

DEVELOPMENT OF AN INTEGRATED ACADEMIC MANAGEMENT SYSTEM IN HIGHER EDUCATION

By

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ABSTRACT

Currently, the development of technology and the change in the student generation have driven educational institutions to adapt to the use of technology in its services. This research is aimed at describing and analyzing research findings and developing an academic management system. ADDIE (Analysis, Design, Development, Implementation, and Evaluation) approach of research and development model was used in this research. The research found that although the university had had an academic management system, its implementation was not yet optimal and integrated. This research developed an integrated academic management system which philosophically not only provides an efficient and up to date professional service but also bolster the efficiency and effectiveness of the performance of the Three Pillars of Higher Education. With quality service, the university performs better and functions more effectively in carrying out the education processes in order to facilitate the learning process of its students. The research concludes that the academic information system is important not only to provide better services but also to enhance the graduate quality.

Keywords: management system, academic management, integrated academic

RESUMEN

Actualmente, el desarrollo de la tecnología y el cambio en la generación estudiantil ha impulsado a las instituciones educativas a adaptarse al uso de la tecnología en sus servicios. Esta

investigación tiene como objetivo describir y analizar los resultados de la investigación y desarrollar un sistema de gestión académica. En esta investigación se utilizó el enfoque ADDIE (Análisis, Diseño, Desarrollo, Implementación y Evaluación) del modelo de investigación y desarrollo. La investigación encontró que aunque la universidad había tenido un sistema de gestión académica, su implementación aún no era óptima e integrada. Esta investigación desarrolló un sistema integrado de gestión académica que filosóficamente no solo brinda un servicio profesional eficiente y actualizado, sino que además refuerza la eficiencia y efectividad del desempeño de los Tres Pilares de la Educación Superior. Con un servicio de calidad, la universidad se desempeña mejor y funciona con mayor eficacia en la realización de los procesos educativos para facilitar el proceso de aprendizaje de sus estudiantes. La investigación concluye que el sistema de información académica es importante no solo para brindar mejores servicios sino también para mejorar la calidad de los graduados.

Palabras clave: sistema de gestión, gestión académica, académico integrado

INTRODUCTION

Background: Many universities have developed academic information system to meet their needs of academic management system and improve the academic services to all their stakeholders (Medland, 2016). One of the supporting facilities in the academic information system is information technology infrastructure. According to Chumjit (2012), a university's academic management system is an integral part of its institutional management system which focuses on the overall management apparatuses designed and structured systematically and comprehensively to manage the whole components of university education processes (Mahlangu, 2020; Miller & Edward, 2020).

A number of research have expounded the importance of an integrated academic system in providing the best services to students. Mukhtar, Sudarmi, Wahyudi, and Burmansah (2020) explained that the purpose of an integrated information system is to encourage leaders in education to implement technology in providing services to make them more effective. This opinion suggests that an integrated management information system, particularly in the academic field, is a non-negotiable imperative. (Claude, Hansson, & Ben, 2019)

There are seven elements in the university's current academic system, each of which performs a particular academic function. These elements are academic calendar preparation, new student admission, new and existing student registration, lecturing process, grading mechanism, thesis writing, and graduation (Noreen, 2020; El-Nasharty, 2022). In practice, not all activities in these elements are done well. This would later become the basis for the development of a consolidated and integrated academic management system so that this research would produce a useful outcome for the research object. (Mahlangu, 2019)

Existing research has proven that the use of an integrated academic system becomes a model for the development of an effective and efficient service. (Muhafidin, 2020; Pfeffer, 2015). Most of these research, however, were focused on one campus or education unit. In contrast, this research involved 5 campuses in different locations so that the problems and complexities of each campus can be accommodated by the system to be developed. This research is very important in that it integrated different campuses into one system with an integrated control.

Based on the above reasoning, the researcher was motivated to analyze the operation of university academic management system.

