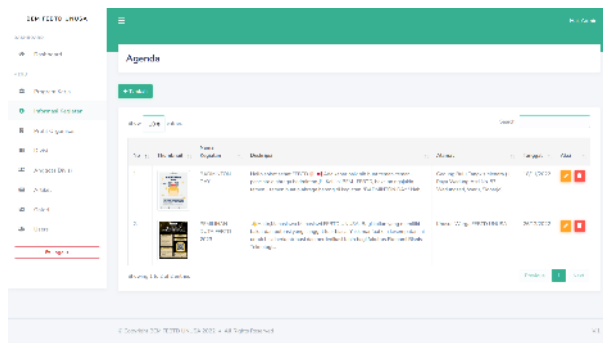

Figure 13. Work Program List Page

Figure 14. To-Do List Page

Figure 15. Organization Profile Edit Page
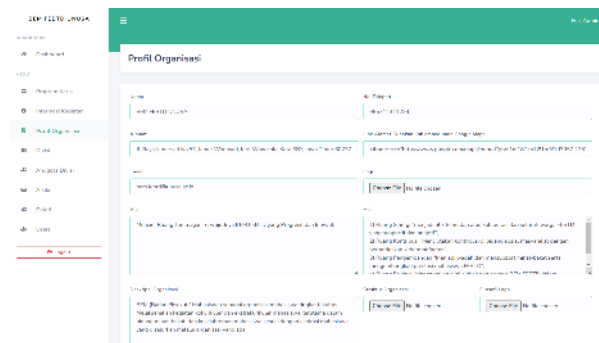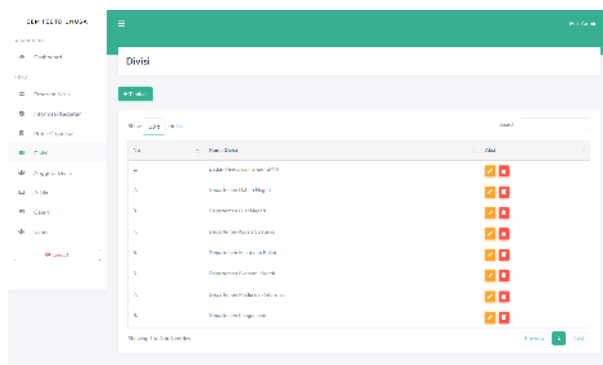

Figure 16. Division List Page
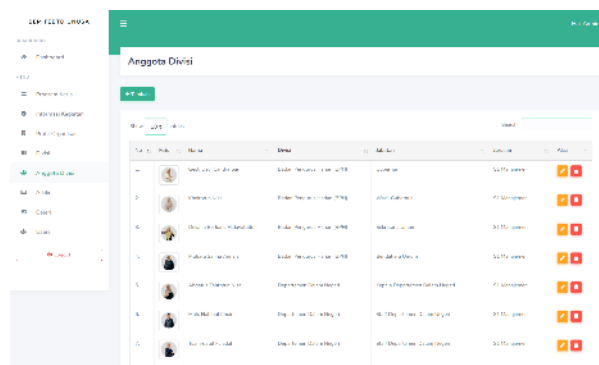
Figure 17. Division Member List Page

