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Scheduling Information System Design Biblical Understanding (PA) In GKS Jemaat Wulla Website-Based

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Abstract

The development of information technology in the digital era has a significant influence on various areas of life, including religious services. The Sumba Christian Church (GKS) Jemaat Wulla t is one of the congregations that routinely carries out PA activities at the household, environment, and other service categories. However, the PA scheduling process that is still carried out manually causes various problems, such as overlapping schedules, and delays in obtaining information on the schedule of the current understanding. This research aims to design and build a website-based PA scheduling information system to assist the GKS Jemaat Wulla in managing PA activities more effectively, efficiently, and structured. The development of the system is carried out using the Extreme Programming (XP) method, an Agile approach that emphasizes flexibility, intense collaboration with users, and continuous testing to ensure that the resulting software is of good quality and adaptive to changing needs. The XP stages that are implemented include planning, designing, coding, and testing. The results of this study resulted in a website-based PA scheduling information system that is able to automate the scheduling process, reduce the potential for manual errors, and provide real-time access to information to administrators and congregations. This system is expected to support increasing the effectiveness of church services, facilitate coordination of PA implementation, and encourage jemaat participation through the provision of more accurate, fast, and transparent schedule information.

Keywords: *Information Systems, Scheduling, PA, Websites, Extreme Programming Methods* (XP).

1. Introduction

The development of information technology in the current digital era has had a very significant impact on various aspects of human life, including in the field of religious services [1]. The use of technology is no longer limited to the world of industry, education, and business, but has penetrated into the realm of spiritual service. The Church as a religious institution has the responsibility to adapt to these developments so that service activities and faith building of the congregation can be carried out more effectively, efficiently, and organized. [2]. The Sumba Christian Church (GKS) Jemaat Wulla is one of the congregations under the auspices of the GKS Synod and plays an important role in fostering the faith life of the congregation through various ministry activities. As a church that is firmly rooted in the Christian tradition on the island of Sumba, GKS Jemaat Wulla has a great responsibility in maintaining the spiritual growth of the congregation through spiritual development activities, one of which is PA which is carried out regularly at the household, environment, and other service categories. PA activities are the main means to deepen the congregation's understanding of God's word, strengthen togetherness, and increase congregational participation in church life.

Based on the results of interviews on October 22, 2025, PA activities often face a number of obstacles in terms of schedule management, participant coordination, and activity recording. So far, the process of scheduling PA activities at GKS Jemaat Wulla is still carried out manually, namely through recording in the agenda book which will be announced on Sunday and verbal communication between the management and members of the congregation. This method is not only difficult in terms of data collection, but also often causes misinformation, schedule clashes, congregations cannot get the PA part within 2 instead of 3 months, there are congregations that get the PA schedule more than 1 time a week and delays in delivering information to congregation members. With these conditions, an information system is needed that can automate the scheduling process, speed up the dissemination of information, and improve the accuracy of data on Bible Understanding activities in households at GKS Jemaat Wulla.

With a website-based PA Scheduling Information System, it is an innovative solution to answer these challenges. This certainly supports information disclosure and facilitates coordination between servants, administrators, and congregations. In addition, the website-based system also allows integration with additional features such as auto reminders and digital PA activity reports. The novelty of this research is to use the Extreme Programming (XP) method which is an Agile Development approach. In manual systems, the scheduling process is often time-consuming and prone to human error, especially when the number of PA groups grows. The XP method emphasizes intense collaboration between developers and users, continuous testing, and flexibility in responding to changing system needs. With this approach, the development process can run faster, more efficiently, and produce a system that meets user expectations.

