# Development of Android-Based Thesis Guidance Information System in the Educational Management Study Program, Faculty of Education, State University of Jakarta

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**Abstract.** The implementation of hybrid learning has an impact on the world of education, where the learning process can occur even if it is not face-to-face with educators[1]. In the context of higher education, this also has an impact on the implementation of the students' final projects (thesis). The guidance process no longer needs to be done face-to-face but virtually[2]. The Faculty of Education, State University of Jakarta has developed a website-based thesis guidance system that is able to increase the effectiveness of the thesis guidance implementation process[3]. Even so, the system display will be more optimal if the user uses a laptop, which means that the uses of the system through a mobile phone is not able to display satisfactory visuals[4]. Therefore, this research was carried out to develop a website into an application. This research uses a Research & Development (R&D) approach which starts from preliminary research activities, planning, product development, early-stage field trials, late-revision field trials, field operational tests-final revision, to product implementation[5].

[1] Disa Hediansah and Herman Surjono, "Hybrid Learning Development to Improve Teacher Learning Management," *JKTP: Jurnal Kajian Teknologi Pendidikan* 3, no. 1 (2020): 1–9.

[2] Adnan Kasim, Lilyan Hadjaratie, and Roviana H Dai, "Rancang Bangun Sistem Informasi Skripsi Dan Kerja Praktik Berbasis Web," *Jambura Journal of Informatics* 2, no. 2 (2020): 95–107.

[3] Dimas Kurnia Robby et al., "Model Sistem Informasi Bimbingan Skripsi Berbasis Website Pada Program Studi Manajemen Pendidikan Fakultas Ilmu Pendidikan Universitas Negeri Jakarta," *Improvement: Jurnal Ilmiah Untuk Peningkatan Mutu Manajemen Pendidikan* 8, no. 2 (2021): 115–37.

[4] Saleema Amershi et al., "Software Engineering for Machine Learning: A Case Study," in *2019 IEEE/ACM 41st International Conference on Software Engineering: Software Engineering in Practice (ICSE-SEIP)* (IEEE, 2019), 291–300.

[5] Sri Gustiani, "Research and Development (R&D) Method as a Model Design in Educational Research and Its Alternatives," *Holistics (Hospitality and Linguistics): Jurnal Ilmiah Bahasa Inggris* 11, no. 2 (2019).


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## 1 Introduction

After the Covid-19 pandemic, it has brought changes in various aspects of human life, one of which is the field of education. This comes in the process of implementing learning activities that are carried out in a hybrid system. In the context of higher education, the hybrid learning system or also called blended learning is a learning system that occurs both face-to-face and remotely. The Minister of Education and Culture, the Minister of Religion, the Minister of Health, and the Minister of Home Affairs established the Guidelines for the Implementation of Learning in the 2020/2021 school year during the Covid-19 Pandemic. This policy minimizes the spread of Covid-19 by carrying out the learning process remotely. Distance learning is supported by a management information system to be able to increase the effectiveness and efficiency of the educational process, in higher education, especially in the management, recording, and processing and storage of final project files (thesis).

Based on Law No. 12 of 2012 concerning Higher Education, it is concluded that universities are obliged to carry out education, research and community service. This activity is a requirement to get a degree, which means that students are required to carry out a thesis. Sari, Ugiarto & Masnawati (2020) stated that there are common obstacles faced in the preparation of thesis, especially during the guidance process, namely lecturers have their own business[6]. It is difficult for students and lecturers to meet face-to-face due to time mismatches. This makes the problems that exist in the thesis work can't be solved as soon as possible. The number of students is not the slightest obstacle for lecturers in carrying out their guidance. For this reason, the optimization of services and thesis data collection needs to be carried out immediately.