2)   *Manager User Role*
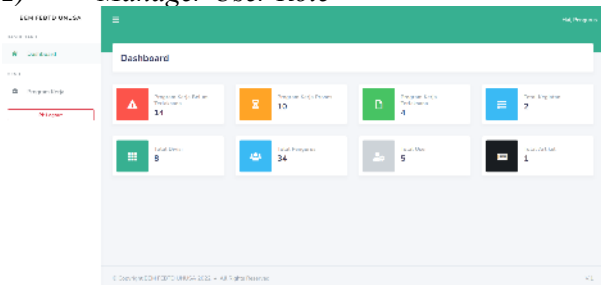
Figure 18. Manager Dashboard Page
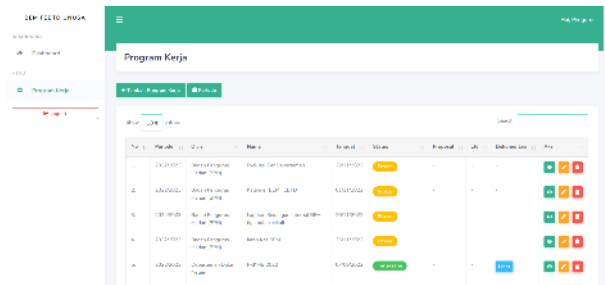
Figure 19. Work Program List Page
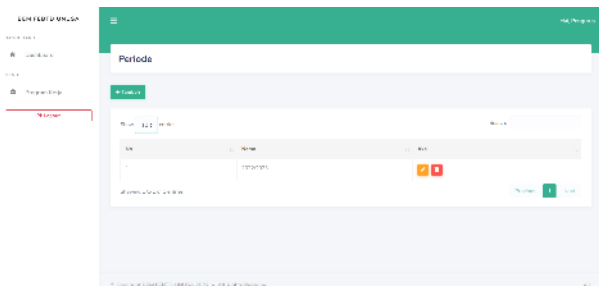
Figure 20. Period List Page
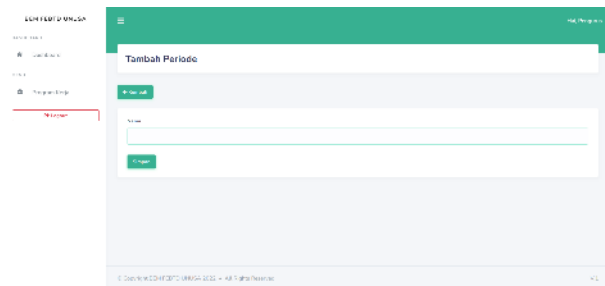
Figure 21. Period Add Page
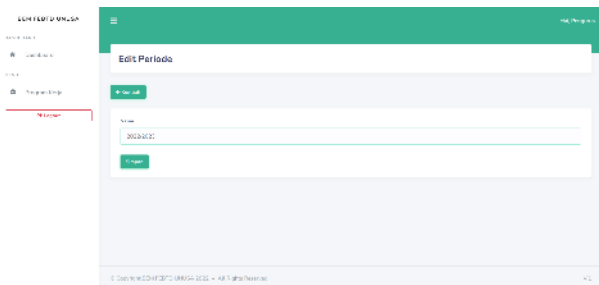
Figure 22. Period Edit Page
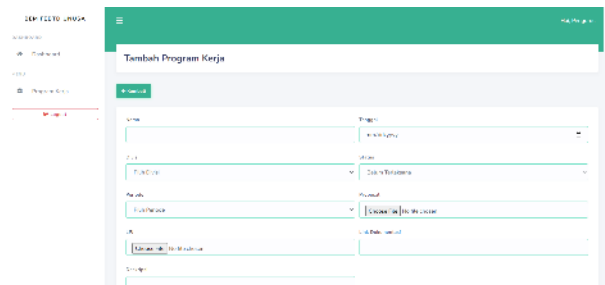
Figure 23. Work Program Add Page
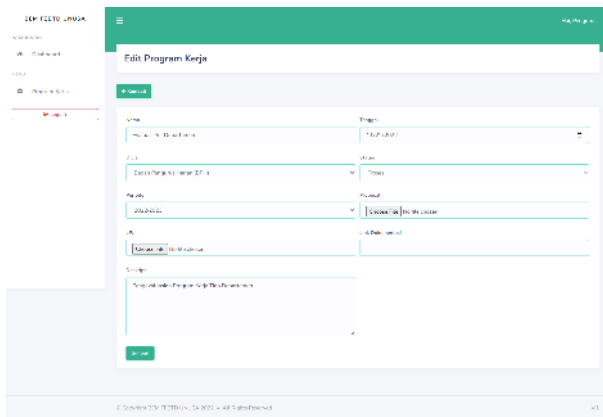
Figure 24. Work Program Edit Page

