

THE ANALYSIS AND DESIGN PHASE OF DEVELOPING WEB-BASED THESIS GUIDANCE MONITORING INSTRUMENT

Gst. Ayu Vida Matrika Giri

Udayana University

vida@unud.ac.id

ABSTRACT

Thesis is one of the requirements needed for students to complete their undergraduate studies and get their bachelor's degree. Since the Covid-19 pandemic began, students and supervisors have to try to be creative and innovative to do the thesis guidance process with minimum or even without face-to-face meeting. There are various ways that have been done by students and supervisors to overcome the problem of thesis guidance, such as using emails, online chatting platforms, doing online meetings, or sharing documents in cloud storage. In some cases, the thesis guidance process cannot be done properly because there are no clear progress records of guidance activities. The supervisors don't have the guidance records and have difficulty contacting students who have to complete their thesis. The students who currently have no obligation to come to campus might not get a good guidance. Before the Covid-19 pandemic, students and supervisors relied on the guidance form that filled by students and signed by supervisors every thesis guidance activity. Today, the guidance form that is usually used as an activity record for both students and supervisors is barely used because the online guidance activities. A thesis guidance instrument that can be accessed online by students and supervisors can overcome the problem of recording student thesis progress. This paper will describe the requirement gathering phase and system design phase of the thesis guidance instrument that will be implemented as a web-based application in Informatics Study Program, Udayana University.

Keywords: monitoring instrument, system analysis, system design, thesis guidance, web-based application.

1. INTRODUCTION

Thesis project is a scientific work compiled by students in each study program based on the results of research carried out carefully. In making the final project, it is necessary to have a supervisor who is in charge of guiding students by providing opinions and input in completing the thesis (Asparizal, et al., 2021). Thesis is one of the requirements needed for students to complete their undergraduate studies and get their bachelor's degree. Since the Covid-19 pandemic began, students and supervisors have to try to be creative and innovative to do the thesis guidance process with minimum or even without face-to-face meeting. There are various ways that have been done by students and supervisors to overcome the problem of thesis guidance, such as using emails, online chatting platforms, doing online meetings, or sharing documents in cloud storage. In some cases, the thesis guidance process cannot be done properly because there are no clear progress records of guidance activities.

Before the Covid-19 pandemic, students and supervisors relied on the guidance form that filled by students and signed by supervisors every thesis guidance activity. Today, the guidance form that is usually used as an activity record for both students and supervisors is barely used because the online guidance activities. It causes the supervisors don't have the guidance records and have difficulty contacting students who have to complete their thesis and the students who currently have no obligation to come to campus might not get a good guidance.

The impact if the issue is not quickly resolved is that the supervisor will have difficulty in monitoring or guiding their students and difficulty in contacting students, and this will cause more students will not graduate on time. This also will affect the study program's accreditation status if many students do not graduate on time. Some researchers have researched to solve similar problems, some of them are Utoyo, et al (2018), Rosman, et al (2021), and Fakhri and Delianti (2021). The systems they made have made it easier for students and supervisors to exchange informations related to thesis work, assisting the supervisors in monitoring the students, and the supervisors can provide guidance to their students without having to meet in person.

In Informatics Study Program, Uvayana University there is also another problem faced by Thesis Commission and Supervisors; Students who exceeded the study period (more than four years) usually don't contact their supervisors thus supervisors might forget their progress. It will also affect study program performance and accreditation status. A thesis guidance instrument that can be accessed online by students and supervisors can overcome the problem of recording student thesis progress and further will help to increase the number of students who graduated on time. The system in the form of a web also can help the thesis guidance process because it can be done online or without meeting in person (Kusuma, 2028). This paper will describe the analysis phase and design phase of the thesis guidance monitoring instrument that will be implemented as a web-based application in Informatics Study Program, Udayana University.

2. RELATED RESEARCH

Some researchers have conducted research related to the problem of monitoring student's thesis progress. Utoyo, et al. (2018) built a thesis monitoring system that helped the supervisors to supervise and monitor progress of their students. The system also helped the students to know the remaining time they have to complete their thesis (Utoyo, et al., 2018).

