ONLINE THESIS GUIDANCE INFORMATION SYSTEM (SI-BISA) TO IMPROVE THE EFFECTIVENESS OF THESIS GUIDANCE ACTIVITIES AT THE UNIVERSITY OF TECHNOLOGY MATARAM

Juhartini¹*, Dwinita Arwidiyarti², Hambali³

Software Engineering Program¹, Information Technology Program¹, Computer Science Program²
Universitas Teknologi Mataram - Indonesia
https://utmmataram.ac.id
juhartini8815@gmail.com¹*, dwinita.arwidya@gmail.com², 08mi071@gmail.com³
(*) Author Corresponding

Abstract—The Covid-19 pandemic has hit the whole world since the beginning of 2020, making many activities unable to run as usual. Likewise, the thesis mentoring process, which is usually carried out face-to-face with the supervisor by the agreed schedule, is no longer possible due to an appeal from the government to work and study from home so that the mentoring process becomes constrained. Instead, the mentoring process through e-mail or WhatsApp application, where the supervisor will correct the thesis, provide notes for improvement, and send it back to students. E-mail and WhatsApp as media in the mentoring process is used. However, it will make it difficult for lecturers to find out recordings of the student. Besides, it is still possible for thesis files to be scattered or lost because there is only one student. The research aims to produce an online thesis guidance application called SI-BISA. The research was conducted using the Waterfall Model, resulting in the SI-BISA application in the PHP Programming Language with the CodeIgniter 4 Framework. The system design used the Unified Modeling Language and system testing using the Black Box Method. Given the long-lasting Covid-19 pandemic, an online thesis guidance application is very urgent. So that the thesis mentoring process can continue to run effectively even without face-to-face and the need to build an integrated information system to make it easier for supervisors to monitor the progress of their guidance students and improve the effectiveness and service of thesis guidance provided to students.

Keywords: SI-BISA, Thesis Guidance Application, Online Thesis

Abstrak—Pademi Covid-19 yang melanda seluruh dunia sejak awal tahun 2020 membuat banyak kegiatan tidak dapat berjalan seperti biasanya. Begitu pula dengan proses pembimbingan skripsi yang biasanya dilakukan secara tatap muka dengan dosen pembimbing sesuai dengan jadwal yang telah disepakati menjadi tidak lagi dapat dilakukan karena adanya himbauan dari pemerintah untuk bekerja dan belajar dari rumah sehingga membuat proses pembimbingan menjadi terkendala. Sebagai gantinya proses pembimbingan dilakukan melalui e-mail atau aplikasi WhatsApp, di mana dosen pembimbing akan mengoreksi skripsi, memberi catatan perbaikan dan mengirimkannya kembali kepada mahasiswa. E-mail dan WhatsApp sebagai media dalam proses pembimbingan memang dapat digunakan tetapi akan menyulitkan dosen untuk mengetahui rekaman aktivitas mahasiswa yang dibimbing selain itu juga masih memungkinkan file skripsi tercecer atau hilang dikarenakan jumlah mahasiswa yang dibimbing tidak hanya satu orang. Penelitian bertujuan untuk menghasilkan aplikasi pembimbingan skripsi secara daring yang diberi nama SI-BISA. Penelitian dilakukan dengan Model Waterfall menghasilkan aplikasi SI-BISA dalam Bahasa Pemrograman PHP dengan Framework CodeIgniter 4, di mana perancangan sistem dilakukan dengan menggunakan Unified Modeling Language dan pengujian sistem menggunakan Metode Black Box. Mengingat masa pandemi Covid-19 yang berlangsung lama, kebutuhan akan aplikasi pembimbingan skripsi online sudah sangat mendesak untuk dibangun agar proses pembimbingan skripsi dapat tetap berjalan secara efektif meski tanpa tatap muka dan perlunya membangun sistem informasi yang terintegrasi sehingga memudahkan dosen pembimbing dalam memantau kemajuan mahasiswa bimbingannya dan meningkatkan efektivitas serta layanan pembimbingan skripsi yang diberikan kepada mahasiswa.

