

Technological Innovation in the Independent Learning-Independent Campus (MBKM) Program at the Information Systems Study Program, Faculty of Computer Science, Subang University

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Abstract. The Merdeka Belajar-Kampus Merdeka (MBKM) Program is a policy launched by the Minister of Education in 2019, aimed at giving students more control over their educational journey. Subang University, especially the Information Systems study program, has participated in this MBKM Program, has played an important role in implementing the vision of this initiative. In the midst of technological developments, innovative approaches and the use of technology are essential in achieving the goals of this program. In its implementation, there are various responses from students or lecturers, and become material for evaluation. This research aims to bring up technological innovations that can be applied to increase the level of effectiveness and efficiency of the educational process, the research method used is descriptive qualitative, the data collection stage is based on data on students who take the MBKM program, the distribution of accompanying lecturers, activities that have been running, and raises several obstacles in the implementation process, then from the results of these findings the authors enter into data groups based on the MBKM program, then describe the proposed technology, information system integration, then compare with the previous system which includes time, cost, human resources involved and implementation procedures.

1. INTRODUCTION

Higher education in this era faces various significant changes and challenges. Amid technological evolution, colleges and universities must adapt to increasingly complex demands from students and the job market. The Freedom of Learning-Independent Campus Program (MBKM) offers students options to enhance skills in specific areas related to interdisciplinary fields and readiness to enter the workforce [1]. The MBKM program is a strategic step to strengthen higher education in Indonesia and create graduates who are competent and ready to face global changes.

Innovations in lecture processes, particularly the implementation of the MBKM program at a higher education institution, are essential in line with existing technological developments, and innovation is an activity of research, development, or engineering that is conducted with the goal of developing practical applications of new scientific knowledge and context [2]. The advancement of technology and the development of gadgets currently bring many changes to any sector, including education [3]. The application of technology, including the integration of learning models into information systems such as E-Learning and video conferencing, greatly aids in enhancing the effectiveness of the educational process [4].

Under the Merdeka Belajar Kampus Merdeka (MBKM) Program, Subang University has committed to providing diverse learning access and experiences to students. The MBKM program at Subang University for the Information Systems study program aims to enhance higher education quality by focusing on competency-based learning, empowering students to design their educational journeys, and collaborating with external stakeholders. However, to achieve these objectives effectively, it is crucial to integrate technological innovations throughout the program's aspects.

Technological innovation has become a mainstay in advancing higher education. The current technological developments include the industry 4.0 revolution and many others [5]. In this advanced digital era, the dissemination of information has become broader, faster, and more accessible to everyone [6]. Technology can enhance accessibility, flexibility, and learning quality, as exemplified

by AI (Artificial Intelligence), considered a key component of industrial transformation that allows intelligent machines to perform tasks autonomously, such as interpretation, diagnosis, and analysis [7]. Then there's the Chatbot, which is a computer program designed to mimic conversations and interactions with users through text, voice, or visuals [8]. Additionally, the Internet of Things (IoT), with one of its implementations being an automatic parking system. The rising popularity of Internet of Things (IoT) technology and the widespread distribution of devices connected within a network is evident [9].

In the Information Systems Study Program of the Computer Science Faculty at Subang University, efforts have been made to integrate technology in the implementation of the MBKM Program, focusing on online-based learning, integrated learning management systems, and other supporting tools. In this context, research on technological innovation in the MBKM Program at Subang University holds a strategic role.

This research aims to identify, analyze, and bring forth technological innovation that will be implemented in the Information Systems Study Program of the Computer Science Faculty at Subang University to support the execution of the MBKM Program. A qualitative research approach is employed. Through this research, valuable insights regarding the challenges and opportunities in applying technology to enhance the effectiveness and efficiency of this program are expected to be found. Consequently, more students can accelerate their studies from 4 years to 3.5 years by becoming faster, more efficient, and more targeted [10].