3)   Coach User Role
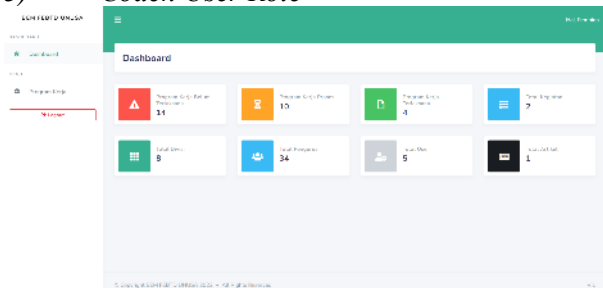
Figure 25. Coach Dashboard Page
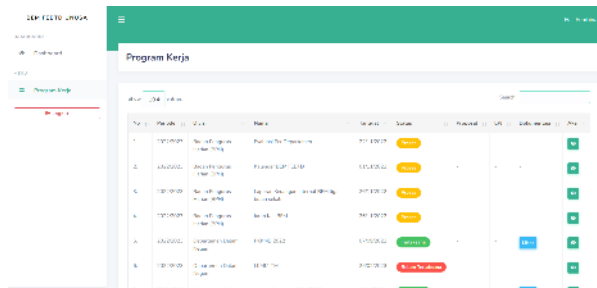
Figure 26. Work Program List Page
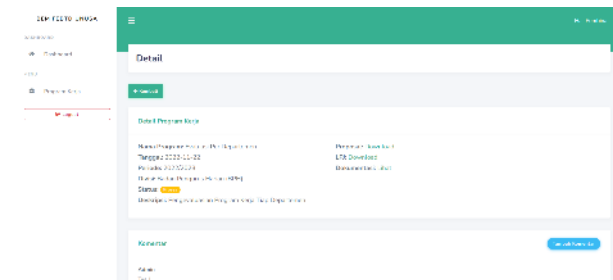
Figure 27. Work Program Details Page
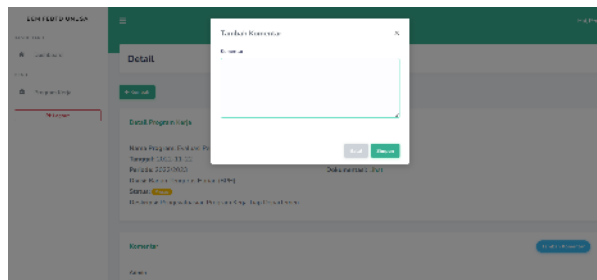
Figure 28. Add Comment Page

4)   Visitor User Roles
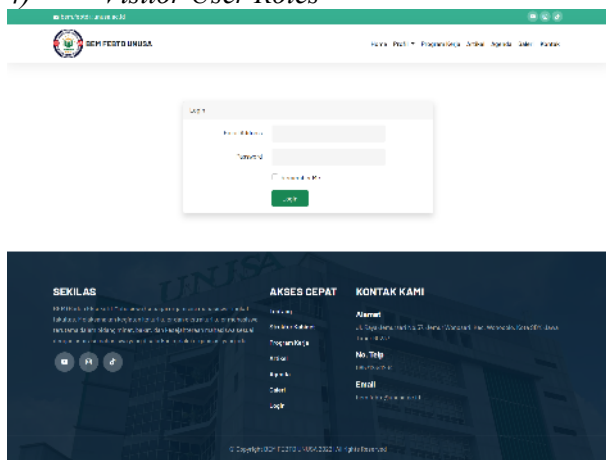
Figure 29. Login Page

Figure 30. Home Page

Figure 31. Organization Profile Page

Figure 32. Cabinet Structure Page

Figure 33. Work Program Page

Figure 34. Article Page

Figure 35. Agenda Page

Figure 36. Gallery Page

E.   Website Testing

1)   *Black Box Testing*

   Black box testing is a testing method that does not involve analysis or understanding of the source code or internal implementation of the system being tested. Its purpose is to evaluate the system by executing predefined tests and analyzing the generated output. This testing is carried out manually without the assistance of tools. The testing is performed on 12 modules comprising 117 test cases.

   Each test will yield a result, either "Passed" or "Failed," which is used to determine whether the conducted test indicates that the tested system meets the specified requirements or not. "Passed" indicates that the tested system has successfully passed the conducted test and can be considered to meet the specified requirements. On the other hand, "Failed" indicates that the tested system did not pass the conducted test and can be considered not to meet the specified requirements.