Research Questions

In reference to the above background, the questions of this research are: (1) what is the current condition of the university's academic management system? (2) How is the university's academic management system controlled? (3) How is a university's integrated academic management system developed? And (4) How is an integrated academic management system implemented at the university?

The novelty of this research is the integrated academic management. The integratedness covers not only the implementation of the elements of academic management system but also its application in five campuses under one system of operational control. Hence, integratedness is viewed from the perspective of system and from its operational implementation in several campuses under a single command of control.

From a scientific standpoint, this research has significant implications, particularly in the creation of technological systems for improving the quality of teaching and learning, as well as the total service provided to students.

RELATED LITERATURE REVIEWS

Academic Information System

Communication and information technology is a branch of science that can be used to help an organization achieve its goals. One of the important things in the 21st century is the role of higher education in technological innovation, both in the use of technology in academic services and in developing technology as part of scientific development (Bottery, 2008). This is in line with the Dearing Reports which, among others, cited technological innovations as one of the major roles of higher education institutions in the 21st century (Mulyani, Gaffar, Komariah, Suhendar, & Wulansari, 2021).

Technology has revolutionized the way we live. The majority of space in the university does not seem to have changed; however, the development of technology, particularly wireless technology, has facilitated mobile learning which has made it possible for students to learn and access information anywhere without being confined by space. This in turn has enabled them to create their own social learning (Bottery, 2008; Claude et al., 2019; Huda, Kabir, & Siddiq, 2020).

Management System

According to Trosset and Weisler (2018), management system is a system that is comprised of various components that work hand in hand with each other in order to make the organization under which they exist operate at its best. To accomplish its goals, an organization needs several key elements, namely synergy, interdependence, and interrelations between an assortment of its subsystem. System, therefore, holds one of the key answers to anticipating changes from within and outside the organization to make it more agile (Annannab, Bakar, & Mohd Khan, 2022).

Collaborative and Adaptive Leadership

A collaborative leader is a leader who knows "how to create a conducive environment that facilitates a sustainable level of innovation and team learning." She would also consider collaboration as "an integral component of learning organizations and communities of learners" and would help others "improve their understanding of practices that foster collaborative leadership." (Roopchund & Ramlowat, 2019; Vom Brocke & Rosemann, 2010)

Knowledge Management (KM)

A collaborative and adaptive leader needs the support of the entire human resources who have the competence and skills needed to oversee and anticipate changes themselves. (David, 2011).

Paideya and Dhunpath (2018) explains that knowledge management is in its essence an effort to optimize the use of knowledge resource. As such, knowledge management occupies a key role in encouraging the production, distribution, and use of an organization's knowledge (Indrayani, 2011).

Productivity

Sullivan states that productivity is essentially how a unit of input is used to produce the output. In education, the output is the quality of graduates that is produced by the input (lecturer, system) (Awang, Ismail, Flett, & Curry, 2011; Trosset & Weisler, 2018). The expected output of an education institution is a graduate whose quality can meet the demand of industry and job market or makes it possible for him to start a business of his own.

(Muhafidin, 2020) states that efficiency is “do the right thing” and effectiveness is “do the right thing”. Efficiency happens when a person can do her job correctly, whereas effectiveness happens when she does the right thing. How effective and efficient a university's productivity is can be measured by means of its integrated academic system.

RESEARCH METHODOLOGY

This study employs the research and development (R&D) process, focusing on the ADDIE model. This methodology provides a way for them to create and test instructional materials. In reality, education practitioners and pedagogues have used this strategy extensively in the development of educational product models (Allan, 2021; Almunashiri, Davies, & McDonald, 2016; Awang et al., 2011; Basera, 2019; Biesta, 2015).