Rosman, et al (2021) built an online web-based thesis guidance information system to overcome guidance process problems such as students cannot meet their supervisors in person because their supervisor is out of town or because of the cases of Covid-19. The system built has helped supervisors to supervise their students without meeting them in person (Rosman, et al., 2021).

Fakhri and Delianti (2021) design and implemented an online thesis guidance information system using PHP framework Codeigniter. This information system is implemented to shorten time of manual thesis guidance, overcome unsuitable of guidance time between students and supervisors, and reduce paper files. The system has helped supervisors and students who doesn't have the suitable time to meet in person and helped them to exchange information easier (Fakhri & Delianti, 2021).

3. RESEARCH METHODOLOGY

Data collection methods are carried out to obtain relevant, reliable, and accurate data. The following are some of the data collection methods used in the study are interviews and literature studies. Interviews were conducted with Informatics Study Program Coordinator, Chairman of Thesis Commission, Supervisors, and Students who are involved in thesis guidance process to get guidance data functional system requirements, and non functional system requirements. Literature studies includes

reading books and literatures that are related to the problem, including collecting forms used in the thesis guidance process and reading thesis guide document.

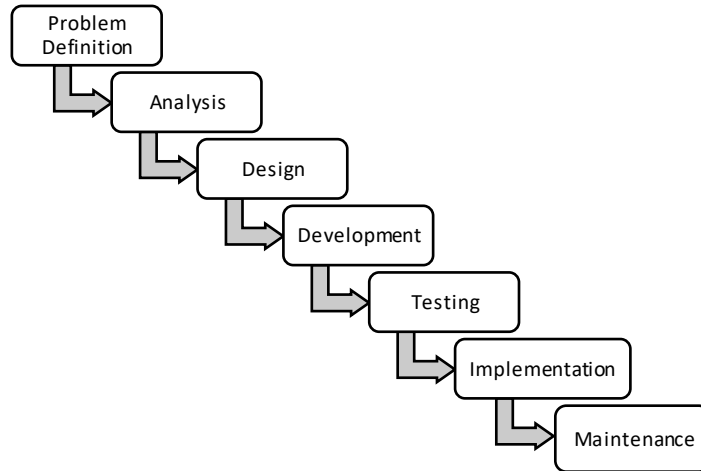


Figure 1. Waterfall Model in SDLC
 Source: Yen (2009)

The system development method used in this research is the waterfall model, the basis for most system analysis and design methodologies in the system development life cycle (SDLC). It is called the waterfall model because it visually suggests work cascading from step to step like a series of waterfalls like shown in Figure 1 (Yen, 2019). The first phase of waterfall model is problem definition, it is done to identify the problem, determine its cause, and outline a strategy for solving it. The second phase is analysis which objective is to determine what must be done to solve the problem. The objective of design phase is to determine how the problem will be solved. The system is created during development phase. Once the system is developed, it is tested to ensure that it does what it was designed to do. Next, the system is implemented, released to the users, and maintenance phase begins.

4. RESULTS AND DISCUSSION

Based on the problem identification, there are three actors involved in the process of thesis guidance monitoring, they are students, supervisors, and administrator which consist of the Study Program Coordinator and the Chairman of Thesis Commission. Those actors can do some activities in the thesis guidance monitoring instrument.

In the analysis phase, interview was conducted with Informatics Study Program Coordinator, Chairman of Thesis Commission, Supervisors, and Students. After the interview, activities that can be accessed by each user was analyzed. The activities or functional requirements for every user can be seen in Table 1.