2)   *Usability Testing*

   Usability testing is a testing method used to evaluate the ease of use of a website by actual users. In Usability testing, researchers distribute questionnaires to users according to their respective criteria or roles. The distribution of questionnaires is carried out periodically from December 28, 2022, to January 10, 2023. The questionnaire consists of 17 statements, with 4 statements for the Learnability aspect, 2 statements for the Efficiency aspect, 3 statements for the Memorability aspect, 3 statements for the Error aspect, and 5 statements for the Satisfaction aspect.
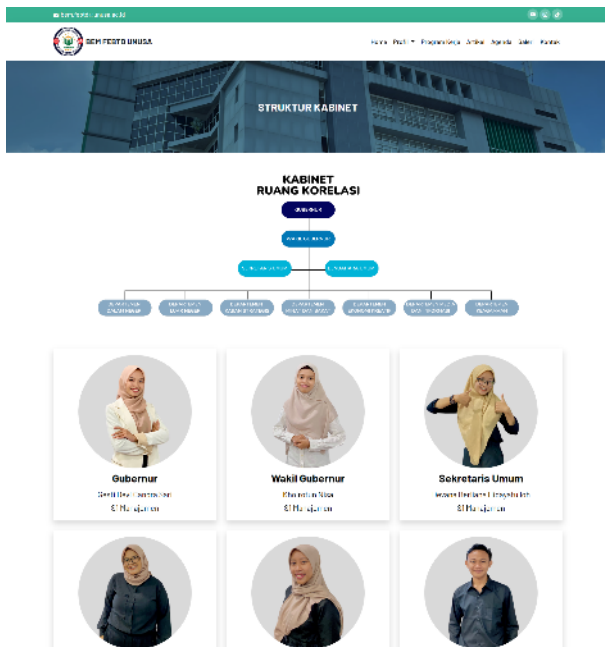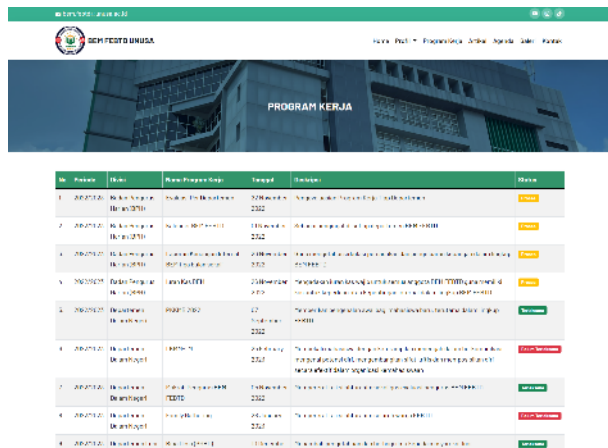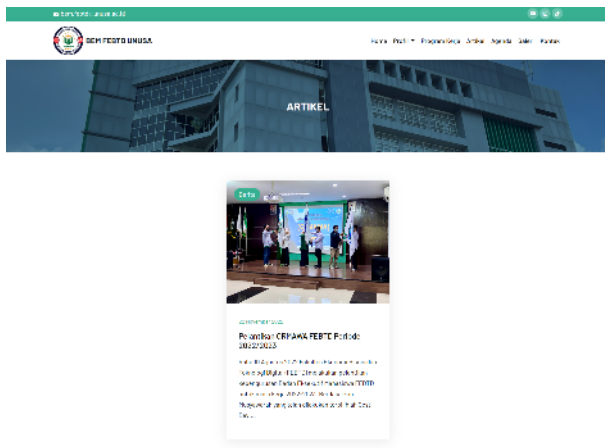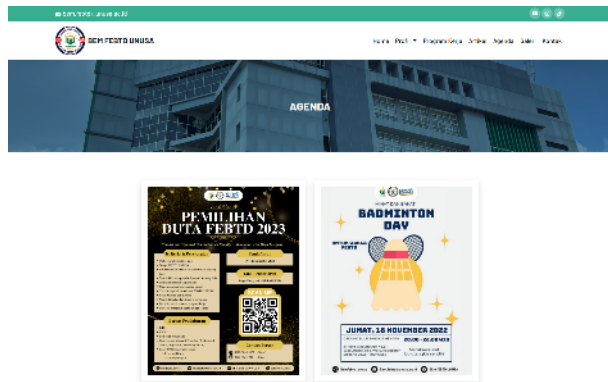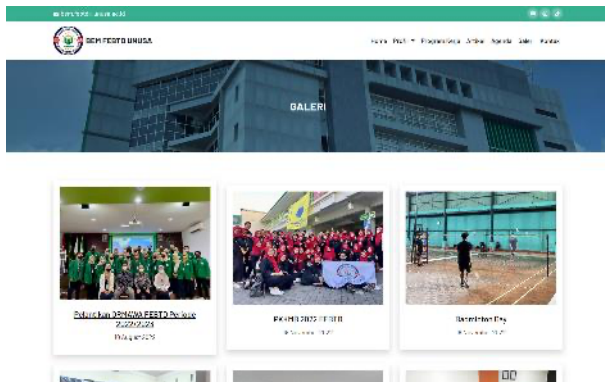
B.   *Website Testing Analysis*

   After testing with the method black box and usability testing, in the final stage an analysis of the test results is carried out black box and usability testing. The results of the research analysis will be provided to the Student Executive Board of the Faculty of Business Economics and Digital Technology, Nahdlatul Ulama University Surabaya to be used and carry out further development of the website that has been created. If the results of the test show that the website is not suitable for use, then repairs will be made accordingly until the website can be used.