In this journal, we will outline the various aspects of technological innovation in the MBKM Program at the Information Systems Study Program of the Computer Science Faculty at Subang University. We will discuss the implementation of technology, its impact on the student experience, and the lessons that can be learned from this experience. This research is compiled as a tangible contribution to the efforts to improve the quality of higher education and ensure that students at Subang University can access relevant, up-to-date, and high-quality learning.

2. METHOD

In this study, the author employs a qualitative descriptive method focusing on in-depth observation [11]. The data collected in this research are through observations, interviews, and field documentation at the Information Systems Study Program of Subang University.

Research Stages

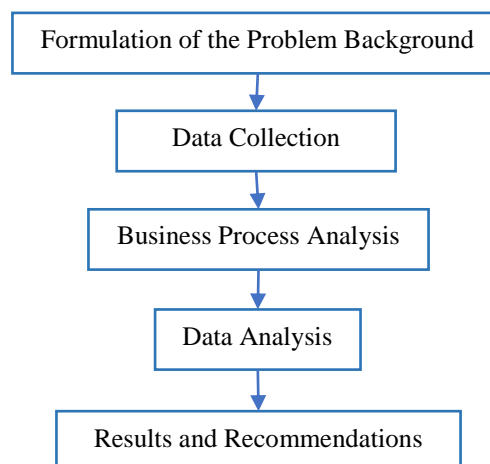


Figure 1. Research Stages

The explanation of the research stages in Figure 1 is as follows:

1. **Formulation of the Problem Background**
Identifying the research background and formulating the problem that becomes the foundation of this study.

2. Data Collection

Data collection is performed on the research object using three methods, including literature review, interviews, and documentation conducted with direct observation.

3. Business Process Analysis

Analyzing the ongoing business processes with a focus on topics related to the MBKM. The documents obtained from the research object are depicted in the form of BPMN. BPMN or Business Process Modeling Notation is similar to a Flowchart; it is a symbol used to describe the flow of a process [12]. BPMN is the depiction of a business process diagram based on a flow diagram technique that outlines a sequence of operations [13].

4. Data Analysis

Conducting the analysis of student data related to the implementation of the MBKM program.

5. Results and Recommendations

Explaining the results from data analysis, then proposing integration with technology, in the form of a system design that can help make the educational process more effective and efficient.

Data Collection

The data collection method refers to the techniques used to gather information [14]. In this study, the author conducted data collection using several methods, as follows:

a. Literature Review

Data was collected by searching for information from journals related to and relevant to the research title.

b. Interviews

The author collected data through question and answer sessions with related sources in the information systems study program, which in this study was done with the head of the information systems study program.

c. Documentation

Documentation involved field observations, where observation is a method of careful examination and systematic recording [15]. The author collected data through written and oral documents from the academic section of the information systems study program at Subang University.

The data obtained included a list of the MBKM programs run by the information systems study program, MBKM partners from the computer science faculty, MBKM programs selected by students, students enrolled in the MBKM program, procedures for MBKM report guidance with related lecturers, which are the primary data to be analyzed.

3. RESULTS AND DISCUSSION

Business Process Analysis

a. BPMN (Business Process Modeling Notation)

BPMN is used to describe the business process flow of the MBKM Program implementation that occurs at the Information Systems Study Program of Subang University. There are several BPMNs used, including:

1. Internship Registration Procedure and MoU with Partners

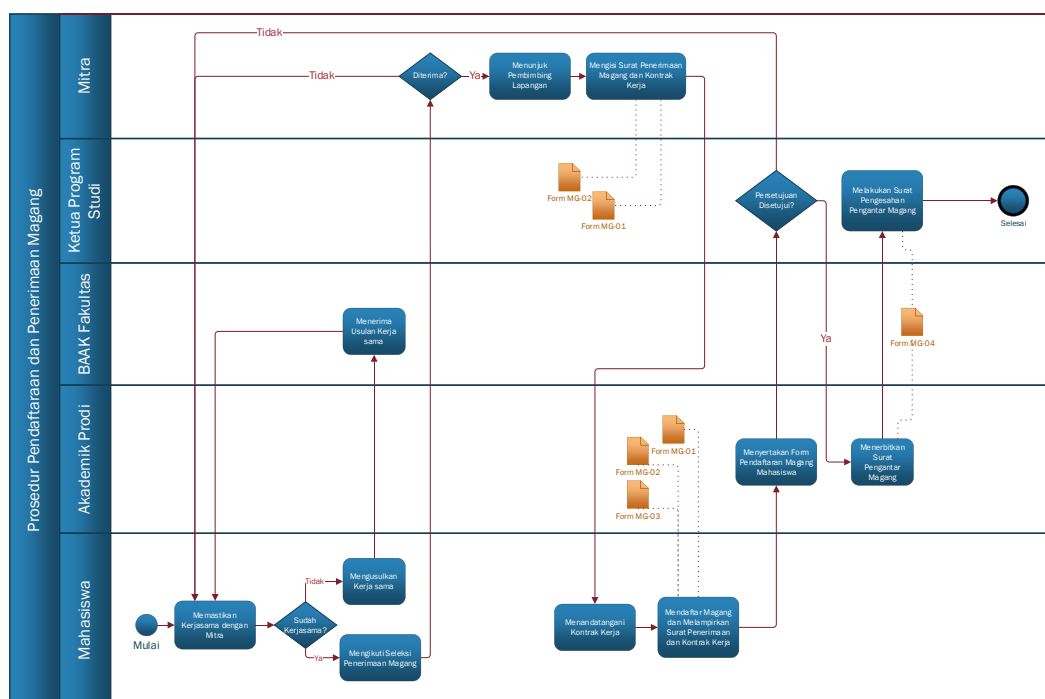


Figure 2. BPMN of Internship Registration Procedure and MoU with Partners

Figure 2 illustrates the process of student internship registration with partners and the faculty, through various processes and administrative requirements that must be fulfilled, which are still carried out in a physical and written form.

2. Internship Implementation Procedure

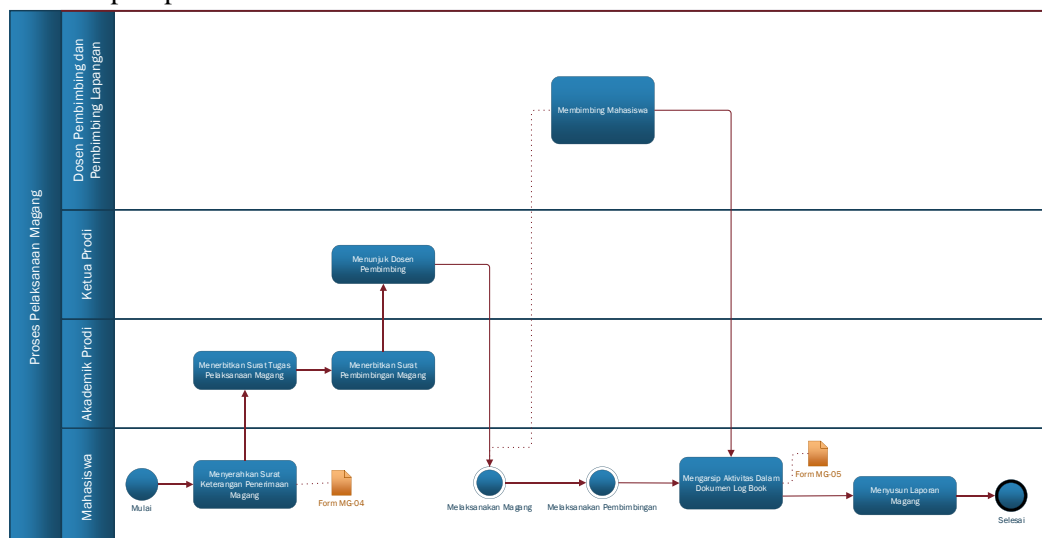


Figure 3. BPMN of Internship Implementation Procedure

For students participating in the MBKM Internship program, figure 3 describes the mentoring procedures during the MBKM Internship activities, where students, lecturers, and field supervisors must monitor and evaluate the progress of the final MBKM internship report. The monitoring and mentoring of students by lecturers are conducted online through the E-learning portal and Google Meet.