2. Literature Review

2.1. Understanding The Bible

Understanding the Bible is an attempt to interpret and live the truths of God contained in the Christian Scriptures so that they can be applied in daily life as a strong foundation of faith and moral guidance. This process involves a sensitive attitude to spiritual truth, a desire to apply divine teachings, and an understanding of the nature and function of the Bible as the authoritative Word of God [3].
According to Gurning, (2021) Biblical Understanding (PA) refers to the process carried out by individuals or groups to deepen their understanding and knowledge of the content of the Bible, the holy book in Christianity. Biblical study involves an intensive and careful study of biblical texts, including their historical, cultural, and linguistic contexts. Bible study is very important for young people because it brings important benefits in aspects of their lives. The benefits of Bible Understanding for youth are a better understanding of religious teachings, faith strengthening, character building, guidance in facing life's challenges, healthy leadership development, developing an attitude of responsibility and forming a strong community [4].

2.2. Information Systems

Information systems are systems that contain a network of data processing systems, which are equipped with communication channels used in data organization. A series of formal procedures in which data is collected, processed into information and distributed to users. Information Systems is also defined as a software system to capture, transmit, store, retrieve, manipulate, or display information in order to support other people, organizations, or software systems [5].

2.3. Scheduling

Scheduling is the arrangement of scheduling operations that includes allocating facilities, equipment or labor for an operation and determining the activities of implementing activities. A web-based scheduling information system is a system used to collect data and at the same time manage a schedule. The scheduling information system is intended to facilitate an activity. A schedule is defined as something that explains where and when to be at a certain time (Panjaitan, 2022). Scheduling is the decision-making process with respect to allocating limited resources to tasks over time that have the goal of optimizing. Resources and tasks can come in many forms. The purpose of scheduling is to minimize the time needed (Darmansah, 2020). In the context of information systems, scheduling is defined as the process of managing schedule data in a structured and computerized manner to support the planning, control, and supervision of activities. The scheduling information system allows for the storage, processing, and presentation of schedule information quickly and accurately, making it easier for users to access and update the schedule of activities (Kadir, 2014). Based on some of these opinions, it can be concluded that scheduling theory is a basic concept that emphasizes the systematic management of time and resources to achieve efficiency and effectiveness in the implementation of activities, especially when implemented in a technology-based information system.

2.4. Website

A website is a collection of digital pages that are interconnected in a single domain (unique address on the internet) and can be accessed through the internet network using a browser. Each page on the website contains various elements such as text, images, audio, video, and links that are structured to convey information or provide certain services to users [6].
Websites can be static or dynamic. Static websites display content that is fixed and does not change frequently, while dynamic websites are able to automatically adjust content based on user interaction or data from databases (Wahyuni, 2021). In the context of the development of modern information systems, websites play an important role as a medium of communication, promotion, education, and online transaction platforms. Its function is not only limited to the presentation of information, but also includes interactive capabilities and integration with other technologies such as cloud computing, APIs, and web-based frameworks (Putra & Santoso, 2019).

2.5. Extreme Programming (XP)

Extreme Programming (XP) is one of the methods in the Agile Software Development approach that focuses on improving software quality and adaptability to changing user or customer needs [7]. XP emphasizes disciplined software engineering practices with the goal of producing high-quality software through close collaboration between developers and users, short iterations, and continuous feedback. According to Pressman and Maxim (2020), XP is one of the lightweight development models that puts customers at the center of decision-making, with a fast and flexible development cycle. In XP, software is developed in a series of short iterations (usually 1–2 weeks), during which each iteration produces a working version of the product.

3. Research Methods

3.1. Research Flow

This research was conducted at GKS Jemaat Wulla, Sumba Christian Church the Jemaat Wulla is a church under the auspices of the Sumba Christian Church Synod which was established on November 4, 2015. Churches that are independent and mature have their characteristics that they have ordained pastors as pastors of the congregation, including elders and deacons as church functionaries who serve in that place The Sumba Christian Church Jemaat Wulla is located on Jl. Raya Melolo – Wulla Waijelu, Wulla Village, Wulla Waijelu District, East Sumba Regency, East Nusa Tenggara. The Sumba Christian Church of the Jemaat Wulla has approximately 180 members who have the right or who have professed to believe (sidi), namely from 86 heads of families. The research flow serves as a framework that describes the stages in the implementation of the study. These stages consist of several main components, namely