1)   *Black Box Testing*

   The results of Black Box Testing get a total of 12 modules with 117 Test Cases which are divided into each module with details of the total results of 117 Test Cases Passed and 0 Test Cases Failed or if presented as 100% Test Cases Passed and 0% Test Cases Failed. To calculate the percentage of test cases, you can use the following simple formula:

$$\text{Test Case Percentage} = \frac{\text{Number of Passed or Failed Test Cases}}{\text{Total Number of Test Cases}} \times 100\%$$

Table 5. Results Statistics Black Box Testing

No	Module	Number of Test Cases	Results		Results (%)	
			Passed	**Failed**	**Passed**	**Failed**
1	Key Link Validation	2	2	0	100%	0%
2	Visitor Page Validation	15	15	0	100%	0%
3	Login and Logout Validation	9	9	0	100%	0%
4	Work Program Menu Validation	20	20	0	100%	0%
5	Activity Information Menu Validation	8	8	0	100%	0%
6	Organization Profile Menu Validation	2	2	0	100%	0%
7	Division Menu Validation	8	8	0	100%	0%
8	Division Member Menu Validation	8	8	0	100%	0%
9	Article Menu Validation	16	16	0	100%	0%
10	Gallery Menu Validation	16	16	0	100%	0%
11	User Menu Validation	8	8	0	100%	0%
12	General Function Validation in Tables	5	5	0	100%	0%
	Total Module = 12	117	117	0	100%	0%

The test results show that the website was successfully tested without any bugs or errors.

2)   *Usability Testing*

In Usability Testing, researchers involve many people as respondents according to their respective user roles. The following are the results of website testing that has been done.

a.   Analysis of Admin Questionnaire Data Testing Results

The results of testing the admin role user questionnaire data were obtained with a total of 2 respondents.

Table 6. Value Recap Usability Testing Admin

No	Statement	Assessment					Average	Aspect Average
		SD	D	N	A	SA		
Learnability								
1	The writing of the text used for the page is easy and clear.	0	0	0	1	1	4,5	4,75
2	The menus are quite easy to understand.	0	0	0	1	1	4,5	
3	The appearance of the website is easy to understand.	0	0	0	0	2	5	
4	Use of the website can be learned without written instructions.	0	0	0	0	2	5	
Efficiency								
5	Clicked menu can display quickly.	0	0	0	1	1	4,5	4,5
6	The information sought is quickly obtained.	0	0	0	1	1	4,5	
Memorability								
7	The name of the website page visited is easy to remember.	0	0	0	1	1	4,5	4,33
8	The website address is written in lowercase.	0	0	0	2	0	4	
9	The use of the website can be remembered easily.	0	0	0	1	1	4,5	
Error								
10	There is a link/menu clicked error.	1	0	1	0	0	4	4
11	There is a menu that when clicked does not give any response.	1	1	0	0	0	4,5	
12	There exists under reconstruction (recovery) from several menus or links displayed on website pages.	0	1	1	0	0	3,5	
Satisfaction								
13	I want to visit this website again.	0	0	0	0	2	5	4,5
14	Information is presented on this website up to date.	0	0	0	1	1	4,5	
15	The website feels comfortable when used.	0	0	0	0	2	5	
16	Color composition and content placement are not confusing.	0	0	0	1	1	4,5	
17	The required menu is found on this website but not on the website you have visited.	0	0	1	1	0	3.5	

The results of the data obtained through the assessment of admin respondents to the BEM FEBTD UNUSA website using the method Usability Testing namely:

1) Aspect **Learnability** which has 4 statements that are assessed, with an average value of 4.75 after being converted to a scale of 5 then it is included in the Rating Scale 5 with the Strongly Agree category if the writing of the text used for the page is easy and clear, the menus are quite easy to understand, the appearance of the website is easy to understand, and the use of the website can be learned without written instructions.