In research conducted by Sari, et al. (2020) concluded that the Final Project Guidance Information System was created to make it easier for students and lecturers to carry out final project guidance. The system is designed in sync with applicable academic regulations. The system can be used to conduct consultations, monitor the progress of students' final projects, approve thesis proposals or theses, allow students to take exams, register for exams, manage exam scores and conduct recapitulation and print student reports that have completed their final projects. The presence of information systems in institutions or higher education institutions such as universities will be able to improve the quality of educational services. Service activities in education, which in the context of this research is thesis guidance, can be realized smoothly because it utilizes technological advances that can be accessed without limited space & time.

The use of technology makes it easier for user/actor activities to interact, record, process, and store thesis data. As in the research conducted by Kurniawan and

[6] Sari, Azriana. Ugiarto, Muh. Masnawati, "Sistem Informasi Bimbingan Tugas Akhir Pada Fakultas Ilmu Komputer Dan Teknologi Informasi Universitas Mulawarman," in Prosiding Seminar Ilmu Komputer Dan Teknologi Informasi Vol, vol. 2, 2017.

Bondowoso (2019), the results were obtained that the information system provides facilities for several actors to be able to interact with each other in accordance with the standard operating procedures owned by each actor and based on electronic documents[7]. Based on the results of observations made by the research team, it was found that the Faculty of Education, State University of Jakarta already has a system related to the thesis designed by Dirgantara (2019). The system is called Sistem Informasi Bimbingan Skripsi Online (SIBISON). There is also Sistem Informasi Bimbingan Online (SIBIMBOL) developed by the Elementary School Teacher Education study program, Faculty of Education, State University of Jakarta. However, in reality, the website-based thesis system at the Faculty of Education, State University of Jakarta is currently not used optimally because both lecturers and students need to log in to their respective laptops or computers and if the login process is carried out on a smartphone, the web display is not neatly organized so that it is difficult for some users to understand.

From these problems, the research team finally concluded that online thesis guidance would be more effective using an application-based system. The research team agreed that android-based applications can be an effective innovation in realizing convenience for lecturers and students to carry out thesis guidance activities. The presence of this android-based application (mobile app) can optimize service activities and management of final projects (thesis guidance) in a structured, systematic and professional manner. This system makes it easier for study programs to manage integrated thesis data so that data management becomes effective and efficient in terms of time, energy, and accommodation spent. Therefore, this research takes the title "Development of Android-Based Thesis Guidance Information System in the Educational Management Study Program, Faculty of Education, State University of Jakarta".

## 2 Literature Review

### 2.1 Research Roadmap

This research refers to the research roadmap of the State University of Jakarta, the research roadmap of the Faculty of Education and also the research roadmap of the Educational Management study program which focuses on innovation to strengthen technology-based management. With the research roadmap as follows:

Research Umbrella (RIP UNJ) : Educational Technology
Study Program Research Umbrella : Education Management
Study Program Research Road Map : Education Management Information System

[7] Hendra Kurniawan and Wicakso Bandung Bondowoso, "Sistem Informasi Terintegrasi Tugas Akhir/Skripsi Berbasis Web (Studi Kasus: Jurusan Sistem Informasi Institut Informatika Dan Bisnis Darmajaya)," *Jurnal SIMADA (Sistem Informasi Dan Manajemen Basis Data)* 2, no. 2 (2019): 124–34.

*Table 1 Roadmap*

| Research Map 2021 | Research Map 2022 | Research Map 2023-2024 |
|---|---|---|
| Creation of a Thesis Guidance Website. | Android Application Development for Thesis Guidance. | Application of the Android Application Model for Thesis Guidance. |

## 2.2 Review of Research Result

Based on the title of the research, namely the Android-based Thesis Guidance Information System for the Education Management Study Program, Faculty of Education, State University of Jakarta, there are several research results that are relevant to the theme used by the researcher, including:

1. Research and development carried out by Rike Mahara and Basrul Abdul Majid with the title Designing an Android-Based E-Thesis Application Interface can be found that the E-thesis application has three main menus, namely: (1) students consisting of sub-menus of student thesis collections, thesis guides, title submission process, selection of supervisors, and session schedules, as well as other information; (2) Study Programs consisting of sub-menus of titles submitted by students and applications to lecturers to become supervisors to further discuss related to the title; 3) Study Programs with sub-menus for approval of title submissions, as well as the number of student and supervisor quotas. The E-thesis application is concluded to be able to help students, lecturers, and study programs in completing thesis courses well. This is evidenced by students who no longer need to meet face-to-face or face-to-face with their supervisors when submitting a research title. E-thesis can be accessed by all lecturers and students who have taken thesis courses[8].
2. Research and development conducted by Siti Patimah, Samsudin, and Bayu Rianto with the title Online E-Thesis Management Application (Case Study of Information Systems Study Program of Indragiri Islamic University) can be seen that this application consists of the main page, the registration page for the title and student identity, the student page, the title submission page, and the announcement page. By using the E-thesis management system, student thesis titles will be easier and faster because the relevance of the title has been automatically detected with various existing titles. Then this system has a storage of thesis title data that will be managed better, besides that there is also an easier and relevant division of supervisors with the title of the thesis submitted. This system also makes it easier for students to apply for title changes, title corrections, and change supervisors automatically or online[9].

[8] Rike Mahara and Basrul Basrul, "Perancangan Interface Aplikasi E-Skripsi Berbasis Android," *Cyberspace: Jurnal Pendidikan Teknologi Informasi* 2, no. 2 (2019): 141–45.

3. The research and development conducted by Benz Edy Kusuma with the title Web-Based Thesis Guidance Information System at Pelita Harapan University can be seen that the design and development of this system is named UPH Thesis Center which consists of five users, namely administrators, staff, heads of study programs, lecturers, and students. This website also consists of twelve main functions, including login and logout, access rights, data input, notifications, data lists, proposal uploads, verification of student thesis titles, appointment or determination of each student's supervisor by the head of study program, messages, profiles, and Change password. This system can be used by students to submit thesis titles and proposals, get title verification, notification of who the supervisor is, and other notifications related to thesis to the implementation of thesis guidance by uploading drafts to the system. This website helps students and supervisors because it can be done online which is equipped with a feature to send messages for each stage of guidance and a conversation history[10].
4. Research and development conducted by Mukhamad Murtadho and Cahya Bagus Sanjaya with the title Mobile-Based Thesis Registration Application System at Yudharta Pasuruan University Using the Unified Process Methodology, it can be seen that this thesis registration application is implemented using Java programming language and extensible markup language. This application can be used in the process of working on a thesis and helping students and lecturers. The menu in this application is the login page and control page (proposal registration, seminar results, research permit, desk exam, proposal minutes, results seminar, and desk exam, judiciary list, filling out the thesis registration form, and printing the supervisor's decree)[11].
5. Research and development carried out by Muhammad Zaky Faried, Anggraini Mulwinda, and Yohanes Primadiyono with the title Development of Thesis Guidance Android Application with Notification Feature It can be known that this application can facilitate the thesis guidance process with the presence of a notification feature every time new and validated guidance. The results of the user experience analysis also show that this application provides an experience for its users both in terms of attractiveness, clarity, efficiency accuracy, stimulation, and novelty. This application focuses on finding out the importance of the notification feature on the application, so that students can conduct thesis

[9] Siti Patimah and Bayu Rianto Samsudin, "Aplikasi Manajemen E-Skripsi Online (Studi Kasus Prodi Sistem Informasi Universitas Islam Indragiri)," *J. Sist. Inf* 7, no. 3 (2018): 298–311.

[10] Benz Edy Kusuma, "Sistem Informasi Bimbingan Skripsi Berbasis Web Di Universitas Pelita Harapan," *Journal Information System Development (ISD)* 3, no. 1 (2018).

[11] Mukhamad Murtadho, "Sistem Aplikasi Pendaftaran Skripsi Berbasis Mobile Di Universitas Yudharta Pasuruan Menggunakan Metodologi Unified Process" (Universitas Yudharta Pasuruan, 2019).

guidance, validate thesis guidance, edit thesis guidance, and provide notifications on new guidance and validated guidance.

