Web based management information system for electrical engineering final project students of State Polytechnic Bandung, Indonesia

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Abstract. This purpose of this research is to develop the web based Final Project Student MIS application for electrical engineering students at Bandung of State Polytechnic in handling the final project students. The system is called the MIS SePaKaT TA (Sistem Pengambilan Keputusan Terpadu Tugas Akhir). The process of implementation of the system is based on the Waterfall Method that is a breakdown of project activities into linear sequential phases, where each phase depends on the deliverables of the previous one and corresponds to a specialization of tasks. The Final Project Student MIS Application is a best solution because it’s support on time correctly without delays and informing online all classified users. In addition, the system provides with Decision Support System (DSS) to decide students eligible for examination based on requirements. Other advantages of the system is less paper usage and less people to manage.

1. Introduction

Final Project is a compulsory subject which students undertaking an autonomous project under the direction of an advisor. The purpose of this final project is to put to work the tools and knowledge that students gain throughout their studies. For Electrical Engineering Students, especially at Bandung of State Polytechnic, Student Final Projects is the ultimate achievement of an electrical engineering graduate. A specific different of electrical engineering final project with others is a complete design electronic system as a requirement.

The processes of final project are complex and time consuming for students, lecturers, and coordinator. It starts from proposed student final projects, reviewing, advising, reporting, and examination. Now, the activities of this student final project in Electrical Engineering Department at Bandung of State Polytechnic are managed manually. To manage it, web based application is applied. The paper presents the Final Project Student MIS Application web platform designed for Electrical Engineering Department students and their lecturers. The system is called the MIS SePaKaT TA (Sistem Pengambilan Keputusan Terpadu Tugas Akhir).

The Web Based MIS for Final Project Student is a best solution because it’s support on time correctly without delays and informing online all classified users (students, advisors, and coordinator). In addition, the system provides with Decision Support System (DSS) to decide students eligible for
examination based on requirements. Other advantages of the system is less paper usage, less people to manage, and integrated.

2. Method
To create a website, two important steps need to be taken: one is web design, and another is web development. Web design is to create websites that are displayed on the internet. It also called the frontend of the website. On the others, Web development simply refers to the creation and editing of websites. Today with the changing technologies, many web development tools are handy and these tools are not only save the development time but also help them in coming up with new website ideas. Web development tools allow web developers to test and debug their code and also allow developers to work with a variety of web technologies, including HTML, CSS, the DOM, JavaScript, and so on.

The process of implementation of the system is based on the System Development Life Cycle (SDLC) with Waterfall Method. This method was originally defined by Winston W. Royce in 1970. Nowadays, the waterfall model is generally taken to mean any sequential model divided into consecutive stages and having the attributes of the original model [1]. Each stage depends on the deliverables of the previous one and corresponds to a specialization of tasks. Figure 1 shows the System Development Life Cycle (SDLC) with Waterfall Method. figure 1 shows the System Development Life Cycle (SDLC) with Waterfall Method.

![System Development Life Cycle (SDLC) with waterfall method.](image)

2.1. System design
System Design helps in specifying hardware and system requirement. In this process, a model is used to define overall system architecture. Use case diagrams are usually referred to as behaviour diagrams used to describe a set of actions (use cases) that some system or systems (subject) should or can perform in collaboration with one or more external users of the system (actors).

In the SePakAT TA, the four highlight main actors are:

1) Management/Admin – administrator of the MIS, that provide account management and system maintenance;
2) Coordinator – organize and monitor all final project activities, including teachers, students, classes, progress, and examination;
3) Lecture/Advisor – provides information about student advising book and examination;
4) Student – students of the electrical engineering whom can view group information and final project progress.
The use-case diagram for MIS SePaKaT TA Application Architecture is presented on figure 2. This use case diagram illustrates the most important functional requirements to the system from the users’ point of view.

![Figure 2. Use case diagram of the MIS SePaKaT TA.](image)

To describe more detail, data flow diagram is used. It visually represents systems and processes that would be hard to describe in a form of text. Diagrams are used to map out an existing system and make it better or to plan out a new system for implementation. Visualizing each element makes it easy to identify inefficiencies and produce the best possible system. Figure 3. shows data flow diagram for the MIS SePaKaT TA.

![Figure 3. Data flow diagram of the MIS SePakaT TA.](image)
The four classified users can access into the MIS web. In order to be user friendly, Single Sign-On (SSO) is used which a session and user authentication services permit a user to use one set of login credentials (e.g., name and password) to access multiple applications. Figure 4 shows flow chart of structure process with single sign-on mode.

![Flow chart diagram of structure process with single sign-on mode in the MIS SePaKaT TA.](image)

**Figure 4.** Flow chart diagram of structure process with single sign-on mode in the MIS SePaKaT TA.

2.2. **User interface design**

User Interface is the way of human as a user to interact with an application or a website in a computer device. A good user interface has to be user friendly which is easy to use. On the other hand, User Interface Design is the process of making interfaces in software or computerized devices with a focus on looks or style.

In the MIS SePaKaT TA, user interface is designed to be used by 4 classified users. Considering what should be menu in the page, access privileged for each user, and security are very important. Figure 5 shows the flow chart of Homepage of SePaKaT TA.
Figure 5. Flow chart diagram of start window SePaKaT TA.

3. Results
The result of design phase is translated into program. Some pages below show the result of this phase. The system starts with homepage which single sign on login option for the registered users can enter to access multiple application in the system. In addition, the page provides tabs for description, final project information, gallery, and contact us. Figure 6 shows homepage window of the MIS SePaKaT TA.

Figure 6. Homepage windows of the MIS SePaKaT TA.

When registered users access the system, it will be directed through menus that according to classified user. It displays all information concerning the student final project which are student final project
propose, student advisory with lectures, and student exam. All final project activities are recorded in
the database. Figure 7 shows page for a student user and figure 8 shows pages for lecture/advisor.

![Figure 7. Page of student user of the MIS SePaKaT TA.](image)

![Figure 8. Pages of lecture/advisor user of the MIS SePaKaT TA.](image)

Coordinator User is the one that can view or access all the system. He/she manage all student project
activities from student proposal, advisory, until the examination. At the end, Coordinator has to make
complete report for management. Figure 9 shows page for Coordinator User.
4. Discussion
The MIS SePaKaT TA is web based application to manage all activities student final projects. It was designed for electrical engineering students in State Polytechnic Bandung. All activities, students and advisor, regarding the final project is recorded in database. Figure 10 shows the database tables that are used in the system.

![Figure 10. List of tables of the MIS SePaKaT TA database.](image)

The system was tested and evaluated. It possible to improve which then progressively gains more complexity and a broader feature set until the final system is complete.

5. Conclusion
The MIS SePakaT TA assists in automating the existing manual system of Electrical Engineering final project students in State Polytechnic Bandung. It can be monitored and controlled remotely. This is a paperless work and it reduces the man power required. It always provides accurate information. Malpractice can be reduced. All years together gathered information can be saved and can be accessed at any time.

The data which is stored in the repository helps in taking intelligent decisions by the management. So, it is better to have a Web Based Management Information System. All the stakeholders, faculty and management can get the required information without delay. This system is essential for students in the other departments of universities.

References
[1] Hemm Barzan and Wu Fei 2014 International Journal of Computer Engineering and Technology 5 Issue 2 pp 09-18