Implementation of the Bethany Tower of Christ Congregation Management Information System Design

Johan William Tanusaputra[1], Abraham Cahyadi Ho[2], Roger Jeremy[3], Indra Budi Trisno[4]

[1,2,3,4] Program Studi Informatika, Fakultas Teknik, Universitas Widya Kartika

Email: [1]fujikawamia@gmail.com, [2]endcode12@gmail.com, [3]rogerjeremy03@gmail.com, [4]indrabt@widyakartika.ac.id

Abstract − Along with the development of the digital era and pandemic conditions have increased the need for systems capable of working remotely. This motivated the researchers to conduct observations at the Bethany Tower of Christ Church. Based on observations and interviews that have been conducted with church pastors and deacons, it is found that the system already owned by the church has a lack of features, one of which is the feature of submitting requests to the church. In addition, there is also a need to update features related to adding devotionals, news, and posts to make it more practical and efficient. The development of this system uses the Waterfall method in which in the process the researcher first conducts direct observation and research at the Bethany Tower of Christ Church followed by analyzing the needs of the church and congregation which results in the design of a congregation management system. As for after the design is done, the system implementation is carried out. After that, researchers conducted testing of system maintenance. Based on the overall results obtained from the survey of respondents' assessment of the website, an average assessment of 87.3% was obtained, indicating that the website is feasible and has impressive respondent satisfaction. Researchers still find shortcomings in the system created, namely the lack of some features and the presence of bugs that need to be fixed. However, researchers still hope that the designed system can be useful for congregations and churches and can continue to be developed and maintained so that the system can be better.

Keywords – Congregation Management, Information System, Church, Website, Digital

I. INTRODUCTION

Church services involve a variety of needs, including the needs of the congregation and the church ministry, so a church must adapt to the times and technology. Especially, in this digital era, digitalization can be a powerful tool to improve the quality of church services and meet the needs of the congregation [1]. The COVID-19 pandemic, which limits mobility and social interaction, has provided additional impetus to look for digital solutions that can help churches function optimally.

Based on the results of the surveys we conducted by interviewing pastors and deacons and observations that we conducted at the Bethany Tower of Christ Church with church pastors and church administrators. Researchers found a lack of an adequate congregational management system in meeting the congregation's increasing needs for information and services.
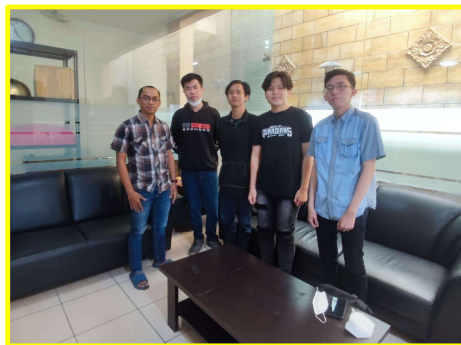

Fig 1. Documentation of Researcher's Interview with Church Administrator at Bethany Tower of Christ Church on September 25, 2023

Therefore, we want to make an update to the church management system by designing a church management system that is expected to provide solutions for this church in managing data, information, communication, and services more effectively and efficiently.

In this research, researchers used the waterfall method as an approach to developing the system to be designed. The waterfall method itself is a method that provides a structured description of system development with each phase by phase that must be completed, thus the researcher's planning will be more organized.

This management system is needed to be a useful tool for the church and congregation, and can increase the productivity of the church and congregation. In other words, this project aims to help the church transform into a church that is more connected, efficient, and responsive to the needs of the congregation in this ever-changing world. In other words, the project aims to help the church transform into a church that is more connected, efficient, and responsive to the needs of the congregation in this ever-changing world.

1.1 LITERATURE REVIEW

1. Church

A church is a place of worship for Christians to pray, praise, worship, and fellowship with God. In the church, Christians can also participate in various other religious activities, such as studying the Bible, singing hymns, and Sunday school or youth worship [2].

2. Management Information System

Management information system is the provision of information in various forms of output on computers or other system equipment that can be used by a person or

group of managers or non-managers in solving a problem or fulfilling the needs of an agency/company [3].