Kata Kunci : SI-BISA, Aplikasi Bimbingan Skripsi, Skripsi Daring

INTRODUCTION

A thesis is a scientific work compiled by undergraduate students as one of the academic requirements that must be met at the end of their study period. The thesis is prepared by discussing a particular topic or field based on the results of a literature review written by experts, the results of field research, or the results of development

(Masnur, 2012). In writing a thesis, students are guided by two supervisors whose roles are to direct both the technical side of writing and the quality of the content with the minimum amount of mentoring that has been determined as stated in the thesis writing manual (Djarwanto, 1992). The Covid-19 pandemic has hit the whole world since the beginning of 2020, making many activities unable to run as usual. Face-to-face lectures in class can no longer be carried out and are replaced by online lectures. Likewise, the supervisory thesis process, which is usually carried out face-to-face with the supervisor under the agreed schedule, is no longer possible because of an appeal from the government to work and study from home so that the mentoring process becomes constrained. Instead, the mentoring process via e-mail or WhatsApp application, where the supervisor will correct the thesis, provide notes for improvement, and send it back to students. E-mail and WhatsApp in the mentoring process can indeed be used. However, they will make it difficult for lecturers to find out recordings of student activities being mentored and still allow thesis files to be scattered or lost, considering the number of students is not one person.

The Covid-19 pandemic has made this ineffective mentoring process experienced by more than 1 generation. An online thesis guidance application is needed that can increase the effectiveness of the thesis mentoring process during the pandemic. This application is built with a responsive website design to be accessed using both PC and mobile devices. All mentoring activities from the student side and the supervising lecturer will be stored in the system to make it easier for the supervisor to monitor the students' progress he supervises. This application is also still possible to use even though the Covid-19 pandemic has ended. Its ability to integrate the thesis mentoring process in a study program or even at the faculty level; besides, all information related to thesis guidance starts from selecting supervisors, submitting titles, and applications. Exams and exam schedules can be done through this application.

Several previous studies have been done related to online thesis guidance applications, namely: research conducted by Utariani and Herkules (2018) entitled Monitoring Online Thesis Guidance at the College of Information and Computer Management (STMIK) Palangka Raya. This study aims to provide a solution to the problem of the difficulty of students meeting directly with their supervisors (Utariani & Herkules, 2017); research conducted by Benz Edy Kusuma (2018) entitled The Web-Based Thesis Guidance Information System at Pelita Harapan University. This research was conducted as a solution to the problem of lecturers and students who have their respective activities, causing the lack of a suitable time to meet and the difficulties experienced by lecturers in monitoring their guidance students because of the large number of students (Kusuma, 2018); research conducted by Siti Patimah et al. (2018) entitled Online E-Thesis Management Application (Case Study of Information Systems Study Program, Indragiri Islamic University). This research was conducted to make it easier for students to submit thesis titles and lecturers in terms of service (Patimah, 2018); research conducted by Rike Mahara and Basrul Abdul Majid's (2019) research entitled "The Design of an Android-Based E-Thesis Application Interface." This study aims to design an Android-based E-Thesis application interface that can help students who have difficulty in the thesis mentoring process and assist supervisors in making decisions and guiding students in completing theses (Mahara & Basrul, 2019); research conducted by Mukhamad Murtadho and Cahya Bagus Sanjaya (2019) entitled "Mobile-Based Thesis Registration Application System at Yudharta University Pasuruan Using the Unified Process Methodology." This study aims to improve services to students (Murtadho & Sanjaya, 2019).

The five previous studies both built applications to facilitate the thesis mentoring process. Then research was conducted by Siti Patimah et al. (Patimah, 2018) the application built provides facilities for submitting a thesis title. The difference with the proposed research lies in the completeness of the facilities offered. The SI-BISA application is used from the beginning to the end of the thesis mentoring process. The supervisor's submission, the thesis title, the submission, and the lecturer's approval. Then proceed with the thesis mentoring process until the proposal exam registration process until the thesis exam registration process. In addition, there will be additional information about thesis preparation, such as a guidebook for writing a thesis, a recap of guidance, an approval sheet, an exam registration form, and an announcement of the implementation of the exam.