5. Independent Project Implementation Procedure

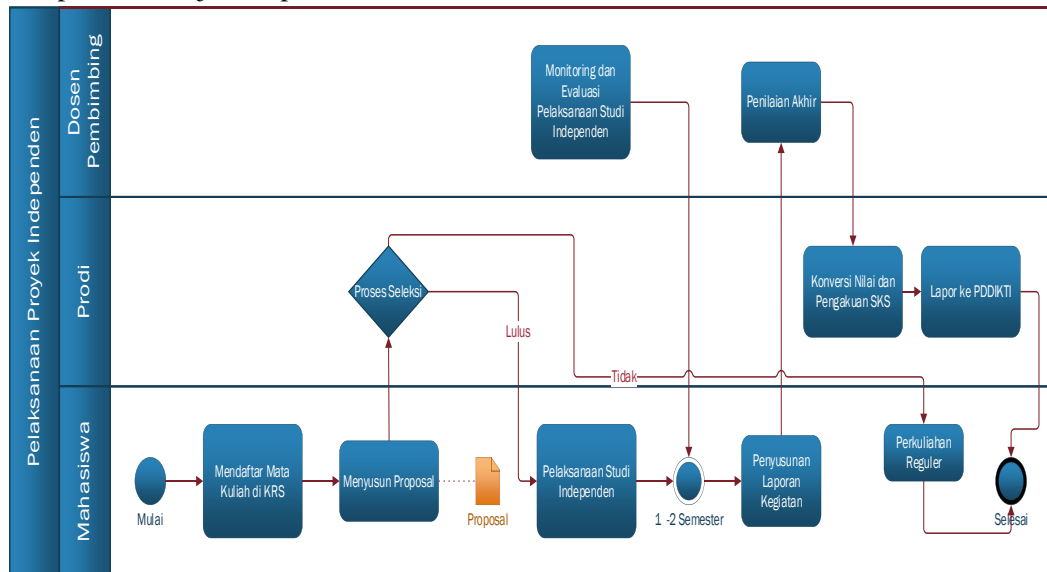


Figure 6. BPMN of Independent Project Implementation

Figure 6 details the procedures for the implementation of the Independent Project, beginning with students drafting a project proposal. The proposal is then vetted by the department, and if deemed feasible, the student proceeds with the implementation of the independent project. The mechanics remain the same as other MBKM programs, involving monitoring, evaluation, and assessment based on the activity report, which is then converted into 20 credits.

Students participating in the MBKM program are provided with a daily activity logbook, which must be signed and documented. Additionally, each MBKM implementation includes photographic and brief video documentation of the activities conducted.

b. MBKM Documentation

The MBKM program at the Information Systems Study Program, Faculty of Computer Science, University of Subang has been conducted since the 2021/2022 academic year and continues to the present. The MBKM programs available for students to choose from include Internship, Independent Project, Entrepreneurship, and Rural Development. Data on the number of students from each MBKM program will be presented below:

1. Internship

Table 1. Number of Internship Students

Tahun Akademik	2021 - 2022		2022 - 2023		2023 - 2024
	Ganjil	Genap	Ganjil	Genap	Ganjil
Jumlah Mahasiswa Magang	46	15	61	52	6
Total Mahasiswa	113	144	142	90	89
Persentase dipilih	41%	10%	43%	58%	7%

Based on the data obtained, the number of students taking the MBKM Internship program is higher compared to other MBKM program options because students are free to choose their own partners, provided that there must still be a connection with the information system. According to the data in Table 1, the majority of students chose internships and in the 2022-2023 odd semester, and the least amount was in the 2023-2024 odd semester, with a percentage taken being 7%..