3. Website

Website is a collection of pages that display various types of text, image, audio, and video information linked together via hyperlinks on a web server. Websites allow people to communicate with others, transact, entertain, and search for information in cyberspace [4].

4. HTML

Hypertext Markup Language is a standard language that serves to organize the display while displaying various kinds of information and content such as images, text, animation to video on a web page and can be published online. HTML has a code writing structure called tags [5]. HTML documents consist of two elements or tags called head and body, where the head as the head of the document is used to place the identity of the file, while the body is used to organize content and other elements that will be displayed on the website [6].

5. CSS

CSS is (Cascading Style Sheets) used to organize the layout of components and the visual appearance of web pages. By using CSS, developers can control formatting [7].

6. JavaScript

JavaScript is a programming language that can enhance the running of the system and the appearance of the web-based application page being developed. This language consists of a collection of scripts that can run on HTML documents [6].

7. PHP

PHP is a script programming language that is processed on a computer server and is designed for web development. PHP has a syntax that is easy to learn and has many strong features that can support dynamic and interactive web development [8].

8. Bootstrap

Bootstrap is a CSS (Cascading Style Sheet) framework that is useful for designing website displays. Bootstrap provides convenience and benefits for web developers in creating websites. For example, Bootstrap provides a wide variety of CSS elements such as fonts, buttons, menus, and others that can be combined with JavaScript to create a more attractive and consistent interface. Bootstrap also has many ready-to-use CSS classes and plugins to help developers customize website design and style. Thus, Bootstrap has become one of the most popular front-end frameworks among web developers [9].

9. XAMPP

Xampp is a complete web server package that can be easily installed on various operating systems. This package includes Apache (webserver), MySql (database),

PHP (server-side scripting), and various other supporting libraries. Xampp can be on Linux, Windows, MacOS, and Solaris, making it possible to create a multiplatform web server [10].

10. MySQL

MySQL is a SQL database management system software that is capable of handling multiple threads and users simultaneously. MySQL can be used to manage database and also can be used to connect server database with software .MySQL is designed to manage databases with high speed and easy to use [11].

11. Unified Modeling Language

Unified Modeling Language (UML) is a way to visually display the analysis of a system. UML is also a model used to describe systems and objects [12].

12. Class Diagram

Class Diagram is a structured picture of a system by defining the classes created in designing a system consisting of attributes and operations. Class Diagram aims to adjust the relationship between software and design documentation [13].

13. Use Case Diagram

Use Case Diagram is a design of interactions that occur in the system. Use Case Diagrams can be used to understand the processes that are happening in the system [14].

14. Waterfall Method

The Waterfall method is a method with a framework that presents a flow of system and software design in sequence [15].

II. RESEARCH METHODOLOGY

In this study, researchers first analyzed the needs of the church in terms of church pages, devotionals/sermons, church news, requests, and event posts. From the results of this analysis, researchers made a system design in the class diagram model to provide a detailed description of the church management system structurally and use case diagrams to explain the role of actors contained in the church management system. For system implementation, researchers developed a system based on the system design design. The system that has been implemented, testing the system is carried out to ensure that the system is running well and smoothly. After that, researchers carry out regular system maintenance to ensure that the system can continue to run smoothly in the future and correct existing errors.
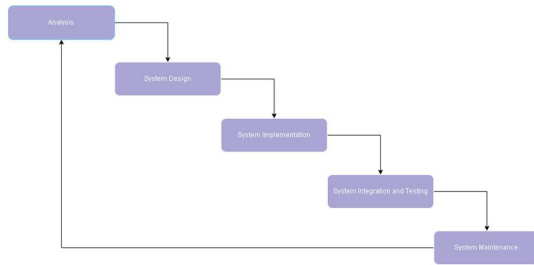
Fig 2. Waterfall Method

1. Analysis

Researchers conducted a survey by interviewing the pastor and the Bethany Tower of Christ church management.

2. System Design

Researchers drafted a system design along with its features and then consulted with the church to ensure that the information system created could suit the needs of the church.

3. Implementation System

Researchers implement the system design that has been designed into a complete system with its functions.

4. System Integration and Testing

The system that has been implemented is integrated into a unified system as a whole to be tested through hosting to ensure the system is functioning properly or needs improvement. The system testing process is carried out by both researchers and congregations through surveys given. So that the results obtained can help the maintenance process carried out after that.