MATERIALS AND METHODS

The method used in this study is a software development method with the Waterfall Method. According to Rosa and Salahuddin (2013), the Waterfall method is often also called a linear sequential model or a classical life cycle. The Waterfall method provides a sequential or sequential software life flow approach starting from the analysis, design, coding, testing, and support stages (Rosa & Shalahuddin, 2013). The Waterfall method is shown in Figure 1.
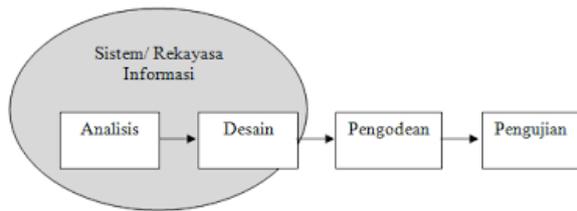
Figure 1. Stages in the Waterfall Method

The explanation of each stage in the Waterfall Method contained in Figure 1 is as follows:
1. Analysis stage
   At this stage, the analysis carried out is a software requirements analysis carried out by collecting data and information through interviews with system users.
2. Design Stage
   The second stage is to design the system both in terms of flow and function. In terms of relations between tables in the database, using the Unified Modeling Language consists of Use Case Diagrams, Activity Diagrams, and Class Diagrams, followed by designing program architecture using HIPO (Hierarchy) Diagrams. Input Process Output) and ends with designing the screen display (user interface)
3. Coding Stage
   The coding stage to produce the SI-BISA application according to the design made into the Web Programming Language using responsive web design.
4. Testing Stage
   Tests to determine whether there is an error made and the suitability between the resulting application and the desired one using the Black Box Method.

RESULTS AND DISCUSSION

1. Analysis Stage

The analysis carried out at this stage is the analysis of software requirements by collecting data and information through interviews with system users (users). This stage interviewed the Dean and Head of the Study Program at the Faculty of Information and Communication Technology (FTIK UTM). This application will later be used at FTIK UTM as a pilot. The result of this interview is that the following needs are generated:
a. An application is needed that can facilitate thesis guidance activities. Even though the supervisor and students do not meet face to face, the thesis mentoring process can still be effective.
b. The application must facilitate all activities related to thesis guidance, starting from selecting supervisors, submitting thesis titles, and the thesis mentoring process.
c. Applications must allow lecturers to control the progress of the students they are mentoring more easily.

2. Design Stage

The second stage is to design the system, namely the flow side, its function, and the relation between tables in the database using the Unified Modeling Language. It consists of Use Case Diagrams, Activity Diagrams, and Class Diagrams. then it is followed by designing the program architecture using HIPO (Hierarchy Input Process Output) Diagrams and ending with designing the screen display (user interface).

a. Use Case Diagram

Use Case diagram is a diagram that describes the external view of the system to be modeled (Al Fatta, 2007). This application's actors (users) consist of supervisors, students, and admins (administrative staff of FTIK UTM). The design of the Use Case Diagram is shown in Figure 2.
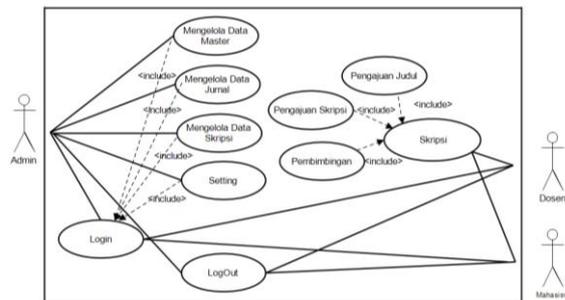
Figure 2. Use Case Diagram

Figure 2 shows the use case (ellipse symbol) which describes the functions that can be performed by each actor. The admin can perform functions: managing master data, managing title data, managing thesis data, and settings; functions that users can perform (lecturers and students) are title submission, thesis submission, and mentoring.

b. Activity Diagram

An activity diagram is a diagram that shows system activity in the form of actions (Widodo & Herlawati, 2011). An example of an Activity Diagram that is designed is the Activity Diagram of Validating Thesis Titles for Supervisors as shown in Figure 3 below:
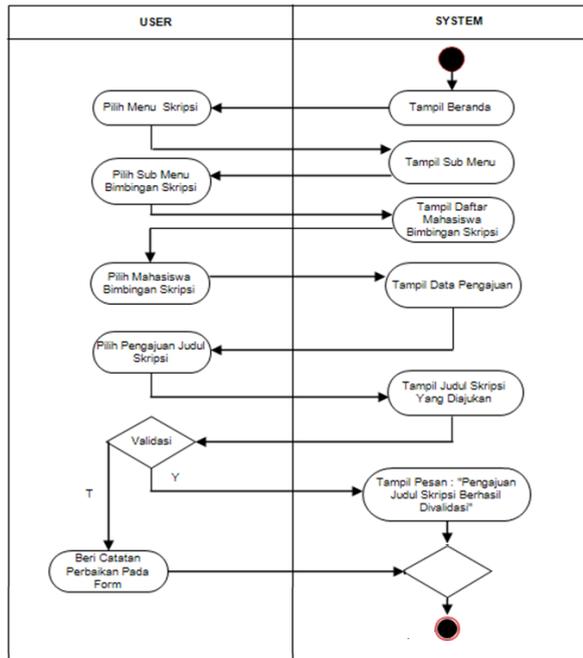
Source : (Juhartini et al., 2021)
Figure 3. The Activity Diagram of Validating Thesis Titles for Supervisors