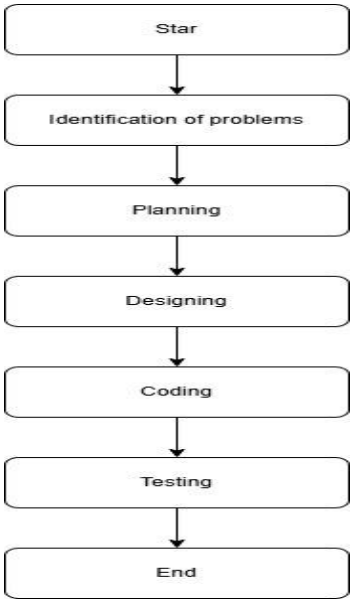

Fig. 1: Research Flow

Figure 1 illustrates the flow of research that began with the identification of the problem of scheduling PA in the GKS Jemaat Wulla which is still done manually. The planning stage is carried out to determine the needs of the system through observation and interviews. Next, system design was carried out using UML diagrams and interface design, then web-based system coding with PHP and MySQL iteratively according to the Extreme Programming (XP) method. The testing phase is carried out using Black Box Testing, and ends with the implementation of the system and evaluation through user training and feedback.

3.2. Development Methods

The development of this system uses the Extreme Programming (XP) method as an agile approach to ensure that the resulting software is flexible, easily adaptable to user needs, and of high quality through the application of iterative engineering practices and continuous testing. Thus, the object of this research not only covers the software products produced, but also covers the development process based on the XP stages, such as planning, designing, coding, and testing[8].

3.3. Functional Needs Analysis

The system needs in this study are described into 2 parts, namely hardware and software. The following is an explanation of the device used,

a Hardware is:
   1. Intel Core i3 processor
   2. 4 GB Memory
   3. Hard Drive 500 GB

b Software is:
   1. Microsoft Windows 10 Operating System and above
   2. XAMPP

3.4. Systems Modeling

The system design process offered aims to identify the features or functions that must be possessed by the system in order to run according to user needs. The needs analysis process is carried out using the Unified Modeling Language (UML) approach as a tool to visualize the system design. The UML used is a use case diagram, activity diagram, sequence diagram and class diagram[9].

1. Use Case Diagram

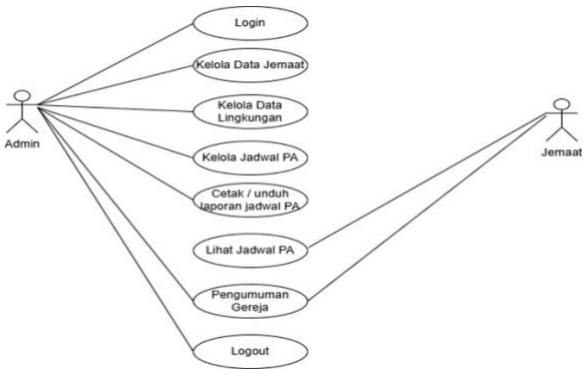

Fig. 2: Use Case Diagram

In Figure 2, there are two actors in the system, namely the Admin and the Congregation. Admin is the congregational assembly that is in charge of managing congregation data, neighborhoods, PA schedules, reports, and user accounts, while the congregation only has access to view the PA's schedule and church announcements. The main use case is login, which allows admins to access all system management features.

4. Analysis and Discussion

4.1 Analysis

Based on the results of observations and interviews conducted with the GKS Jemaat Wulla, it is known that the process of scheduling PA is still carried out manually and often causes obstacles, such as recording errors, overlapping schedules, and delays in delivering information to the congregation. The limitations of an integrated information management system cause the administrative process of PA activities to be less effective. As a solution to this problem, a web-based PA scheduling information system was developed that functions to manage congregation data, neighborhood data, PA activity schedules, and church announcements centrally and in real-time. With this system, it is hoped that PA schedule management can be carried out more effectively, accurately, and easily accessible by admins and congregations

4.2 Planning

At the system design stage, the process flow and system structure are thoroughly designed according to the needs of the user. The system was developed as a web-based PA scheduling information system that centrally manages data. The design includes the preparation of UML diagrams as well as the design of the user interface to support the ease of use of the system. The system supports two types of users, namely:

1. The congregation, which acts as a system user with access rights to view the PA schedule and church announcements.
2. Admin, which is a congregational assembly that has access rights to manage congregation data, neighborhood data, PA activity schedules, church announcements, and user accounts.