5. System Maintenance

After testing the website along with conducting surveys and interviews at Bethany Tower of Christ church, repairs are made to existing bugs and improvements to existing features. So that the system runs well

III. RESULTS AND DISCUSSION
3.1. Analysis and Identification
3.1.1 Analysis Method

1. Interview Method

Data collection related to church needs / problems is carried out directly in the field by interviewing researchers with the pastor as well as the Bethany Tower of Christ church management.

2. Observation Method

Researchers observed the website that the Bethany Tower of Christ church had previously owned to observe the shortcomings / problems that the website had.

3. Literature Study

Researchers conducted a literature review in order to ensure that the system created can run well and can find out what features are needed.

3.1.2 Problem Identification

Based on the analysis conducted by researchers, several core problems were found as follows:

1. The current website has shortcomings in providing features for requesting congregational assistance to the church.

2. The current website lacks detailed information related to an event including notifications for upcoming events.
3. Lack of integration between information systems with church service features.
4. The importance of integration and development of church information systems to support digitalization.

3.2. System Architecture Diagram
1. Class Diagram Relation
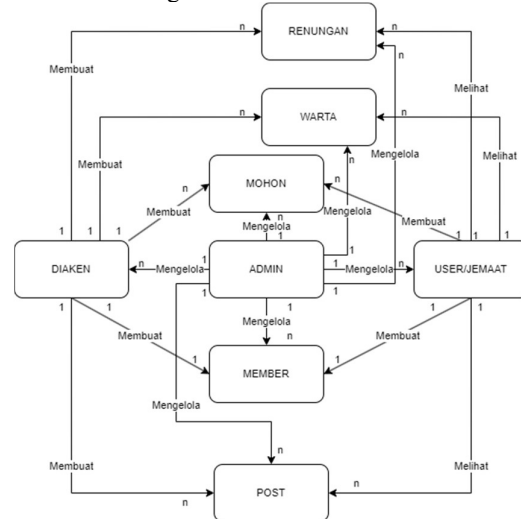
Fig 3. Class Diagram Relation

In this class diagram, we can see the relationships that occur in the flow of the system, where 8 classes consist of users/congregations, deacons, and admins as actors who have their respective roles for each system menu, namely members, posts, news, requests, and devotionals.

The administrator role encompasses the capacity to oversee all facets of the system, including user and member management, as well as the addition and deletion of devotionals, newsletters, and posts. Administrators can also review requests submitted by congregants. Similarly, the Deacon role shares these responsibilities but lacks the authority to control other users and members. In contrast, regular users are limited to viewing devotionals, newsletters, and posts, with the added capability to submit requests for assistance from the church regarding matters such as marriage, baptism, etc. Furthermore, users have the option to register for upcoming events and can also sign up as members via the website.

2. Class Diagram Properties

Fig 4. Properties of Class Diagram as System Menu

Based on the class diagram relationship, there are member, post, news, request, and devotional classes that describe the system menu with various attributes and methods owned by each class.

Fig 5. Properties of the Class Diagram as a System Actor

In addition, in the class diagram relationship there are 3 classes as actors of the system consisting of users / congregations, admins, deacons with each attribute and method owned by each class.
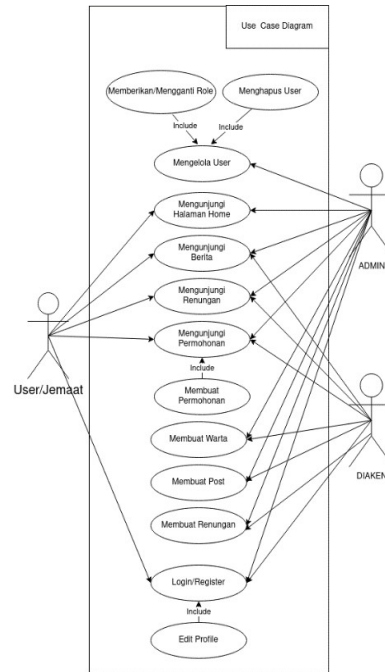
3. Use Case

Fig 6. Use Case Diagram

As can be seen in the use case diagram design above, in this system design there are 3 actors, namely Admin, Deacon / Church Servant, User / Congregation with their respective roles and flows. Starting from the admin who can manage user accounts and requests made by users as well as the creation of various kinds of services and information, such as adding news, devotionals, events, and other information related to the church cannot be separated from access to visit these pages. Then deacons have almost the same access as admins in adding church information, newsletters, devotionals, events, and managing user requests. However, deacons cannot manage user accounts. In contrast, users can only visit the home page, news, devotionals, and posts, to see various information that has been published by the admin and deacons and visit the application page including submitting a request to the church for something.