The Activity Diagram shown in Figure 3 illustrates the activities carried out by the Advisor when checking the data for the submission of the thesis mentoring process. Lecturers can find out students who apply for thesis guidance and read the proposed title. The lecturer validates if the proposed title is approved and rejects the title submitted by the student if it is not approved.

Another example of an Activity Diagram design is the Activity Diagram for Choosing Thesis Advisor Lecturers for Students, which can be seen in Figure 4 below:
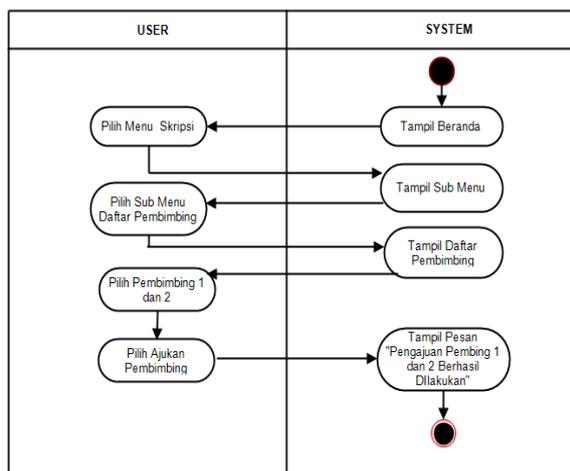
Source: (Juhartini et al., 2021)
Figure 4. The Activity Diagram for Choosing Thesis Advisor Lecturers for Students

The design of the Activity Diagram shown in Figure 4 illustrates the activities carried out by students when choosing a thesis supervisor. Students can select the thesis submission menu, then select the thesis submission sub-menu and the supervisor lecturer list sub-menu. Students can choose a supervisor from the list of supervisors displayed after that select the submit thesis button.

c. Class Diagram

A class diagram is a diagram that describes the object modeling process (Nugroho, 2002). The Class Diagram design is shown in Figure 5.
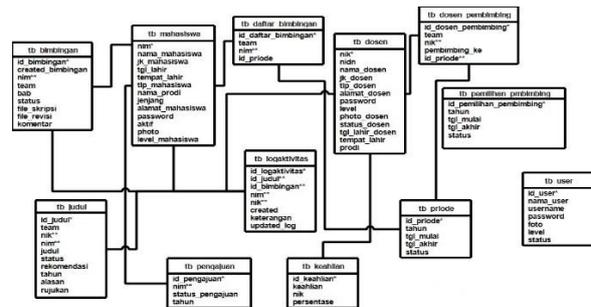
Source : (Juhartini et al., 2021)
Figure 5. Class Diagram

Figure 5 describes the Class Diagram design which consists of 12 objects (classes) are produced, namely: users, students, lecturers, supervisors, selection of supervisors, submissions, expertise, period, title, list of guidance, guidance, and log activity.

d. HIPO (Hierarchy Input Process Output) Diagram

The HIPO diagram is a diagram that describes the program architecture (Hartono, 2002). By using the HIPO diagram, you will describe the menus and sub-menus that exist in the application. The program architecture for admins and users (lecturers and students) is shown in Figure 6:
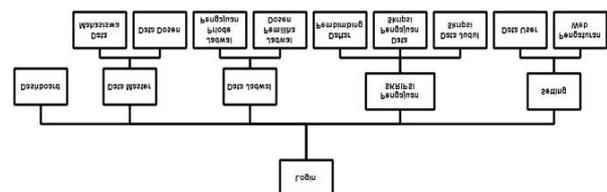
Source : (Juhartini et al., 2021)
Figure 6. Admin Program Architecture