ADDIE (Analysis, Design, Development, Implementation, and Evaluation) approach of research and development method. ADDIE is commonly used for research on learning processes; however, currently it has developed and can be used for research in educational management. (Bottery, 2008)

Data were obtained by means of interviews, documentation, and ground observation from all stakeholders of the universities, which include the Foundation, Chairperson, Vice Chairperson, Department Heads, Office of Academic and Student Affairs Administration, Campus Coordinator, and IT staff.

Research and analysis were conducted in accordance with the stages of the ADDIE model, which was then simplified into three stages, namely: (Bottery, 2008)

1. Analysis of the existing condition

At this stage, the researcher analyzed the existing condition of the Academic Management System. The focus was on identifying and discussing the findings.

2. Development

This stage consists of the following steps:

- a. Identifying the philosophical foundation of the integrated academic management system;

- b. Designing the structure of the system;

- c. Determining the operation of the system.

3. Implementation of Integrated Academic Management System

At this stage of the research, the following were conducted:

a. Preparing the operational plan, which includes determining the elements to be included in the trial, preparing the software, hardware, and human resources involved, scheduling a limited trial, and organizing a technical meeting with all members of the technical teams.

b. Implementation of the operational plan, which includes stage 1 and stage 2 of limited trial.

This research was conducted at Sekolah Tinggi Ilmu Ekonomi Pertiwi (Pertiwi College of Economics) on Jl. Ir. H. Juanda No. 133, Bekasi.

FINDINGS AND DISCUSSIONS

Findings

Below are the findings on the existing academic management system:

a. Preparation of Academic Calendar and Class Schedules

The existing system has not integrated the academic calendar with the curriculum. This condition had made it difficult for the management to prepare class schedule because it had to check the curriculum manually to put courses in the appropriate semester. The aforementioned findings demonstrate that the existing system is not fully integrated since approval is done through manual meetings, which takes a long time and occasionally does not match the time frame established.

b. New Student Admission

The research found that:

a) There were no guidelines for the selection process. This condition had rendered the system unmeasurable and disorganized because everybody who was involved could make their own interpretation and decision.

b) There was no menu for the applicants to print out the admission test card on their own. Because the system was not yet integrated, applicants could not print out the admission test card on their own.

c. Registration of New Students and Re-registration of Existing Students

The research found that:

The new and old student re-listing systems, it may be argued, go through numerous stages. The most crucial phase is how they re-register, which is directed by academic advisers chosen by the campus on the basis of students taking suitable courses and based on their previous semester's achievements. Several procedures show some of the issues connected with student re-enrollment, including:

a) Proof of payment made by applicants and students still had to be inputted manually by the personnel of Office of Academic and Student Affairs (BAAK). This practice was prone to errors, which should have been minimized.

b) Reactivation of student status was still performed manually.

c) The number of active, on leave, and dropout students were not readily identified at the end of the registration period.

d) Students filled in the study plan card (signed up for courses) online but the academic advisers did not give their approval through the system.

According to the findings, the present system is not performing properly, and more extensive integration and upgrades are required. The efficacy and execution of lectures in the upcoming semester will be improved with greater improvement and integration.

d. Classes

The research found that student and lecturer attendance list was still filled in manually. Attendance list was available in the system but it was synchronized with assignment submission, mid-semester grade, final grade, and the Google Classroom. This condition seriously affected the service given to the students and prevented grades from being published on time.

e. Assessment

The research found that the existing system had already had a complete menu for grading. However, lecturers often missed the deadlines for inputting the grade into the system. There were a variety of reasons for this problem. Some lecturers were not used to grading through the system and preferred doing it manually. There was no sanction for lecturers who was late in submitting the grades.