2) Aspect **Efficiency** which has 2 statements that are assessed, with an average value of 4.5 after being converted to a scale of 5 then it is included in the 5 rating scale with the Strongly Agree category if the menu that is clicked can display quickly, and the information sought is quickly obtained.

3) Aspect **Memorability** which has 3 statements that are assessed, with an average value of 4.33 after being converted to a scale of 5 then it is included in the Rating Scale 4 with the Agree category if the name of the website page visited is easy to remember, the website address is written in lower case, and the use website can be remembered easily.

4) Aspect **Error** which has 3 negative statements that are assessed, with an average value of 4 after being converted to a scale of 5 then it is included in the Rating Scale 4 with the Disagree category if there is an error clicked link/menu, there is a menu that when clicked does not give any response, and there is under reconstruction (recovery) from several menus or links displayed on website pages.

5) Aspect **Satisfaction** which has 5 statements that are assessed, with an average value of 4.5 after being converted to a scale of 5 then it is included in the 5 rating scale with the Strongly Agree category if you want to visit this website. Return, the information presented on this website is up to date, the website it feels comfortable when used, the color composition and placement of content is not confusing, and the required menu is found on this website but is not on the website you have visited.

b. Analysis of Management Questionnaire Data Test Results

The results of testing the manager user role questionnaire data were obtained with a total of 17 respondents.

Table 7. Value Recap Usability Testing Manager

No	Statement	Assessment					Average	Aspect Average
		SD	D	N	A	SA		
Learnability								
1	The writing of the text used for the page is easy and clear.	1	0	1	2	13	4,53	4,49
2	The menus are quite easy to understand.	1	0	0	5	11	4,47	
3	The appearance of the website is easy to understand.	1	0	0	5	11	4,47	
4	Use of the website can be learned without written instructions.	1	0	0	5	11	4,47	
Efficiency								
5	Clicked menu can display quickly.	1	0	0	5	11	4,47	4.41
6	The information sought is quickly obtained.	1	0	1	5	10	4,35	
Memorability								
7	The name of the website page visited is easy to remember.	1	0	0	5	11	4,47	4.39
8	The website address is written in lowercase.	0	1	1	6	9	4,35	
9	The use of the website can be remembered easily.	1	0	0	7	9	4,35	
Error								
10	There is a link/menu clicked error.	8	4	2	1	2	3,88	3.86
11	There is a menu that when clicked does not give any response.	8	5	0	2	2	3,88	
12	There is under reconstruction (recovery) from several menus or links displayed on website pages.	7	5	1	3	1	3,82	
Satisfaction								
13	I want to visit this website again.	0	1	1	1	14	4,65	4,53
14	Information is presented on this website up to date.	0	1	1	1	14	4,65	
15	The website feels comfortable when used.	1	0	1	2	13	4,53	
16	Color composition and content placement are not confusing.	1	0	0	2	14	4,65	
17	The required menu is found on this website but not on the website you have visited.	1	1	2	3	10	4,18	

The results of the data obtained through the assessment of management respondents on the BEM FEBTD UNUSA website using the method Usability Testing namely:

1) Aspect **Learnability** which has 4 statements that are assessed, with an average value of 4.49 after being converted to a scale of 5 then it is included in the Rating Scale 5 with the Strongly Agree category if the writing of the text used for the page is easy and clear, the menus are quite easy to understand, the appearance of the website is easy to understand, and the use of the website can be learned without written instructions.

2) Aspect **Efficiency** which has 2 statements that are assessed, with an average value of 4.41 after being converted to a scale of 5 then it is included in the Rating Scale 5 with the Strongly Agree category if the menu that is clicked can display quickly, and the information sought is quickly obtained.

3) Aspect **Memorability** which has 3 statements that are assessed, with an average value of 4.39 after being converted to a scale of 5 then it is included in the Rating Scale 4 with the Agree category if the name of the website page visited is easy to remember, the website address is written in lowercase letters, and the use of the website can easy to remember.

4) Aspect **Error** which has 3 negative statements that are assessed, with an average value of 3.86 after being converted to a scale of 5 then it is included in the Rating Scale 4 with the Disagree category if there is an error clicked link/menu, there is a menu that when clicked does not give any response, and there is under reconstruction (recovery) from several menus or links displayed on website pages.