Figure 6 shows the Admin Dashboard which consists of four menus, namely the Master Data menu, Schedule Data Menu, Thesis Submission Menu, and the Settings Menu. Where each menu

consists of several sub-menus. The Master Data menu has two sub-menus, namely Student Data Sub Menu and Lecturer Data Sub Menu. The Schedule Data Menu consists of two sub-menus, namely the Sub-Menu for the Schedule of the Submission Period and the Sub-Menu for the Lecturer's Schedule. The Thesis Submission Menu consists of three sub-menus, namely the Supervisor List Sub Menu, Thesis Submission Data Sub Menu, and Thesis Title Data Sub Menu. The Settings menu consists of two sub-menus, namely User Data Sub Menu and Web Settings Sub Menu. While the program architecture design for lecturers and students can be seen in Figure 7.
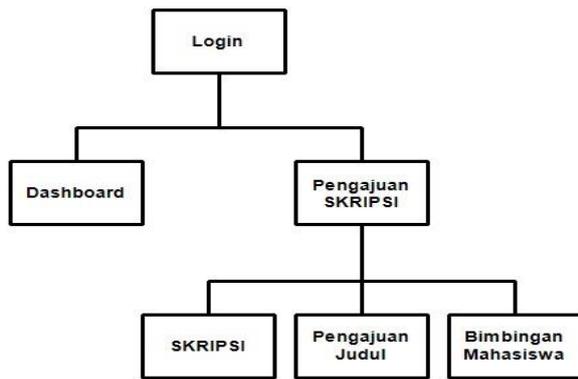
Source : (Juhartini et al., 2021)
Figure 7. Lecturer and Student Program Architecture

Figure 7 shows the Lecturer and Student dashboard which has a Thesis Submission menu with three sub-menus, namely The Thesis Sub Menu, Title Submission Sub Menu, and Student Guidance Sub Menu.

e. User Interface

The user interface or screen display is where the user interacts with the system (Wahyono, 2004). One example of a user interface design is the user interface design for the admin dashboard as shown in Figure 8, where selectable menus and sub-menus appear on the left side, making it easier for admins to move from one menu to another.
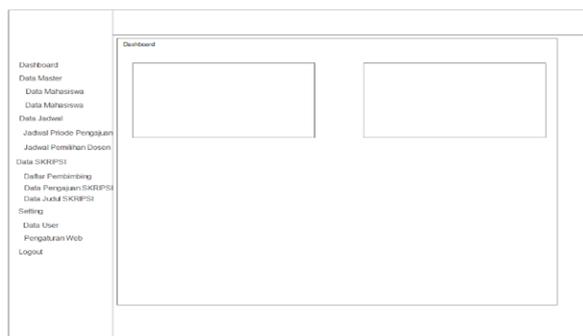
Source : (Juhartini et al., 2021)
Figure 8. User Interface Dashboard Admin

Other examples of user interface designs are user interface designs for lecturer and student dashboards as shown in Figure 9 below:
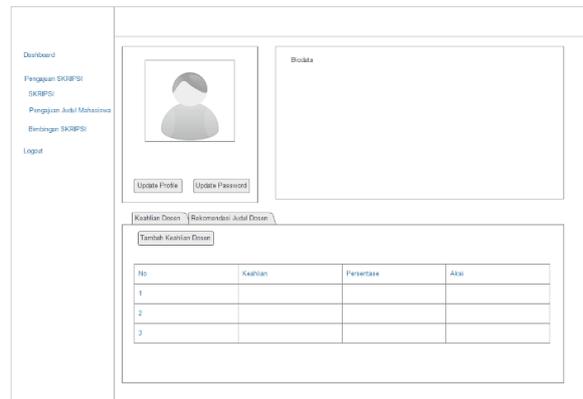
Source : (Juhartini et al., 2021)
Figure 9. Lecturer and Student Dashboard User Interface

Figure 9 shows the user interface design, namely the lecturer and student dashboard, where the menus and sub-menus are on the left. Lecturers and students can also update profiles and passwords. In addition, lecturers can add skills and provide title recommendations for students.

3. Coding Stage

The coding stage is to produce the SI-BISA application according to the design made into the PHP Programming Language using the CodeIgniter 4 Framework. The result of this coding stage is the creation of the SIBISA application. The following are examples of some screenshots of the resulting screen display:

Figure 10 shows the login form for admin, lecturers, and students. There is a verification process for the username and password entered by the user. If the username and password are correct, a dashboard will appear and if they are incorrect, an error message will appear.