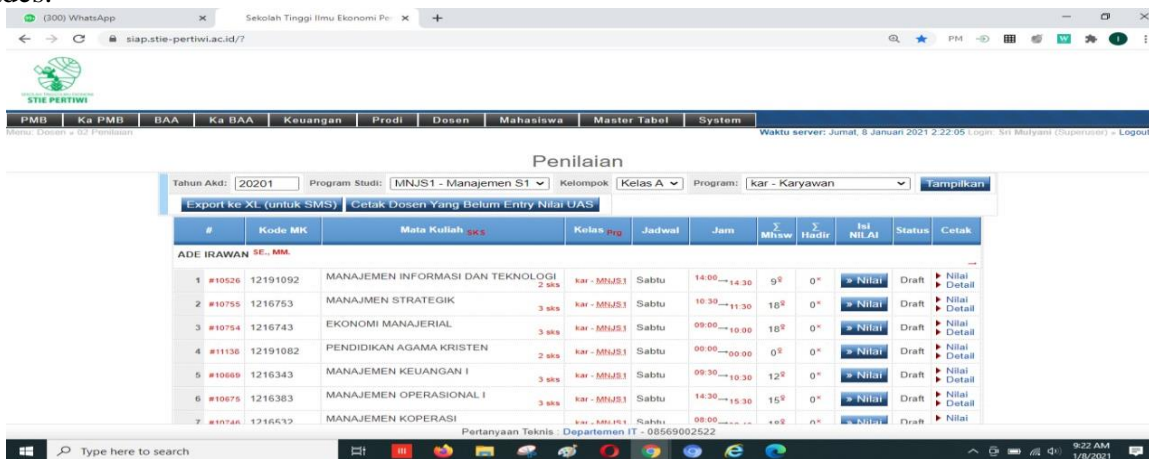


Figure 1.

f. Thesis Advising and Defence

The research found that thesis administration menu had not been used although it was available in the system. This happened because there was still duality in its implementation: both the manual and online administration were still used

g. Graduation

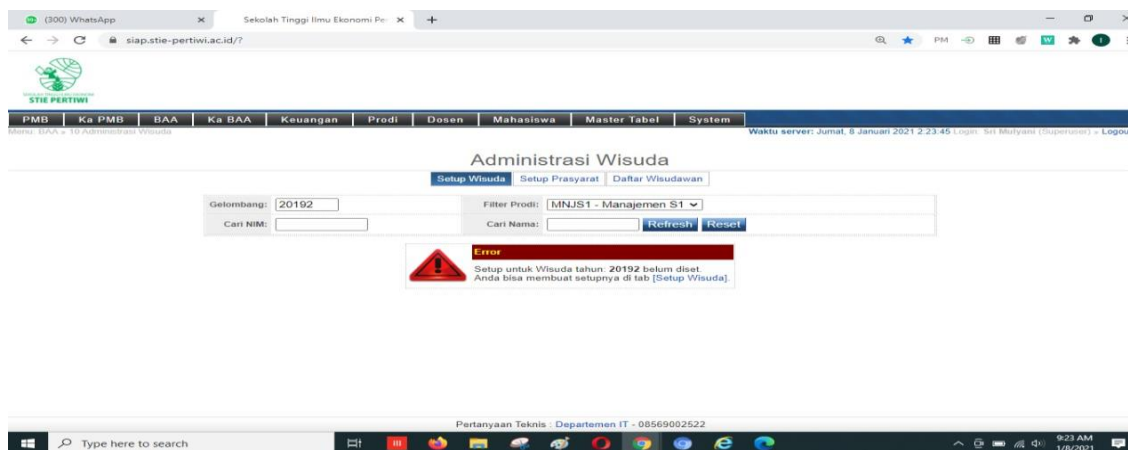


Figure 2.

Graduation administration menu was actually available in the existing system but had not been used. As a result of this, it was difficult to identify students who were ready to attend graduation.

In addition to the above findings, this stage of the research also found that the control (maintenance) of the university's academic management system was not well scheduled.

Evaluation of the system was conducted based on problems and input. The university's academic management system as the goal keeper of its quality still did not perform optimally.

DISCUSSIONS

Based on the above findings, the researchers found three crucial elements whose implementation were seriously inadequate. These elements are the registration of new students and re-registration of existing students, course registration (filling in the study plan card), classes and grading.