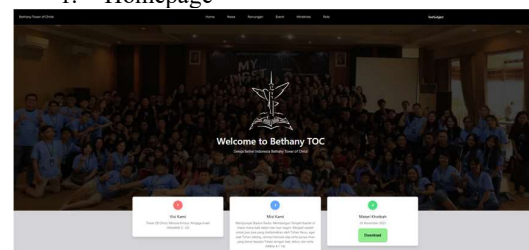**3.3. Implementation**
1. Homepage
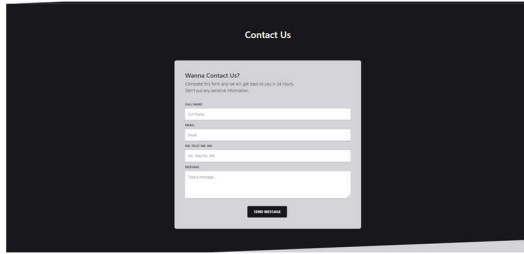

Fig 7. Top View of the Home Page

Fig 8. Bottom View of the Home Page

On the main page there is a church homepage feature which can be seen in Figure 3 and there is a feature to contact the church which can be seen in Figure 4.
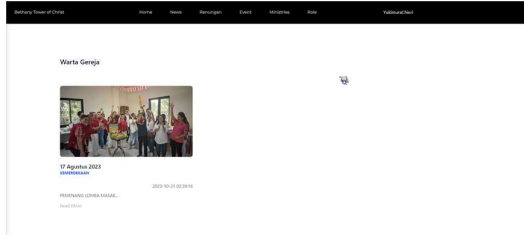
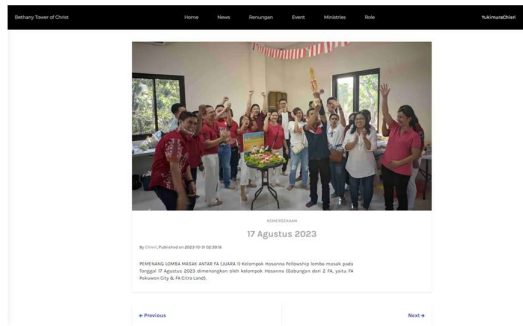2. Church News Page

Fig 9. Church News List Page

Fig 10. Church News Page

On this page, the system displays various kinds of church-related information presented in the form of news.
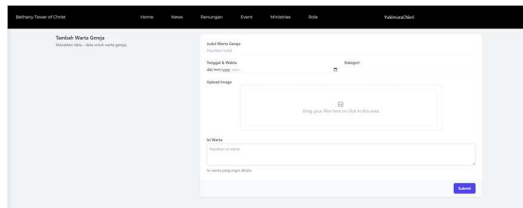

Fig 11. Display of the Form for Adding Newsletters

On this page the deacon/admin can add church news so that church news can be seen as can be seen in Figures 8 and 9.

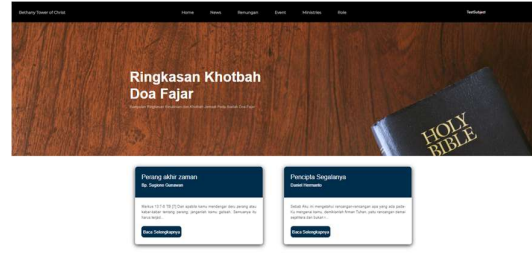3. Dawn Prayer & Sermon Summary Page

Fig 12. Dawn Prayer & Sermon Summary Page

On the sermon summary and dawn prayer page there is a feature that can be used to view the summary of sermons and dawn prayers that are already available.
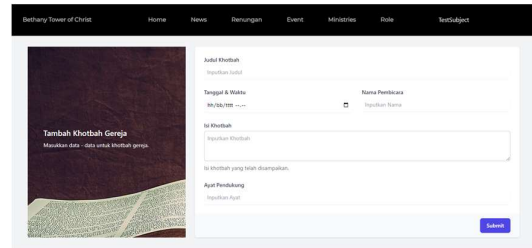