Source : (Juhartini et al., 2021)
Figure 10. Login Form

The admin dashboard display is shown in Figure 11. The menu is on the left and a data recap shows the number of supervisors, the number of students who compose theses, the number of titles received, and the number of thesis reports that have been completed making it easier to monitor and evaluate theses.
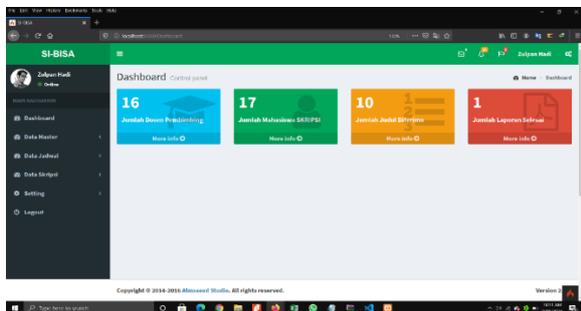
Source : (Juhartini et al., 2021)
Figure 11. Admin Dashboard

Figure 12 is a screen display for lecturers that shows the supervisor and a list of students he mentors along with the percentage progress of the mentoring process for each student he mentors.
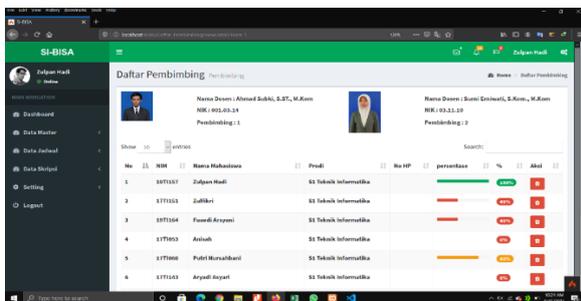
Source : (Juhartini et al., 2021)
Figure 12. List of Guiding Students Per Lecturer

The screen display for lecturers that displays lecturer profiles can be seen in Figure 13. In addition to personal data, the screen display also displays a list of skills possessed by lecturers.
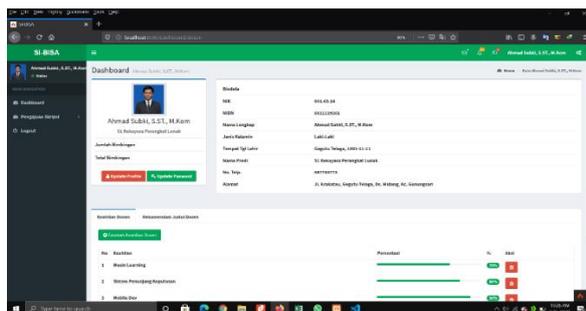
Source : (Juhartini et al., 2021)
Figure 13. Lecturer Dashboard

The screen display for the Advisory Lecturer to check the data for the submission of the thesis

mentoring process is shown in Figure 14. The lecturer can find out which students are applying for thesis guidance and read the proposed title. The lecturer validates if the proposed title is approved and rejects the title submitted by the student if it is not approved.
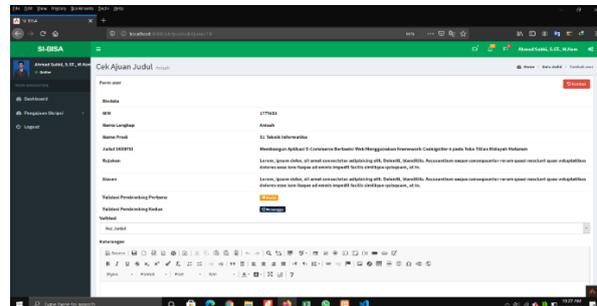
Source : (Juhartini et al., 2021)
Figure 14. Validation of Student Thesis Title

Figure 15 is a screen display of the lecturer mentoring process, where the lecturer can find out the title submitted by the student along with the references and reasons and download the thesis file uploaded by the student.
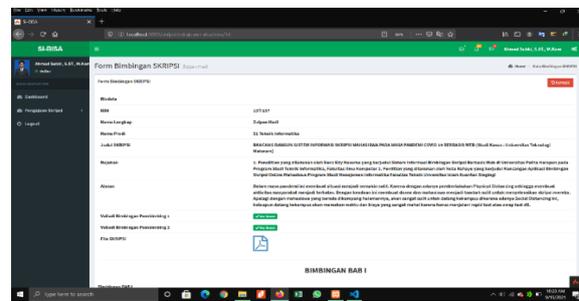
Source : (Juhartini et al., 2021)
Figure 15. Mentoring Process