4.3 Implementation

The implementation phase focuses on the use of a web-based PA scheduling information system by each user's role according to their access rights. At this stage, the system is still running locally through localhost. Every feature that has been developed, such as congregation data management, PA schedules, and church announcements, is tested and used according to its function. The interface and functionality of the system that have been built are shown in the following images.

a) Login Page

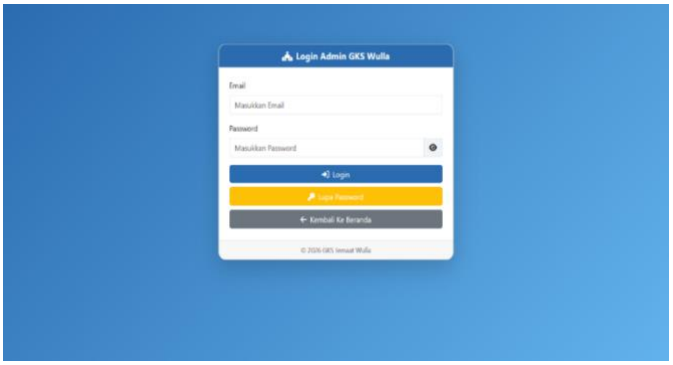

Fig. 3: Login Page

This view is used by admins to log in to the system by entering a username and password. This view is designed to make access rights easier.

b) Admin Page

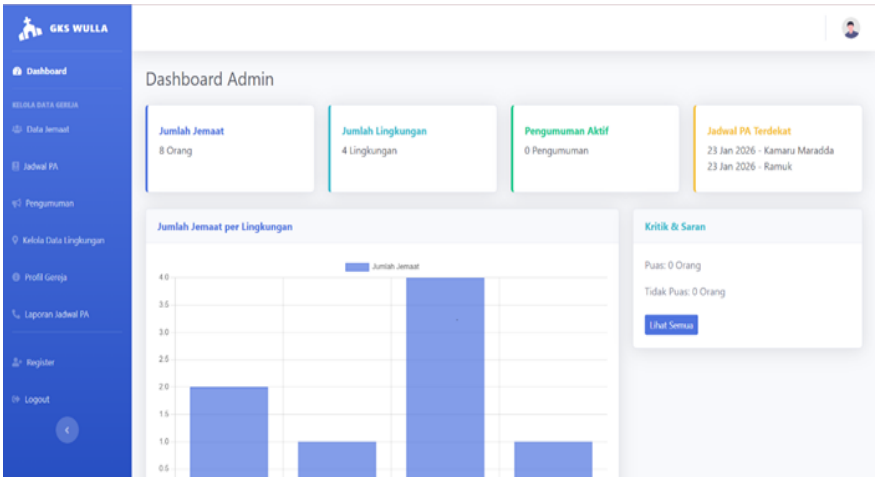

Fig. 4: Admin Page

After successfully logging in, the admin is directed to a dashboard page that displays a summary of system information, such as the number of congregation data, the environment, and the PA schedule. On this page, there is also a navigation menu on the left side to access the Home, Church Data, Environment Data, Manage PA Schedule, Announcements, and Logout features.