Registration of New Students and Re-registration of Existing Students

The research found that quite a few students who did not fill in the study plan card (sign up for courses), and were therefore not listed in the course's attendance list, attended the classes. This happened because they were late for registration because of financial reason and did not report it to the Office of Academic and Student Affairs (BAAK). This resulted in their names not being listed in the final grading recapitulation.

Registration process is essential not only to confirm a student's status but also to take courses that correspond to their previous achievement. Registration ensures the student's place in the class. [Oladunjoye and Omemu \(2013\)](#) stated that: "The academic curriculum in all tertiary institutions determines the number of courses a student is expected to offer. This requirement is to certify the requirements that any student must meet in order to graduate or be considered to have completed the course. Course registration is a necessary and procedural task. A genuine student is required to sign up for a certain amount of hours of work. Each semester/session, a legitimate student is required to register for a certain number of hours of work. Based on the education policy of the university, any of the courses can be required or optional. Before a student is allowed to attend courses or take an exam, their enrollment is often checked and validated.."

Their research corroborated the findings about the procedures that a university's management need to undertake with regard to student registration and what they mean to the students.

Teaching and learning process

Lecturing is a process of learning that involves the registered students who have signed up for a particular course, the lecturer who is in charge of the course, time, and place where the learning takes place in a particular semester. Lecturing is important because it engages students in an active process of knowledge construction. As [Skewes \(2018\)](#) said: "Teaching is described as engaging with students in order to help them understand and apply information, principles, and processes. To teach is to include students in the process of learning; thus, teaching entails involving students in the active creation of knowledge."

This research found that although class schedule had been published far in advance and confirmed to the lecturer, class schedules would often need to be adjusted in the first two weeks of the semester because the schedule offered was not suitable with the lecturer's time availability. This finding was consistent with the result obtained in a study conducted by [Kutbiddinova, Eromasova, and Romanova \(2016\)](#) published in *International Journal of Environmental and Science Education*, which states that: the new focus in education on the development of competencies as a person's preparation and capacity to engage in action and conversation necessitates the establishment of pedagogical and psychological environments in which the pupil should demonstrate not only academic and cognitive activity, but also personal social status.

Teaching and learning process is more than just a cognitive activity that aims at developing the intellect, it is also an effort to put the students in a social context where they live and have their activities.

Additionally, they also stated that, the active training technique is a method of organizing student-teacher contact in which the teacher and students engage with each other during class, with the students being active participants rather than passive listeners (Kutbiddinova et al., 2016). This research suggests that there is still a problem where the university was ineffectual in controlling the activities of the lecturers and the students in the classroom. This situation further emphasized the need for an integrated academic system that enables the university's management to see the interaction processes that take place between students and the lecturer in the learning process.

Grading

The results of this research show that the mid-semester examination, conducted in the 8th session, and the end of semester examination, conducted in the 16th session of the semester, were not yet optimally conducted according to the academic calendar. Some courses had their examinations not in accordance with the dates set in the academic calendar.

In addition to the above problem, this research also found that grading given by the lecturers and processed through Academic Administration Office (BAA) and Computer Center had not run optimally. From the documentation, it was found that only 40 percent of the lecturers graded the examination papers on time.

Cotterell, Lowe, and Shaw (2006) stated that for others, gradeless refers to the absence of grades, or the complete avoidance of the harmful and demotivating consequences of grades. These educators are attempting to place a greater emphasis on learning by removing grades in favour of feedback and development. Some can also operate in classrooms where portfolios or informative assessments have taken the place of standard report cards.

This means that whatever grading system is used, grading to student's work is still needed as a reference for feedback and progress in the future. From the evaluation process, campus can determine what kind of grading model to be developed for the students.

Assessment or grading is an essential component in the teaching and learning process to see if it has achieved the level of knowledge set in the objective and whether a student deserves to get the grade he gets (Huda et al., 2020).