Code	Functional Requirements	Actor
FR001	Create, read, and update thesis data	Student
FR002	Create guidance data	Student
FR003	Read guidance from supervisor	Student
FR004	Read progress bar	Student
FR005	Read announcement	Student
FR006	Update and read thesis data	Supervisor

Code	Functional Requirements	Actor
FR007	Create and read guidance data	Supervisor
FR008	Create and read progress data	Supervisor
FR009	Create and read announcement data	Supervisor
FR010	Read student data	Supervisor
FR011	Create, read, update student data	Administrator
FR012	Create, read, update thesis data	Administrator
FR013	Create, read, update guidance data	Administrator
FR014	Create, read, update progress data	Administrator
FR015	Create, read, update announcement	Administrator
FR016	Receive notification Email	All Actor

The design phase was conducted after the analysis phase completed. This phase consist of making system flow design, database design, and user interface design. The main system flow design for guidance activity is shown in Figure 2. The thesis guidance process starts from students filling guidance data. When the guidance data is saved, the system sent a notification email for supervisor to open the monitoring instrument. Supervisor who received guidance data should give response and check student's thesis progress. If the student ready for examination, the system will send an email notification to student informing to prepare for examination, if not the system will send an email notification to student informing to do some revision and report in another meeting.

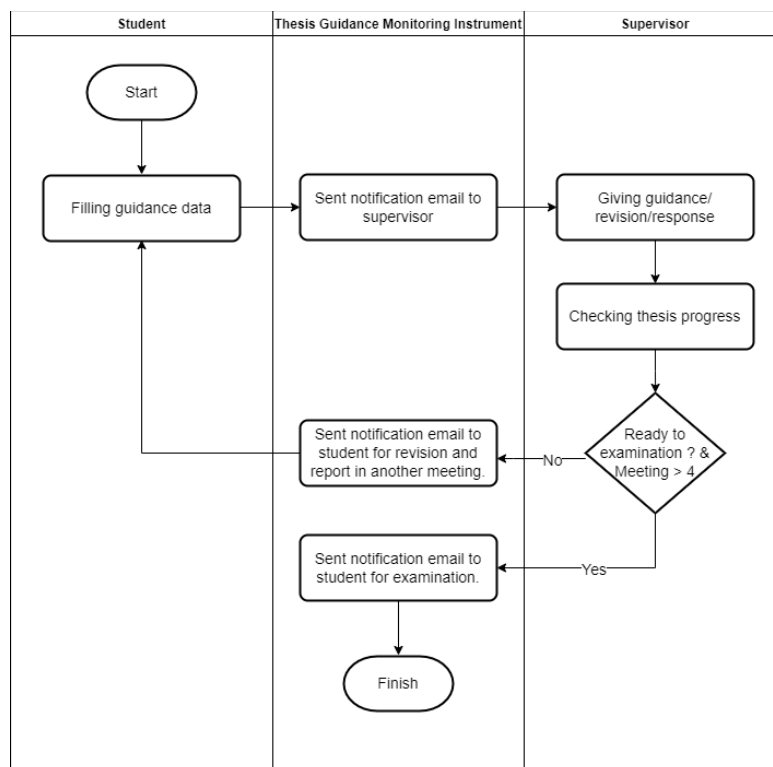


Figure 2. System Flow of Thesis Guidance Monitoring Instrument

The database of the thesis guidance monitoring instrument consist of six tables; user, mahasiswa, pegawai, bimbingan, tugas_akhir, and pengumuman. User table consists of user's data such as user id and email, mahasiswa table consists of student's data such as name and phone number, pegawai id consists of supervisor's

data such as name and phone number, bimbingan table consist of guidance data such as guidance date and notes, tugas_akhir table consist of thesis data such as title and progress, and pengumuman table consists of announcement data, such as sender, receiver, and announcement text. The detail of database tables and relationships are shown in Figure 3.