c) User Home View

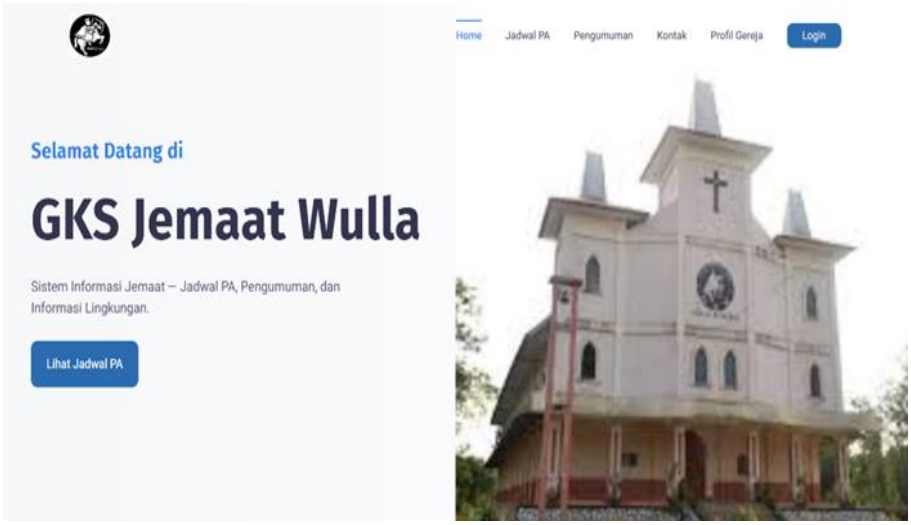

Fig. 5: User Home View

On the main page of the system, admins and congregations can access services according to their respective roles. Congregations can view PA schedules and church announcements through the available menu, while admins can log in to the system through the login menu to manage data. The main navigation on this page includes the Home menu, PA Schedule, Announcements, contacts, Church profiles and Loguot.

d) PA

Fig. 6: Bible Understanding Schedule

Figure 6 shows the Bible Study Schedule (PA) page which contains the PA schedule information in a structured manner, including date, time, household, speaker, companion, and environment. This page serves as an information medium for the congregation to find out the latest PA schedule as well as a complete list of PA activities that have been determined by the church admin.

d) Announcement of the Church

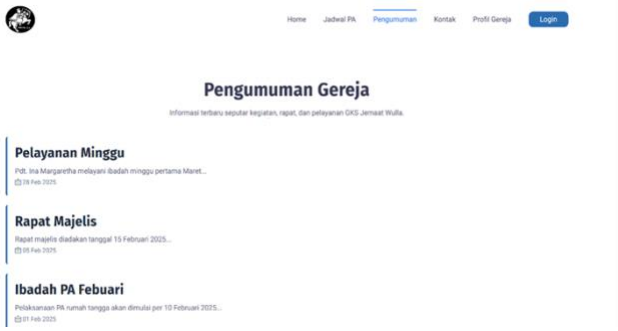

Fig. 7: Congregational announcement

Figure 7 shows the Church Announcements page which contains the latest information regarding activities, meetings, and services at the GKS Jemaat Wulla. This page serves as a medium for delivering official information to the congregation so that announcements can be accessed easily and on time.

4.4 Testing

The system testing stage is carried out using *the black-box testing* method. This method is used to ensure that every function in the system runs according to the set objectives and is able to produce accurate outputs. Testing is carried out on all the main features of the system, including the login process, disease symptom input, disease data management, and the disease diagnosis process of corn plants. In addition, testing was also carried out using 10 test case scenarios compiled based on a combination of symptoms from several corn plant diseases, such as mildew, leaf spot, root and stem rot, and leaf rust. The test results showed that the system was able to identify maize crop diseases with an accuracy rate of up to 80%, which indicates that the system has been functioning properly and is able to provide diagnostic results that are in accordance with the symptoms entered by the user.

5. Conclusion

Based on the results of research and development of the GKS Jemaat Wulla PA system, it can be concluded that the system built has succeeded in meeting the basic needs in congregation data management and PA. This system is designed by paying attention to the principles of ease of use, data order, and efficiency in recording. Features such as congregation data management, grouping by environment, and graph-based dashboard visualization provide optimal support for church administration in managing and monitoring congregation development digitally.

The use of form capital in the data input process makes user interaction more dynamic and fast without the need for page moves. In addition, the integration of a clear navigation menu and a minimalist user interface has supported a good user experience, especially for church managers who may not have a strong technical background. Based on the tests carried out, the system has been functioning properly and stably in carrying out its functions.

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