While Figure 17 is a student dashboard containing student profiles along with photos and facilities for updating profiles and passwords.
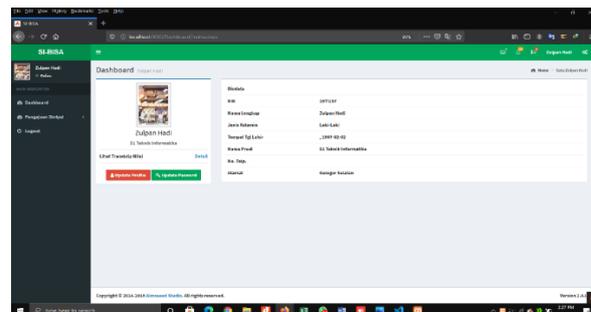

Source : (Juhartini et al., 2021)
Figure 16. Student Dashboard

Figure 17 shows a list of supervisors that can be chosen by students. In addition to showing photos and profiles of lecturers, the expertise possessed by lecturers includes the status of lecturers as 1 or 2

supervisors and the number of students being mentored.
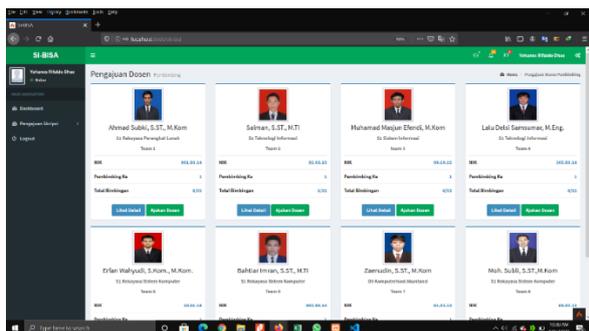
Source : (Juhartini et al., 2021)
Figure 17. Selecting an Advisor

The screen display for the title approved by the teacher can be seen in Figure 18. This screen displays the title, references, and reasons as well as the validation of supervisors 1 and 2.
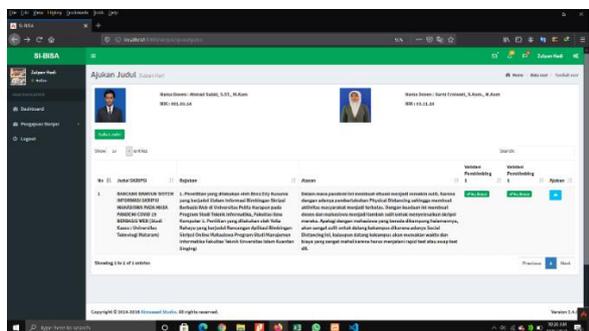
Source : (Juhartini et al., 2021)
Figure 18. Submission of Thesis Title

In Figure 19, the screen display for student thesis guidance shows the history of the thesis guidance carried out.
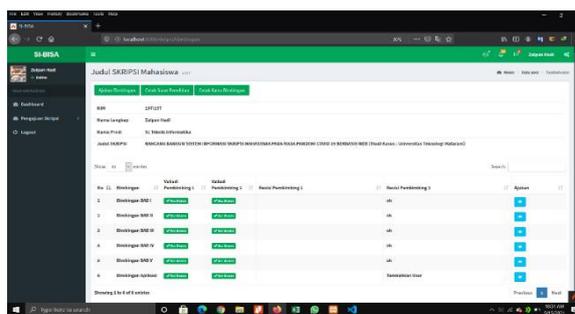
Source : (Juhartini et al., 2021)
Figure 19. Thesis Guidance Process

4. Testing Stage

Testing to determine whether an error occurs in the application made and the suitability between the application produced and the desired one. The test results for both the admin page, lecturers, and students have met expectations, so it can be concluded that the overall system test results are expected. After testing the application at this stage, an assessment of the effectiveness of the application using an assessment instrument in the form of a questionnaire filled out by the Dean, Head of Study Program, lecturer representatives, and 8th-semester student representatives within the scope of FTIK UTM with a total of 31 people. The application suitability assessment instrument consists of 10 questions with indicators covering display design, ease of use, completeness, applicable, interactive, impactful, and effectiveness. The results of filling out the questionnaire areas are listed in table 1 below:

Table 1. Recap of the Results of Filling Out the Assessment Questionnaire

SS	24	23	24	17	22	21	25	8	25	4
S	7	8	7	14	9	10	6	23	6	27
R	0	0	0	0	0	0	0	0	0	0
KS	0	0	0	0	0	0	0	0	0	0
TS	0	0	0	0	0	0	0	0	0	0
TOTAL	31	31	31	31	31	31	31	31	31	31

Source : (Juhartini et al., 2021)

SS	120	115	120	85	110	105	125	40	125	20
S	28	32	28	56	36	40	24	92	24	108
S	0	0	0	0	0	0	0	0	0	0
KS	0	0	0	0	0	0	0	0	0	0
TS	0	0	0	0	0	0	0	0	0	0
TOTAL	148	147	148	141	146	145	149	132	149	128

Source : (Juhartini et al., 2021)

The index in percentage form is obtained by totaling the score divided by the maximum total score then multiplied by 100. The following are the results :

99   99   99,3   95   98   97   100   89   100   86

So that an average index of 96% is produced, or the SI-BISA application **is very feasible to use** because it is **very suitable for needs**.

CONCLUSION

Based on the results and discussions that have been described, several conclusions using the SI-BISA application will make it easier to detect similarities between titles submitted by students and titles submitted by other students, where title data and thesis files will be easier to manage, lecturer distribution mentoring can be done more quickly. In addition, by using the SI-BISA application, the mentoring process can be carried out effectively without being limited by space and time, supervisors can easily monitor the progress and activities of the student mentoring process they are mentoring.

REFERENCES

Al Fatta, H. (2007). *Analisis & Perancangan Sistem Informasi*. Andi Offset.

Djarwanto. (1992). *Petunjuk Teknis Penyusunan Skripsi*. BPFE.

Hartono, J. (2002). *Analisis & Disain Sistem Informasi : Pendekatan Terstruktur Teori dan Praktek Aplikasi Bisnis*. Andi Offset.

Juhartini, Arwidiyarti, D., & Hambali. (2021). *Laporan Akhir Penelitian : Sistem Informasi Bimbingan Skripsi Secara Daring (SI-BISA) Untuk Meningkatkan Efektivitas Kegiatan Pembimbingan Skripsi Di Universias Teknologi Mataram*.

Kusuma, B. E. (2018). Sistem Informasi Bimbingan Skripsi Berbasis Web Di Universitas Pelita Harapan. *Jurnal ISD*, *3*(1), 71–78.

Mahara, R., & Basrul, B. (2019). Perancangan Interface Aplikasi E-Skripsi Berbasis Android. *Cyberspace: Jurnal Pendidikan Teknologi Informasi*, *2*(2), 141. https://doi.org/10.22373/cj.v2i2.4074

Masnur, M. M. (2012). *Bagaimana menulis Skripsi*. Bumi Aksara.

Murtadho, M., & Sanjaya, C. B. (2019). Sistem Aplikasi Pendaftaran Skripsi Berbasis Mobile Di Universitas Yudharta Pasuruan Menggunakan Motodologi Unified Process. *JASIEK (Jurnal Aplikasi Sains, Informasi, Elektronika Dan Komputer)*, *1*(2), 156–160. https://doi.org/10.26905/jasiek.v1i2.3445

Nugroho, A. (2002). *Analisis dan Perancangan Sistem Informasi dengan Metodologi Berorientasi Objek*. Informatika.

Patimah, S. (2018). Aplikasi Manajemen E-Skripsi Online (Studi Kasus Prodi Sistem Informasi Universitas Islam Indragiri). *Sistemasi*, *7*(3). https://doi.org/10.32520/stmsi.v7i3.358

Rosa, A. ., & Shalahuddin, M. (2013). *Rekayasa Perangkat Lunak Terstruktur dan Berorientasi Objek*. Informatika.

Utariani, U., & Herkules, H. (2017). Monitoring Bimbingan Skripsi Online Pada Sekolah Tinggi Manajemen Informatika Dan Komputer (STMIK) Palangka Raya. *Jurnal SAINTEKOM*, *7*(1), 33. https://doi.org/10.33020/saintekom.v7i1.19

Wahyono, T. (2004). *Sistem Informasi : Konsep Dasar, Analisis Desain dan Implementasi*. Graha Ilmu.

Widodo, P. P., & Herlawati. (2011). *Menggunakan UML*. Informatika.