2. Independent Project

Table 2. Number of Independent Project Students

Tahun Akademik	2021 - 2022		2022 - 2023		2023 - 2024
	Ganjil	Genap	Ganjil	Genap	Ganjil
Jumlah Mahasiswa Proyek Independen	10	18	15	10	8
Total Mahasiswa	113	144	142	90	89
Persentase dipilih	9%	13%	11%	11%	9%

Students opting for the independent project based on the data obtained are fewer compared to other MBKM options, this needs to be noted as there are still many students who are more interested in choosing regular classes or other MBKM programs. The highest number of students taking the independent project program was in the odd semester of 2021-2022 with a percentage of 13%.

3. Entrepreneurship

Table 3. Number of Entrepreneurship Students

Tahun Akademik	2021 - 2022		2022 - 2023		2023 - 2024
	Ganjil	Genap	Ganjil	Genap	Ganjil
Jumlah Mahasiswa Kewirausahaan	14	19	24	19	26
Total Mahasiswa	113	144	142	90	89
Persentase dipilih	12%	13%	17%	21%	29%

The data shows an increase in students taking the entrepreneurship program in 2023, the largest number was 26 students with a percentage of 29% of the total student population. This presents an opportunity to enhance the entrepreneurship program's effectiveness.

4. Village Development

Table 4. Number of Village Development Students

Tahun Akademik	2021 - 2022		2022 - 2023		2023 - 2024
	Ganjil	Genap	Ganjil	Genap	Ganjil
Jumlah Mahasiswa Membangun Desa	0	0	0	0	36
Total Mahasiswa	113	144	142	90	89
Persentase dipilih	0%	0%	0%	0%	40%

The village development program started to be implemented by the information systems study program in the odd semester of the academic year 2023. This program is akin to fieldwork study (KKN), differentiated by the timing of implementation, reporting, and assessment, which will still convert into 20 credits. This program has great potential to attract students' interest, with an initial percentage of 40%, marking a promising start for improvements in its implementation procedures.

5. Regular Classes

Table 5. Number of Regular Class Students

Tahun Akademik	2021 - 2022		2022 - 2023		2023 - 2024
	Ganjil	Genap	Ganjil	Genap	Ganjil
Jumlah Mahasiswa Kuliah Biasa	43	92	42	9	13
Total Mahasiswa	113	144	142	90	89
Persentase dipilih	38%	64%	30%	10%	15%

Regular lectures are still held for students who do not participate in the MBKM program. According to the data in table 5, the success of the MBKM program implementation is indicated by the decreasing percentage of students who take regular classes. However, faculties and study programs still need to develop and evaluate the implementation of the MBKM to encourage more students to take part in the available MBKM program.

Results and Suggestions

a. Proposed Business Process

1. Procedure for Cooperation with MBKM Partners (MoU)
 - 1.1. Students obtain internship information from the MBKM information system portal.
 - 1.2. Students input the target partners, and the system validates the partnership.
 - 1.3. If the partners have not yet established cooperation, it is forwarded to the BAAK faculty operator to issue a digital MoU letter.
 - 1.4. Publication of internship selection schedules with partners on the system portal.
 - 1.5. Students who pass the selection with partners then sign the Internship Acceptance Letter and the Student Work Contract downloaded from the system portal.
 - 1.6. The Head of the Study Program verifies or rejects the student's internship activities.
 - 1.7. BAAK issues the MBKM internship introduction letter that has been approved by the head of the study program on the system portal.
2. MBKM Program Implementation Procedures
 - 2.1. Downloading the internship implementation certificate.
 - 2.2. The Head of Study Program assigns a supervising lecturer for the student.
 - 2.3. Conduct guidance and monitoring of the student's final report progress with the lecturer through the MBKM system portal.
 - 2.4. Filling out the logbook on the MBKM portal, accompanied by attachments of activity photos.
3. MBKM Report Assessment Procedures
 - 3.1. Daily logbook is automatically verified and monitored by the supervising lecturer during the MBKM period.
 - 3.2. In the 17th to 20th weeks, students register for the MBKM seminar on the system portal, which is then verified by the supervising lecturer.
 - 3.3. Scheduling the seminar on the system portal.
 - 3.4. Field supervisor enters the grades into the system portal.
 - 3.5. The supervising lecturer enters the assessment of the internship seminar results into the system.
 - 3.6. The Head of Study Program verifies the internship seminar result form.
 - 3.7. Grade conversion is performed by the system, which is then entered into PDDIKTI (Indonesian Higher Education Database System).