5) Aspect **Satisfaction** which has 5 statements that are assessed, with an average value of 4.53 after being converted to a scale of 5 then it is included in the 5 rating scale with the Strongly Agree category if you want to visit this website. Return, the information presented on this website is up to date, the website it feels comfortable when used, the color composition and placement of content is not confusing, and the required menu is found on this website but is not on the website you have visited.

c. Analysis of Testing Results of the Supervisor Questionnaire Data

The results of testing the supervisor role user questionnaire data were obtained by 1 person.

Table 8. Value Recap Usability Testing Coach

No	Statement	Assessment					Average	Aspect Average
		SD	D	N	A	SA		
Learnability								
1	The writing of the text used for the page is easy and clear.	0	0	0	1	0	4	4.75
2	The menus are quite easy to understand.	0	0	0	0	1	5	
3	The appearance of the website is easy to understand.	0	0	0	0	1	5	
4	Use of the website can be learned without written instructions.	0	0	0	0	1	5	
Efficiency								
5	Clicked menu can display quickly.	0	0	1	0	0	3	4
6	The information sought is quickly obtained.	0	0	0	0	1	5	
Memorability								
7	The name of the website page visited is easy to remember.	0	0	0	0	1	5	5
8	The website address is written in lowercase.	0	0	0	0	1	5	
9	The use of the website can be remembered easily.	0	0	0	0	1	5	
Error								
10	There is a link/menu clicked error.	0	1	0	0	0	4	4
11	There is a menu that when clicked does not give any response.	0	1	0	0	0	4	
12	There is under reconstruction (recovery) from several menus or links displayed on website pages.	0	1	0	0	0	4	
Satisfaction								
13	I want to visit this website again.	0	0	0	0	1	5	4.4
14	Information is presented on this website up to date.	0	0	0	1	0	4	
15	The website feels comfortable when used.	0	0	0	1	0	4	
16	Color composition and content placement are not confusing.	0	0	0	1	0	4	
17	The required menu is found on this website but not on the website you have visited.	0	0	0	0	1	5	

The results of the data obtained through the assessment of the supervisor's respondents on the BEM FEBTD UNUSA website using the method Usability Testing namely:

1) Aspect **Learnability** which has 4 statements that are assessed, with an average value of 4.75 after being converted to a scale of 5 then it is included in the Rating Scale 5 with the Strongly Agree category if the writing of the text used for the page is easy and clear, the menus are quite easy to understand, the appearance of the website is easy to understand, and the use of the website can be learned without written instructions.

2) Aspect **Efficiency** which has 2 statements that are assessed, with an average value of 4 after being converted to a scale of 5 then it is included in the rating scale 4 with the Agree category if the menu that is clicked can display quickly, and the information sought is quickly obtained.

3) Aspect **Memorability** which has 3 statements that are assessed, with an average value of 5 after being converted to a scale of 5 then it is included in the 5 rating scale with the Agree category if the name of the website page visited is easy to remember, the website address is written in lowercase, and the use of the website can be easy to remember.

4) Aspect **Error** which has 3 negative statements that are assessed, with an average value of 4 after being converted to a scale of 5 then it is included in the Rating Scale 4 with the Disagree category if there is an error clicked link/menu, there is a menu that when clicked does not give any response, and there is under reconstruction (recovery) from several menus or links displayed on website pages.

5) Aspect **Satisfaction** which has 5 statements that are assessed, with an average value of 4.4 after being converted to a scale of 5 then it is included in the 5 rating scale with the Strongly Agree category if you want to visit this website. Return, the information presented on this website is up to date, the website it feels comfortable when used, the color composition and placement of content is not confusing, and the required menu is found on this website but is not on the website you have visited.

d.   Analysis of Visitor Questionnaire Data Test Results

The results of testing the visitor user role questionnaire data were obtained with a total of 117 respondents.

Table 9. Value Recap Usability Testing Visitors

No	Statement	Assessment					Average	Aspect Average
		SD	D	N	A	SA		
Learnability								
1	The writing of the text used for the page is easy and clear.	2	1	9	40	65	4,41	4,36
2	The menus are quite easy to understand.	2	2	6	43	64	4,41	
3	The appearance of the website is easy to understand.	1	4	7	43	62	4,38	
4	Use of the website can be learned without written instructions.	3	1	12	48	53	4,26	
Efficiency								
5	Clicked menu can display quickly.	2	1	12	50	52	4,27	4,28
6	The information sought is quickly obtained.	2	1	12	49	53	4,28	
Memorability								
7	The name of the website page visited is easy to remember.	1	3	14	56	43	4,17	4,21
8	The website address is written in lowercase.	2	4	18	43	50	4,15	
9	The use of the website can be remembered easily.	0	1	16	46	54	4,31	
Error								
10	There is a link/menu clicked error.	54	25	17	13	8	3,89	3,93
11	There is a menu that when clicked does not give any response.	53	35	14	8	7	4,02	
12	There exists under reconstruction (recovery) from several menus or links displayed on website pages.	49	27	24	11	6	3,87	