Fig 13. Form for Adding Dawn Prayer & Sermons

This page contains a form for adding church sermons & dawn prayer that will later be displayed on the dawn prayer & sermon summary page, as can be seen in Figure 12.
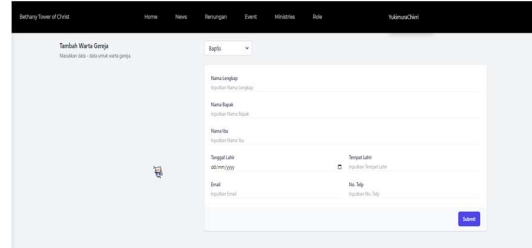
4. Application Form Page

Fig 14. Application Form Page

On this page, the system displays a request form that can be filled in and submitted by the user to the church service.
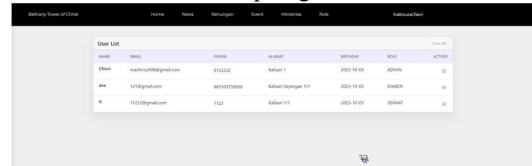
5. User Role Setup Page

Fig 15. User Role Setup Page

This page is used by Admin to view user data and change or set the role types of all users.
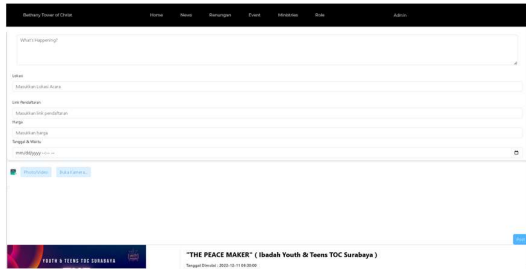
6. Event Page

Fig 16. Event Page (With Admin/Deacon Role)

The picture above is the admin or deacon page for uploading events in the Church that will run or have already run
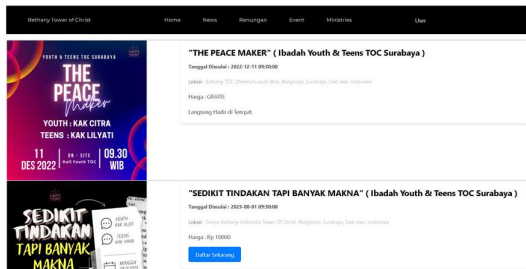

Fig 17. Event Page (With Congregation Role)

This page is intended for users/congregations to be able to view and register for events that will run.
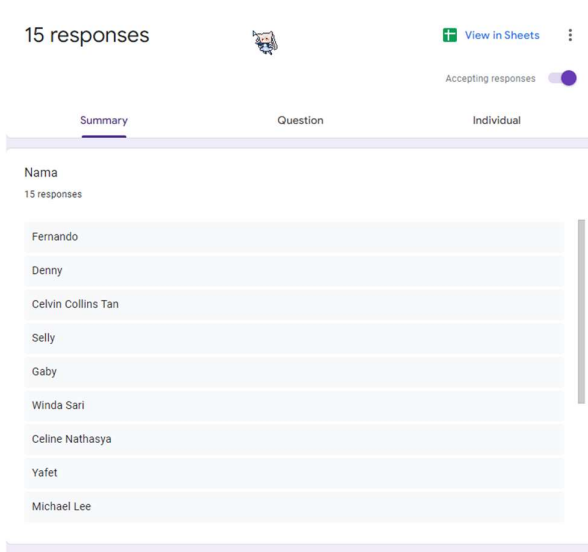
3.4 Survey Results

Figure 18. Survey Respondent Name List 1

Fig 19. Survey Respondent Name List 2

As can be seen in the Figure 18-19, there are 15 respondents who give responses to the church website assessment survey, ranging from congregations to church administrators.