b. Proposed Technology and Systems

The roles of technology and information systems required for innovation in the implementation of MBKM programs include website-based and android applications utilizing the Internet so that all processes can be done in real-time, and can be accessed at any time. Furthermore, AI (Artificial Intelligence) technology is needed for objective assessment, based on the MBKM progress reporting process, attendance, and activity logging in the Logbook, so that lecturers will not have difficulty in assessing, and of course, the required time is very short.

In the process of collaboration with partners, to handle necessary documents or letters, current technology can utilize E-Materai (electronic stamp duty), and during the delivery, disposition, and filing, it can be well managed by the system, and there will be no data duplication, because each issued letter has a unique Primary ID.

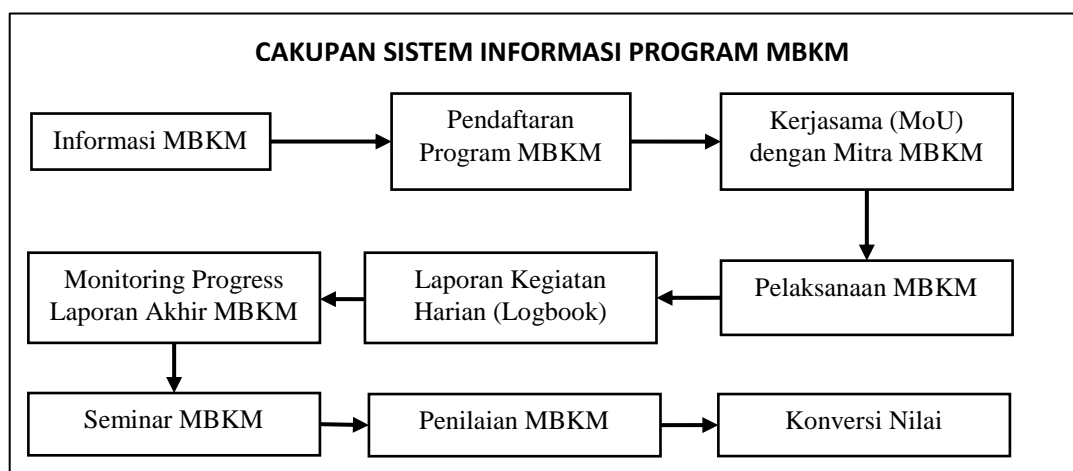


Figure 6. Scope of the MBKM Program Information System.

Technological innovation in the MBKM program in the Information Systems Study Program can be carried out by designing an MBKM information system, which includes procedures for MBKM registration, MBKM implementation, MBKM assessment, and MBKM evaluation. Thus, all processes can be undertaken swiftly, minimizing the occurrence of human error, and reducing the cost of printing documents for letters, MBKM guides, and others.

4. CONCLUSION

The Information Systems Study Program of the Faculty of Computer Science at Subang University is running the MBKM program implementation effectively, yet it necessitates integration with the latest technology and information systems. The innovation proposed in this research could be further developed by the faculty's academic team. Broadly speaking, the application of this technology will expedite procedures from registration to MBKM assessment, reduce costs in the printing of letters and MBKM guidebooks, and decrease the amount of human involvement in its execution. It is expected that academic processes will proceed effectively and efficiently, and students who complete the MBKM on time may have a greater opportunity to participate in the accelerated 3.5-year program. The more students who are interested in taking the MBKM program, the better the Faculty's success in running the MBKM program.

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