No	Statement	Assessment					Aver age	Aspect Avera ge
		SD	D	N	A	SA		
Satisfaction								
13	I want to visit this website again.	1	7	34	40	35	3,86	
14	Information is presented on this website up to date.	1	5	27	42	42	4,02	
15	The website feels comfortable when used.	2	3	17	43	52	4,2	
16	Color composition and content placement are not confusing.	2	3	20	44	48	4,14	3,99
17	The required menu is found on this website but not on the website you have visited.	3	8	37	38	31	3,74	

The results of the data obtained through the assessment of visitor respondents to the BEM FEBTD UNUSA website using the method Usability Testing namely:

1) Aspect **Learnability** which has 4 statements that are assessed, with an average value of 4.36 after being converted to a scale of 5 then it is included in the Rating Scale 4 with the Agree category if the writing of the text used for the page is easy and clear, the menus are sufficient easy to understand, the appearance of the website is easy to understand, and the use of the website can be learned without written instructions.

2) Aspect **Efficiency** which has 2 statements that are assessed, with an average value of 4.28 after being converted to a scale of 5 then it is included in the rating scale 4 with the Agree category if the menu that is clicked can display quickly, and the information sought is quickly obtained.

3) Aspect **Memorability** which has 3 statements that are assessed, with an average value of 4.21 after being converted to a scale of 5 then it is included in the Rating Scale 4 with the Agree category if the name of the website page visited is easy to remember, the website address is written in lowercase, and the use website can be remembered easily.

4) Aspect **Error** which has 3 negative statements that are assessed, with an average value of 3.93 after being converted to a scale of 5 then it is included in the Rating Scale 4 with the Disagree category if there is an error clicked link/menu, there is a menu that when clicked does not give any response, and there is under reconstruction (recovery) from several menus or links displayed on website pages.

5) Aspect **Satisfaction** which has 5 statements that are assessed, with an average value of 3.99 after being converted to a scale of 5 then it is included in the Rating Scale 4 with the category Agree if you want to visit this website Come back, the information presented on this website is up to date, the website feels comfortable when used, the color composition and placement of content is not confusing, and the required menu is found on this website but is not on the website you have visited.

V.   CONCLUSIONS AND RECOMMENDATIONS

A.   Conclusion

Before the existence of the BEM FEBTD UNUSA website, there were several problems in the management process of the BEM FEBTD UNUSA including limited information distribution, unstructured management schedules, and no monitoring of progress. The results of the BEM FEBTD UNUSA website design have 4 actors with 54 functions which are modeled using use case diagrams, activity diagrams, and sequence diagrams, database modeling using ERD (Entity Relationship Diagram) which consists of 12 tables, interface design using Figma, and implementation of the BEM FEBTD UNUSA website using the Laravel framework based on Php and MySQL. The results of testing the BEM FEBTD UNUSA website using the Black Box Testing method concluded that 117 Test Cases Passed and 0 Test Cases Failed or a percentage of 100% Test Cases Passed and 0% Test Cases Failed, which means that the website was successfully tested without any bugs or errors. As for the results of testing the BEM FEBTD UNUSA website with Usability Testing, it shows that according to the admin and supervisor, they strongly agree that the website is easy to use, fast, memorable, no errors found, and satisfied when used. Meanwhile, according to administrators and visitors, they agree that if the website is easy to use, fast, memorable, no errors are found, and satisfied when used.

B.   Suggestion

Based on the results of the analysis and conclusions obtained from the final project research, several suggestions were obtained for further development of the limitations that exist on the BEM FEBTD UNUSA Website and for further research, namely: Future research can use Android-based applications, There are additional features such as chat bots, criticism and suggestions or comments on aspirations for BEM FEBTD UNUSA, work program validation menu by supervisors, and trying to use other testing methods such as compatibility testing, performance testing, security testing, etc.

VI.   REFERENCES

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