6. Research and development carried out by Yana Nuryana and Asri Mulyani with the title Development of Android-Based Thesis Control Application for Students and Lecturers can be known that the development of this application can help students and lecturers in the process of implementing Thesis courses such as reporting, progress reports, guidance, searching for information about Thesis and so on. This application is designed based on the business process of requiring a suitable system and in accordance with the business process of implementing Thesis courses at the Garut College of Technology. This application is designed based on the business process of requiring a suitable system and in accordance with the business process of implementing Thesis courses at the Garut College of Technology[12].

## 3 Method

This research generally aims to produce output in the form of an integrated thesis guidance Information System product as a service medium and data management as well as the educational process. Guided by Chapter 1, the ideal research method for this research is to use a Research & Development (R&D) approach in accordance with the statement of Borg & Gall. The statement quoted by Borg & Gall is "research & development is a powerful strategy for improving practice. It is a process used to develop and validate educational products". In the field of education, products produced through R&D research are expected to be tools that can increase effectiveness and efficiency as well as the productivity of the performance of the components (academic community) involved[13]. The final result or output of R&D activities is in the form of a new tool or product design, complete with its specifications.

The research was conducted in the Educational Management Study Program, Faculty of Education, State University of Jakarta. This research, starting from the trial error of the system until later this system will be implemented and officially applied in the Study Program for services and data management as well as the educational process (final project, thesis). In the first year of the implementation of this research, we will try to spawn an application homepage design in the implementation of thesis guidance in the Education Management Study Program, Faculty of Education, State University of Jakarta with the success indicator being the existence of an android-based application that can serve final year students who are doing their thesis.

[12] Yana Nuryana and Asri Mulyani, "Pengembangan Aplikasi Pengendalian Skripsi Berbasis Android Untuk Mahasiswa Dan Dosen," *Jurnal Algoritma* 14, no. 2 (2017): 6.

[13] Meredith D. Gall, Walter R. Borg, and P. Gall Joyce, *Educational Reseacrh: An Introduction*, 5th ed. (New York: Longman, 1989).

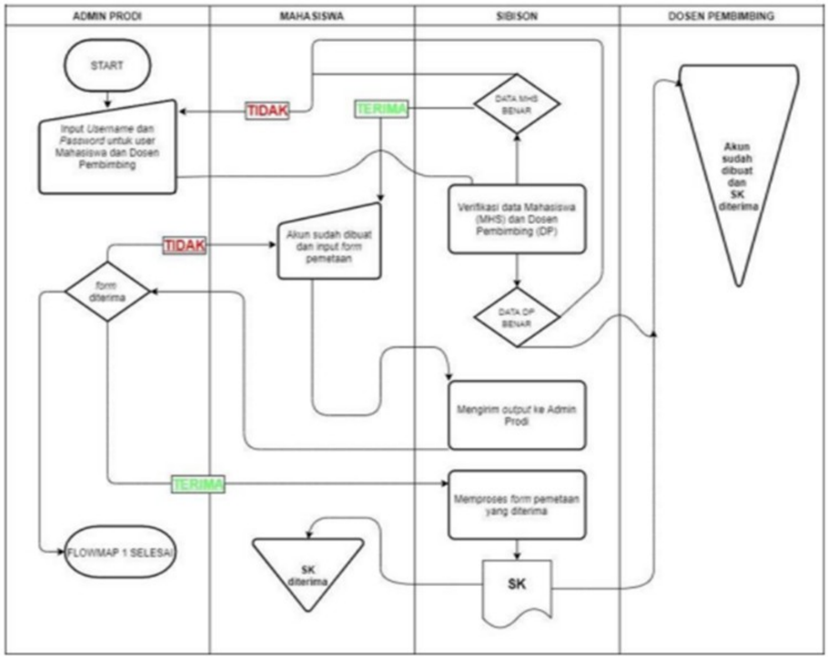



*Diagram 1 Draft Diagram of Data Collection and Synchronization Flow between Users in SIBISON Application*