The objective of grading process is to measure the qualities, skills, and competences that would be beneficial for the students so that they can demonstrate the results of their learning in the society (Dumas, La Rosa, Mendling, & Reijers, 2018). Assessment is a means to measure if the learning process administered by the university has been successful.

System Development

The development phase of this research aims to develop an integrated academic management system, which is a system that integrates all the core processes of education business into an information system supported by the latest technology. University Academic Management System is the entire management process that integrates all the academic activity components into a system that applies ICT in every stage of academic services to the students.

To provide a strong basis for the development, a philosophical basis is needed. The development proposed by the researcher would include a philosophical meaning to the implementation of university education based on technology and information technology. The philosophy is adopted from the "Function and Objectives of National Education" based on Article 3 of Law of the Republic of Indonesia Number 20 of 2003 on National Education System, which reads: National education serves to cultivate competence and shape the character and culture of a

dignified country in order to enrich the nation's life, with the aim of improving students' ability to become individuals. who believe in the Almighty God, have a noble character, are strong, knowledgeable, capable, imaginative, and self-sufficient, and become democratic and responsible people. (Indrayani, 2011; Kutbiddinova et al., 2016)

The Objectives of The Development of Integrated Academic Management System:

Based on the challenges found in the findings of the research, the researcher developed an integrated academic management system that provides not only an efficient and up to date service, but also helps in achieving efficient and effective performance of the Three Pillars of Higher Education. With better quality services, the university can function more effectively in administering the education process to serve the students.

The Structure of Integrated Academic Management System

The system's structure is designed comprehensively at the university level, which includes the university's management, departments and study programs' management, and academic and administrative support units, covering different but closely interrelated functions and tasks in a comprehensively synergistic process.

Below is the table comparing the existing system with the proposed system:

Table 1. Comparison of Existing System with Proposed System

No	Elements of Academic Management System	Weakness of the Existing System	New System
1	Preparation of Academic Calendar & Class Schedule	System is not integrated with the curriculum, not accessible through the web.	Online Class Schedule Application Program. Academic Calendar Additional authorization menu for policy makers (approval button)
2	New Student Admission and Selection	1. Guidelines for admission process are not available yet. 2. Menu for applicants to print out admission test card on their own is not available yet. 3. New student admission test results are announced manually.	1. Guidelines for new student admission are available online. 2. Data are integrated with university information system application. 3. Results of admission test are announced online. 4. Applicants can print out admission test card on their own.
3	Student Registration	1. Upload of new student registration papers is conducted by the admin.	1. Online registration.

	<p>2. Input of student's proof of payment is still conducted manually by Office of Academic and Student Affairs (BAAK).</p> <p>3. Reactivation of student status is still conducted manually.</p> <p>4. Number of active, on leave, and dropout students cannot be identified by the system at the end of the registration period.</p> <p>5. Filling in Study Plan Card (signing up for courses) is done online but academic advisor does not give her approval through the system.</p>	<p>2. Bimbingan PA Online</p> <p>3. ACC Dosen PA online</p>	
4	Classes	<p>1. Student and lecturer attendance lists are filled in manually. The system has the menu but incomplete.</p> <p>2. The system is not yet synchronized with assignment submission, mid-tem test, final test, and Google classroom.</p>	<p>1. Online student and lecturer attendance list.</p> <p>2. Interconnecting Academic managment system with Google Classroom.</p>
5	Grading	System has a complete grading menu, but lecturers are often late in inputing the grades into the system.	Notification feature to send reminder to lecturers of grade submission deadline.
6	Thesis Advising and Defense	Not yet implemented in the system.	Online proposal submission. Online thesis advising.
7	Graduation	Not yet implemented in the system.	Graduation administration is interconnected with grading (transcript, judicium)

Based on the comparison between the existing system and the proposed system, an Integrated Academic Management System (SMART) was designed, the visualization of which is presented below.