Fig 20. Results of the First Question of the Website Satisfaction Survey

The first question of the survey showed an average score of 91.2%, with 60% of respondents giving a perfect score of 10. This reflects the respondents' satisfaction as church members with their experience using the website.

Fig 21. Results of the Second Question of the Website Satisfaction Survey

The second question of the survey showed an average score of 86.8%, with 33.3% of respondents giving a perfect score of 10. This proves that the website can help facilitate what respondents' needed.

Apakah Anda merasa bahwa website kami menyediakan informasi yang cukup untuk memenuhi kebutuhan Anda? (1: Tidak Cukup - 10: Sangat Cukup)
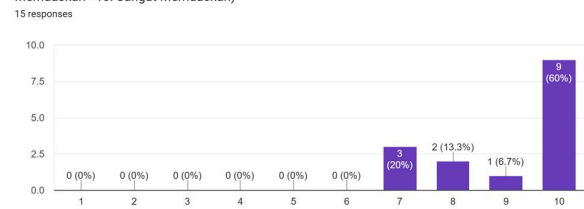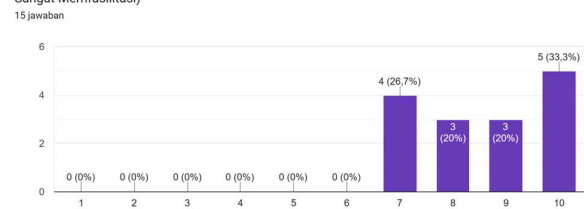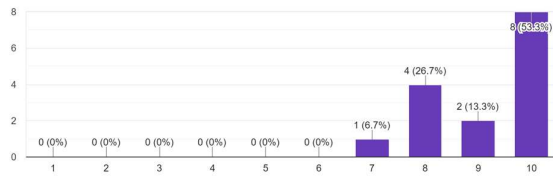15 responses

Fig 22. Results of the Third Question of the Website Satisfaction Survey

The third question of the survey showed an average score of 91.8%, with 53.3% of respondents giving a perfect score of 10. This shows that respondents feel fulfilled with the information and information features provided on the website.

Berikan nilai dari 1 hingga 10 untuk kemudahan penggunaan website GBI Bethany TOC. (1: Sangat Sulit - 10: Sangat Mudah)
15 responses

Fig 23. Results of the Fourth Question of the Website Satisfaction Survey

The fourth question of the survey showed an average score of 92.5%, with 53.3% of respondents giving a perfect score of 10. This proves respondents' ease of use of the website

Dari skala 1 hingga 10, seberapa mungkin Anda akan menggunakan website kami di masa depan? (1: Tidak Mungkin - 10: Sangat Mungkin)
15 responses

Fig 24. Results of the Fifth Question of the Website Satisfaction Survey

The fifth question of the survey showed an average score of 91.2%, with 53.3% of respondents giving a perfect score of 10. This proves that respondents agree to use the website in the future.

Seberapa puas Anda dengan tampilan dan desain keseluruhan website kami? (1: Tidak Memuaskan - 10: Sangat Memuaskan)
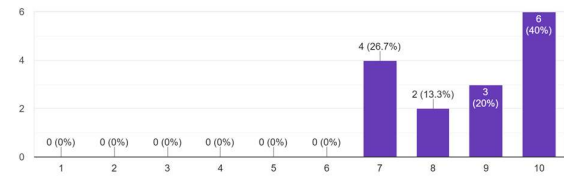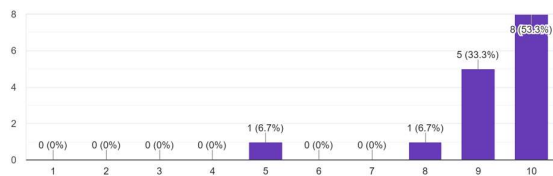15 responses

Fig 25. Results of the Sixth Question of the Website Satisfaction Survey

The sixth question of the survey showed an average score of 86.8%, with 40% of respondents giving a perfect score of 10. This shows that respondents feel the appearance and design on the website has satisfied church members.