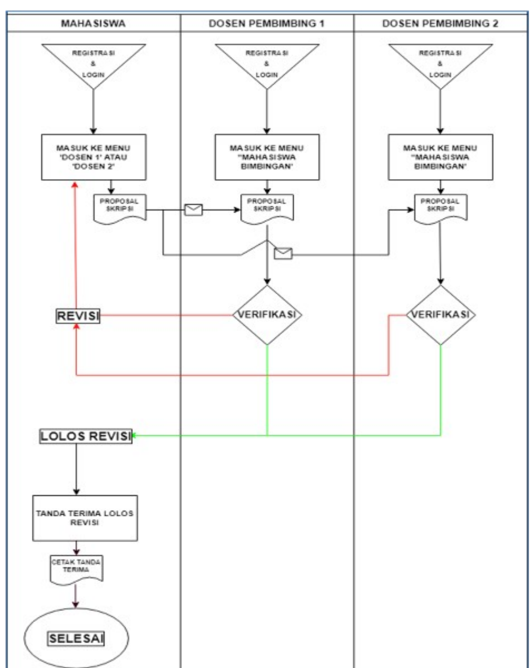



*Diagram 2 Draft Diagram of Thesis Guidance Flow between Users in the SIBISON Application*

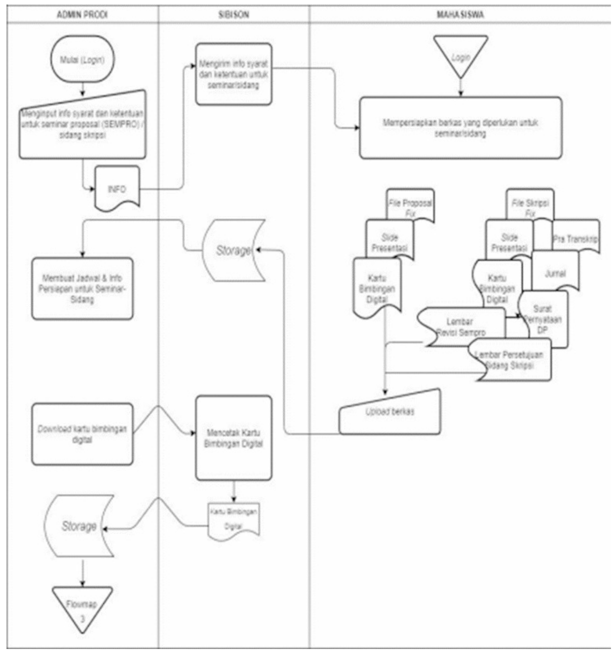


*Diagram 3 Draft Diagram of Digital Filing Flow for Proposal Seminar and Final Session between Users in SIBISON Application*

# 4 Result & Discussion

## 4.1 Result

The system consists of two or more components that are integrated with each other and can achieve a specific goal in the work environment (scope). The needs analysis carried out by the researcher is by conducting observation techniques directly to see the conditions and circumstances in. The analysis of the running system can be explained on the Flowmap as follows:

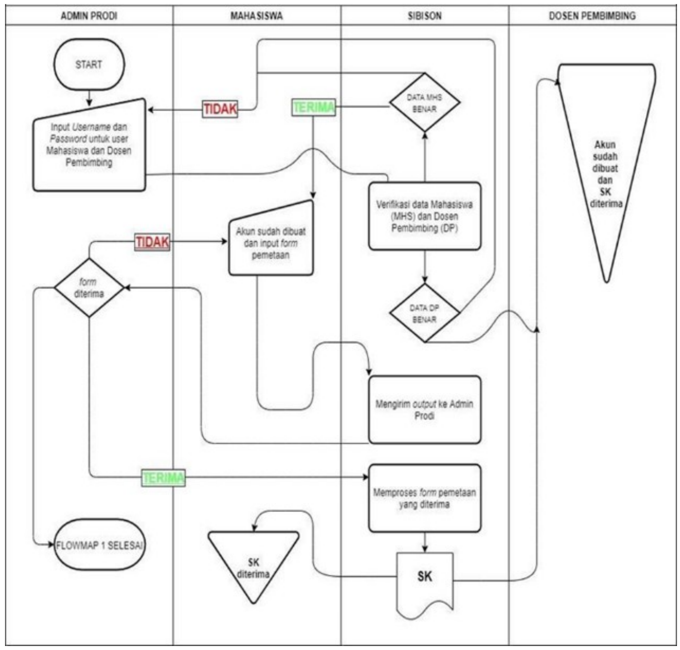



*Diagram 4 Flowchart 1 Student Data Collection & Synchronization*

Description of Flowchart 1 Student Data Collection and Synchronization:

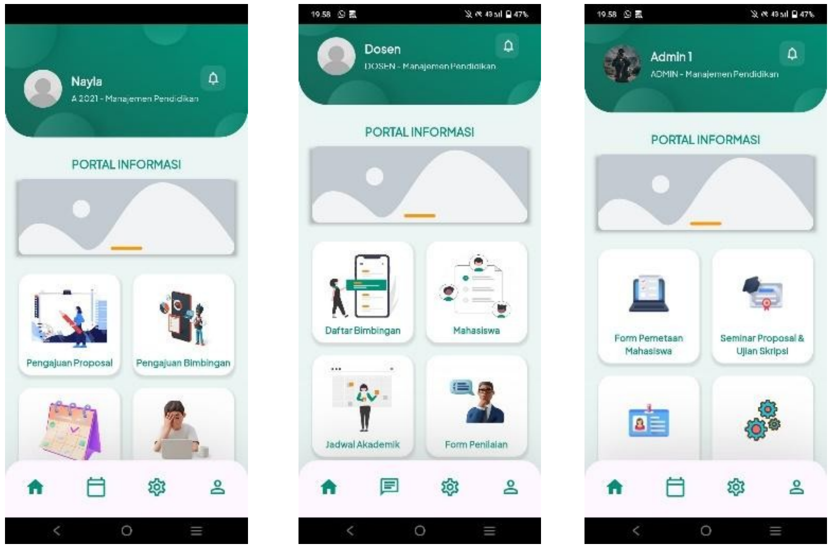
1. Study program administers input username (NIM) and password (Date of birth) for students and username (NIP) and password (Date of birth) for Supervisor or use the mobile phone number and campus email of each user.
2. The SIBISON system verifies student data (MHS) and Supervisor Lecturers (DP).
3. For lecturers, if the verification is successful, the account is successfully created, and the lecturer receives the decree.
4. For students, if the verification is successful, they will be directed to fill out the mapping form.
5. After filling out the mapping form, students submit the results of filling out the mapping form and the SIBISON system receives the output and sends it to the study program admin.
6. The study program admin receives the output of the student mapping form.
7. The SIBISON system processes the results of the mapping form received.
8. Students receive the SK.

Based on the results of observations and interviews with resource persons for analysis of what is needed in the system, the researcher decided to create a mobile app-based Thesis Guidance Information System model in the University of Education Management Study Program, Faculty of Education, State University of Jakarta to facilitate data management (administration) and the educational process, in this case the thesis guidance process. In the mobile app-based thesis guidance information system model at the Education Management Study Program, Faculty of Education, State University of Jakarta, the researcher uses React native and Typescript as the programming language used to design an android application, as well as MySQL, which is a database management software that runs on mobile app hosting. These three things will be configured according to needs, so that it will create a model of a mobile app-based thesis guidance information system in the Education Management Study Program, Faculty of Education, State University of Jakarta. The mobile app-based is installed on an android phone. The researcher uses the local host server installed on the researcher's laptop for development needs.