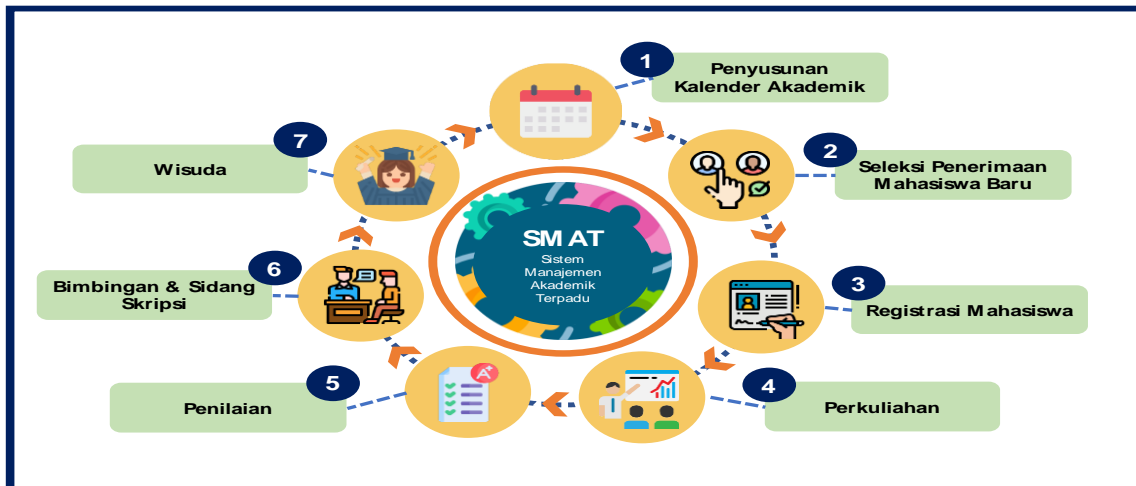


Figure 3. Integrated Academic Management System

The development was made by adding features that had not previously existed, namely approval or validation button to be used by the authority or persons in charge of the respective elements. The button is not just an additional feature but a representation of the reinforcement of the respective functions in the overall academic system. The button is also a symbol of control administered by the authority in order that the work process conducted by the respective individuals is under control and recorded by the system.

System Implementation

After the development stage is completed, the next step is the implementation of the system. This stage begins with preparing the operational plan which consists of the elements to be tried, checking the readiness of the infrastructure, the software, the hardware, and the readiness of the human resources involved, the scheduling of phase 1 and phase 2 of the limited trial, and organizing a technical meeting with the whole team involved in the limited trial.

The next step is to conduct phase 1 and phase 2 of the limited trial and to receive evaluation and input from the reviewer to improve the Integrated Academic Management System (SMART) that has been developed by the researcher.

CONCLUSIONS

Based on the findings and discussion in the previous chapters, the following conclusion can be drawn.

The implementation of an academic management system, which includes preparation of academic calendar, new student admission, registration of new students and re-registration of existing students, class administration, grading, thesis advising and graduation had not run optimally. Implementation of control of university academic management system had not been scheduled properly. The university's academic management system as the gate keeper of the university's quality had not run optimally.

A new system was developed based on the previously existing system with the aim of creating a more comprehensive system that would improve on the existing system by adding features needed to facilitate users in using the system (ease of use). The developed system is called SMART (Sistem Manajemen Akademik Terpadu) or Integrated Academic Management System.

The system implementation began with preparing the operational plan which consists of preparing the elements to be tried, checking the readiness of the infrastructure, software, hardware,

and the readiness of the human resources involved, the scheduling of limited trial phase 1 and phase 2, and organizing a technical meeting with the whole team involved in the limited trial. Results of the limited trial phase 1 and phase 2 were then evaluated and given feedback by the reviewer to improve the Integrated Academic Management System (SMART) that had been developed by the researcher.

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