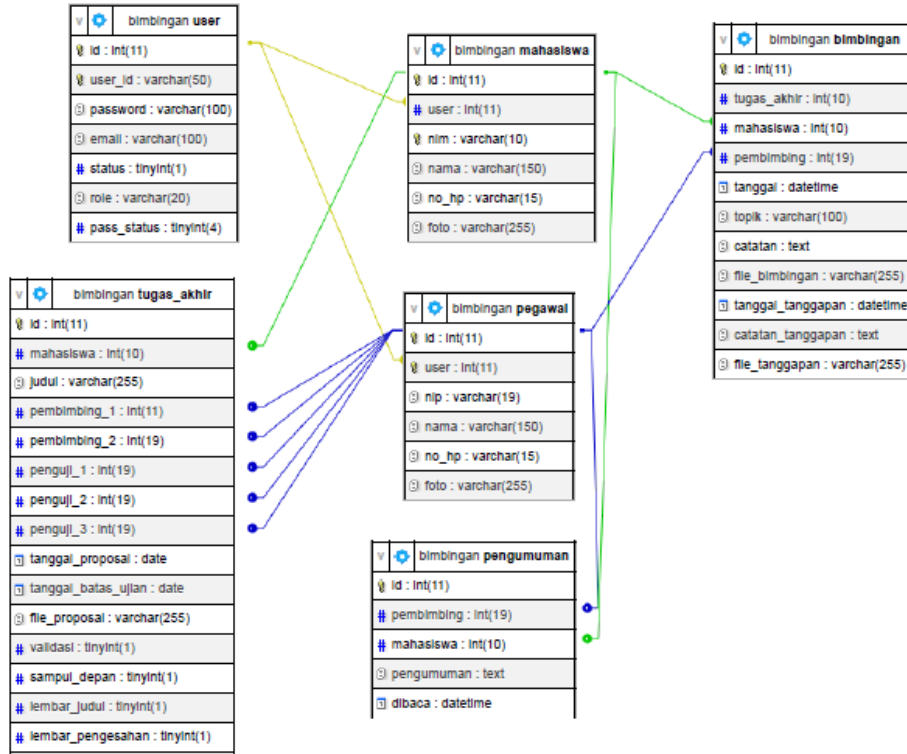


Figure 3. Database Design of Thesis Guidance Monitoring Instrument

Figure 4 shows the design of supervisor’s dashboard interface. Supervisors will be able to see student’s ID Number, Name, Thesis Title, Progress, Thesis Deadline Date, and Detail. List of students will be divided into two, the first list consists of students guided as first supervisor and the second list consists of students guided as second supervisor.

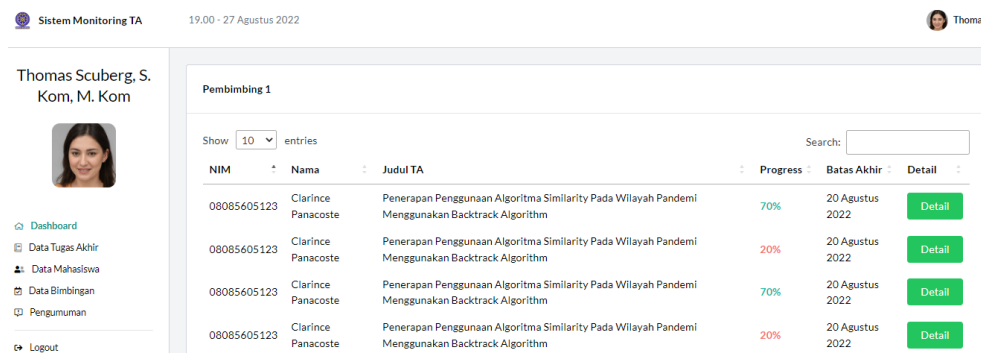


Figure 4. Design of Supervisor’s Dashboard Interface

Student’s dashboard design can be seen in Figure 5. It shows Progress Bar, Thesis Deadline Date, Remaining Time in months and days, and numbers of meeting with their first and second supervisor. The number of meetings will be colored green if the meeting is finished.

The dashboard displays the following information:

- Informasi Tugas Akhir:**
 - Title: Penerapan Penggunaan Algoritma Similarity Pada Wilayah Pandemi Menggunakan Backtrack Algorithnm
 - Pembimbing 1: Drs. Putu Dosen 1
 - Pembimbing 2: Drs. Putu Dosen 2
 - Sisa Waktu: 3 bulan 20 hari
 - Batas Akhir: 21 Mei 2023
- Progress Tugas Akhir:**
 - Progress bar for 'Pengerjaan Laporan Tugas Akhir' showing completion across BAB I, BAB II, BAB III, BAB IV, and PERSETUJUAN.
- Bimbingan dengan Pembimbing 1:**
 - Meeting 1: 15/08/2022
 - Meeting 2: 15/08/2022
 - Meetings 3-8 are marked as 'B' (Bimbingan).
- Bimbingan dengan Pembimbing 2:**
 - Meeting 1: 15/08/2022
 - Meeting 2: 15/08/2022
 - Meetings 3-8 are marked as 'B' (Bimbingan).