The description of Flowmap 1 Mapping Activities is as follows:

1) The Study Program Admin makes a mapping form which will later be entered into one of the application menu sections, namely (mapping form).
2) Students input the mapping form via the system along with supporting files.
3) The form that has been inputted, will be recapped by the study program admin to be given to the Study Program Coordinator.
4) The Study Program Coordinator reads and analyzes the results of the mapping form recap, after going through various considerations, the Study Program Coordinator conducts acceptance and rejection actions related to the mapping form submitted by students.
5) If accepted, the student gets the status of 'Accepted' from the system.
6) If rejected, the student gets a 'Declined' status from the system and revises the mapping form submission.
7) If all student mapping forms have been accepted by the Study Program Coordinator, the Study Program Coordinator will make a Certificate (SK).
8) The Study Program Choir gave a decree to the Study Program Admin. The Study Program Admin inputs the Lecturers who will be used as Student Supervisors according to the Decree in the System.
9) The decree made by the Study Program Coordinator that has been given to the Study Program Admin is then given to Students via the System (Notification on Application and email).
10) Students receive the Decree and confirm it to the Supervisor 1 & 2 (DP1 & DP2) according to the Decree.
11) The Supervisor inputs the students under their guidance by the system.

## 4.2 Discussion




*Picture 1 User Interface*

The image depicts the development of an online thesis guidance information system application in the Educational Management study program. In this application, each student has their own account and can propose topics and conduct consultations through a single platform. This facilitates students and lecturers in terms of time and efficiency. Additionally, lecturers can also monitor the progress of students in completing their studies.

The implementation stage on a system is the stage where the application designed in the previous stage is applied, in the form of software and hardware used. By implementing the application of the designed system, the result is that the system can be operated or used after testing.

a) Limitations of System Implementation

In implementing the web-based Thesis Guidance Information System application for the FIP Education Management Study Program of the State University of Jakarta, there are several things that are limitations to implementation, including:

1) This system can be used by Study Program Admins, Supervisors, and Students of the Education Management Study Program, Faculty of Educational Sciences, State University of Jakarta who have been registered in the database used by this system.
2) This system can operate optimally by using a mobile app that will be designed.
3) In the creation of the mobile app-based Thesis Guidance Information System application in the Education Management Study Program, Faculty of Education, State University of Jakarta, using React native and Typescript.

b) Hardware Implementation

The hardware used to implement the system is as follows:

1) Quad core processor

   2) 4GB RAM
   3) 16gb storage

c) Software Implementation

The software used to implement the system is React native and Typescript.

## 5 Conclusion

This research aimed to develop a mobile app-based Thesis Guidance Information System named SIBISON for the Educational Management Study Program, Faculty of Education, State University of Jakarta. The research method employed a Research & Development (R&D) approach, focusing on the creation and validation of an educational product.

The analysis of the current system revealed limitations in the existing web-based thesis guidance system. These limitations included difficulties with accessibility and a lack of features for efficient communication and data management. To address these limitations, the research proposed a mobile app-based model.

The proposed model utilizes React Native and Typescript for app development and MySQL for database management. The app facilitates data management for the study program administration and streamlines the thesis guidance process for both students and supervisors. Features include student data synchronization, mapping activities, proposal submission, notification systems, and progress monitoring functionalities.

The implementation of the mobile app-based SIBISON is expected to enhance the efficiency and effectiveness of thesis guidance in the Educational Management Study Program. This system offers benefits such as improved accessibility, streamlined communication, and centralized data management. Further research could explore user experience testing and the integration of additional features such as document sharing and plagiarism checking functionalities.

## 6 Recommendation

Universities should consider implementing the SIBISON (Sistem Informasi Bimbingan Skripsi Online) to streamline the thesis supervision process. This system can enhance communication between students and supervisors, ensuring timely feedback and efficient progress tracking. When this system wants to be used simultaneously in all existing faculties, universities also should develop training programs for both students and lecturers to effectively use SIBISON. These programs should cover the system's functionalities and best practices for online thesis guidance.

For user security, the university needs to strengthen the security measures within SIBISON to protect sensitive data and ensure the privacy of users. Implementing robust security protocols is crucial for maintaining trust and compliance with data protection regulations.

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