Seberapa sering Anda mengalami kesalahan teknis atau bug saat menggunakan website kami? (1: Sering - 10: Jarang Sekali)
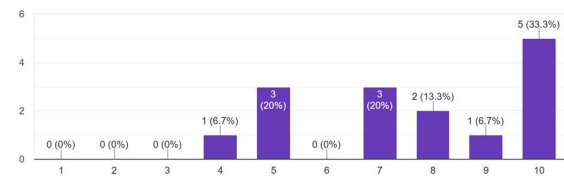15 responses

Fig 26. Results of the Seventh Question of the Website Satisfaction Survey

The seventh question of the survey showed an average score of 76.2%, with 33% of respondents giving a perfect score of 10 followed by 20% scoring 5 and 7 as well as 6.7% scoring 4. This shows that although some respondents rarely encounter technical errors/bugs, there are also some respondents who feel there are problems with technical errors/bugs when running the website.

Seberapa mungkin Anda akan merekomendasikan website kami kepada orang lain? (1: Tidak Mungkin - 10: Sangat Mungkin)
15 responses

Fig 27. Results of the Eighth Question of the Website Satisfaction Survey

The eighth question of the survey showed an average score of 81.8%, with 40% of respondents giving a perfect score of 10. This shows that it is very likely for some respondents to recommend our website to others.
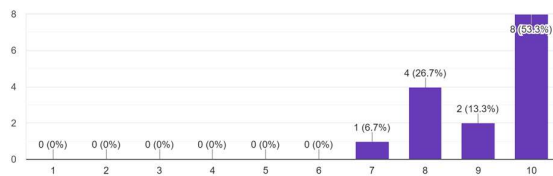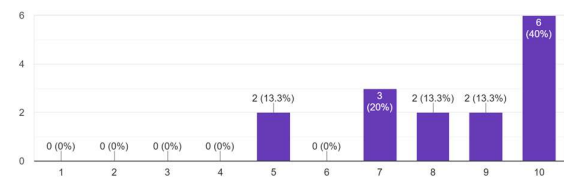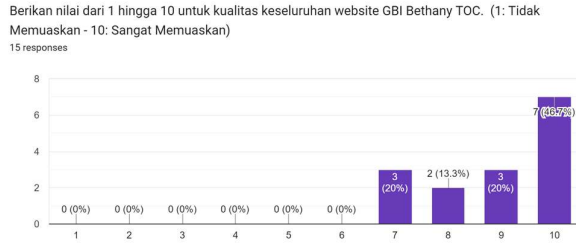
Fig 28. Results of the Ninth Question of the Website Satisfaction Survey

The ninth question of the survey showed an average score of 86.8%, with 46.7% of respondents giving a perfect score of 10. This shows that respondents are satisfied with the overall quality of the website.

Fig 29. Collection of Website Satisfaction Survey Respondent Suggestions 1
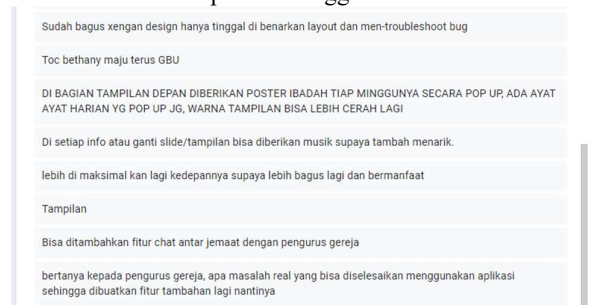

Fig 30. Collection of Website Satisfaction Survey Respondent Suggestions 2

The last question of this survey is a suggestion for the development of the website designed by the researcher. Some respondents suggested adding chat features, design or appearance can be arranged better, adding content to some features, and so on.

IV. CONCLUSION

Based on the results obtained from the survey of respondents' assessment of the website designed by the researcher, overall, an average assessment of 87.3% was obtained, indicating that the website is feasible and has impressive respondent satisfaction.

So it can be concluded that the system can help the needs of its congregation, both for the fulfillment of church information and the fulfillment of church services. Even so, researchers still find weaknesses in this system, one of which is the lack of features such as direct chat to the church, the display design needs to be better organized and other features added. Researchers also realize the need to improve the website to avoid bugs. All of these weaknesses motivate researchers to work on further system maintenance and development of the website to improve the user experience.

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