Figure 5. Design of Student's Dashboard Interface

Student's guidance form design is shown in Figure 6. Data that have to be filled are Name of Supervisor, Topic, Notes, and Thesis Draft File.

The form includes the following fields and elements:

- User Profile:** Clarince Panacoste (with profile picture), Dashboard, Data Tugas Akhir, Bimbingan, Pengumuman (2), Logout.
- Buat Jadwal Bimbingan:**
 - Dosen Pembimbing: Pilih Dosen
 - Topik: Topik
 - Catatan: Catatan
 - Upload Draft Tugas Akhir: Choose File (No file chosen)
 - Simpan button

Figure 6. Design of Student's Guidance Form

The form contains the following sections:

- Progress Bab I:**
 - Latar Belakang
 - Rumusan Masalah
 - Batasan Masalah
 - Tujuan
 - Manfaat
 - Sistematika Penulisan
- Progress Bab II:**
 - Tinjauan Studi
 - Tinjauan Metode
 - Tinjauan Lainnya
- Progress Bab III:**
 - Data Penelitian
 - Metodologi Penelitian
 - Metode Pengujian
- Progress Bab IV:**
 - Hasil Penelitian
 - Pengujian
 - Analisis Hasil
- Proses Persetujuan:**
 - Pembimbing 1
 - Pembimbing 2
 - Daftar Ujian
- Tanggapan:**
 - Tanggal: DD/MM/YYYY
 - Catatan: Catatan
- File Draft Tugas Akhir:** Unduh File

Figure 7. Design of Supervisor's Guidance Response Form

Figure 7 shows the design of supervisor's form to response student's guidance form. Supervisors have to give checks in the checkboxes if the progress is already done by the student. Next, supervisors can give response in the form of notes or uploading thesis draft file which already given comments.

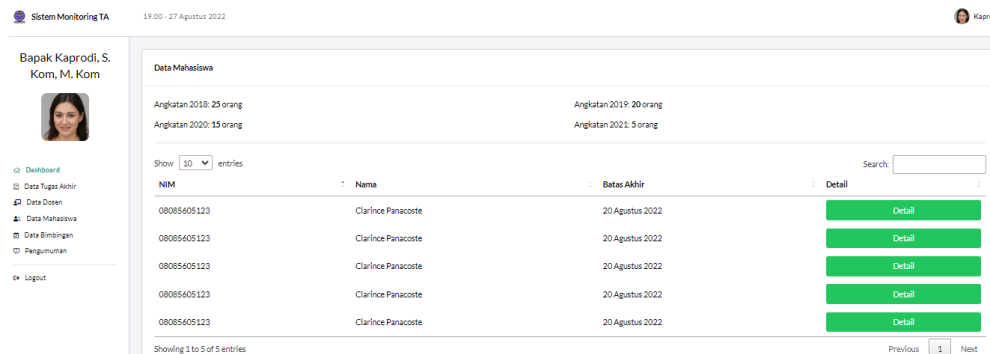


Figure 8. Design of Administrator's Dashboard

Administrator's Dashboard design is shown in Figure 8. Administrators can see and manage all student's data, thesis data, supervisor's data, guidance data, and announcement data.

5. CONCLUSION

The analysis and the design phase of developing web-based thesis guidance instrument has already conducted. The analysis phase was done by doing interviews with students, supervisors, Informatics Study Program Coordinator, and Chairman of Thesis Commission. The analysis phase resulted in 16 functional requirements for student, supervisor, and administrator. The design phase was done by designing system flow to define every flow in the system, designing database to store all data needed, and designing user interface to display useful information for user and also to make thesis guidance process and monitoring easier to do without having to meet in person.

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