



IMPLEMENTATION OF INTEGRATED ONLINE SYSTEM (IOS) IN IMPROVING LEARNING CAPABILITY BASED ON TECHNOLOGY MANAGEMENT

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Abstract

This research aims to determine: (1) Motivation for implementing IOS in improving technology management-based learning capabilities at the Faculty of Economics; (2) Procedures for implementation; (3) Implications of its application; and (4) Obstacles to its implementation. This research uses a qualitative case study type approach. The research location is the Faculty of Economics at UIN Maulana Malik Ibrahim Malang. Data sources come from primary and secondary data. Data collection techniques include: observations, interviews to seek information and information, and documentation as evidence of research. Meanwhile, data analysis techniques include: data reduction, data presentation, verification and conclusions. Then, data validity checking techniques include: increased persistence and source triangulation. The research results show that: first, there are several motivations for implementing IOS in improving technology management-based learning capabilities at the Faculty of Economics, including: increasing research, innovation, learning quality, resources and accessibility. Second, there are several procedures for implementation, including: curriculum integration, identification of needs, and selection of platform. Third, there are several implications in its implementation, including: increasing accessibility, monitoring, evaluation, integration of the latest technology, student involvement, and time flexibility. Fourth, there are several obstacles in its implementation, including: limited infrastructure, availability of technical support, and internet access.

Keywords: *Integrated Online System (IOS), Learning Capabilities, Technology Management.*

I. Introduction

The industrial revolution of this century, also known as Industry 4.0, is characterized by the use of digital technology and the internet to automate and increase production efficiency. Some technologies related to the industrial revolution of this century include artificial intelligence, robotics, Internet of Things (IoT), blockchain, big data, and cloud computing (Tukino, 2022). The industrial revolution of this century has brought major changes in industry, including production, logistics, manufacturing, and services. One method of using digital technology and the internet

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is the Integrated Online System (IOS) or Integrated Online System (Liliana, 2023). Integrated Online System (IOS) is a system that combines various functions and processes in one online platform. In a more general context, this term can refer to various types of systems that integrate business processes, information and other functionality into one centralized online platform (Abdurrahman, 2022).

IOS can be used to integrate management systems, financial systems, production systems, marketing systems, distribution systems and logistics systems in one connected system. With IOS, companies can optimize operational efficiency and minimize human error. IOS can also be applied in public services such as health service systems, education systems and public security systems (Idrus, 2021). In a government context, IOS can be used to integrate various public services such as health services, education services, licensing services, financial services, etc. in one coordinated system. The advantages of IOS are increasing operational efficiency, reducing operational costs, increasing data accuracy, and making information easier to access. However, implementing IOS also requires quite a large investment and requires good planning and management so that the system can run optimally (Narendra, 2019).

There are several things that can be done to increase technology-based learning capabilities in faculties, including (Aini, 2014): first, faculties provide adequate technology and infrastructure such as stable internet access, adequate hardware and software, and adequate classroom facilities. supports the use of technology. Second, the faculty provides adequate training to teaching staff so that they can use technology effectively in learning. The training should include the use of online learning applications, learning videos, and platforms e-learning. Third, the faculty develops interesting and interactive learning content to increase student motivation and interest in learning. The learning content can be in the form of learning videos, simulations, games and online interactions. Fourth, the faculty applies learning methods that are appropriate to technology such as the flipped classroom, blended learning, and project-based learning. This method can utilize technology to increase interaction between students and teachers. Fifth, faculties utilize data and analysis to monitor and evaluate technology-based learning. This data can be used to identify student problems and difficulties, evaluate learning effectiveness, and make necessary improvements. Sixth, the faculty actively involves students in technology-based learning. Students can be given the opportunity to select and access learning content according to their interests and needs, as well as being given the opportunity to participate in online discussions and group projects. In this way, students will feel more involved in learning and increase the effectiveness of technology-based learning in the faculty (Adi, 2019). Learning capability is an individual's ability to understand, adopt and apply new knowledge, skills and concepts in order to improve their knowledge and skills. This includes the ability to learn from experience, information, or training, and the ability to develop new knowledge and skills. Learning capabilities also involve the ability to solve problems, think critically, adapt to change, and innovate (Winardi, 2023).

In the concept of technology management, it involves various activities, such as developing and implementing technology, monitoring and evaluating existing technology, planning technology needs, managing technology risks, as well as developing long-term strategies and plans for technology in the organization (Surjono, 2020). Several things that need to be considered in technology management are

understanding customer needs and desires, monitoring technology and innovation trends, managing budgets and resources, and ensuring the availability of adequate infrastructure and support. Technology management also involves a management team consisting of various departments in the organization such as information technology, marketing, finance, human resources, production, and others, to ensure good coordination and synergy in developing and managing technology in the organization (Arisuniarti, 2016). Technology Management is a management discipline that focuses on managing technological aspects in an organization. The goal is to optimize the use of technology to achieve business goals and increase the company's competitiveness. Technology Management involves planning, developing, implementing, and monitoring technology and innovation within an organization (Rahman, 2022).

In looking for credibility and comparison material for this research, the researcher included previous studies, searched the existing data, the researcher found several titles that were similar and had several similarities, but for these studies, in the research conducted by the researcher, there were very different fundamental between the two. There are several differences and similarities between this research and previous research. Previous research has mostly applied IOS to goods and services systems, the investment sector, iLearning Education, synchronous learning, asset management, school attendance, online courses, laboratories, pawnshop services, OSS, smart parking systems, business facilities.

Based on the description of the research background above, the researcher focuses the research objectives on the motivation, procedures, implications and obstacles to implementing the Integrated Online System (IOS) in improving technology management-based learning capabilities at the Faculty of Economics.

II. Research Methods

In this research, the approach taken is through a qualitative approach with a field study type of research (Anggraini, 2021). Basically, researchers using qualitative research want to provide a comprehensive and detailed description of the findings regarding the implementation of the Integrated Online System (IOS) in improving technology management-based learning capabilities in the Faculty of Economics, so this research is presented using qualitative research, so the discussion becomes more detailed, and deeper so that the researcher's desired goals are achieved (Fadilah, 2017; Rahman, 2022; Winardi, 2023).

In qualitative research, the researcher himself is the main data collector. (Abdurrahman, 2022). In the initial activity, researchers conducted a survey at the research location to understand the general picture of the implementation of the Integrated Online System (IOS) in improving technology management-based learning capabilities at the Faculty of Economics. The second activity of the researcher was to determine the research location, namely the Faculty of Economics, Maulana Malik Ibrahim State Islamic University, Malang, then collect data based on the location agreed upon between the researcher and the informant. In this research, researchers determined the Faculty of Economics, Maulana Malik Ibrahim State Islamic University, Malang as the research object, which is located in the Megawati Soekarno Putri Building, Jalan Gajayana No. 50, Dinoyo Village, Lowokwaru District, Malang City, East Java Province, Postal Code 65144.

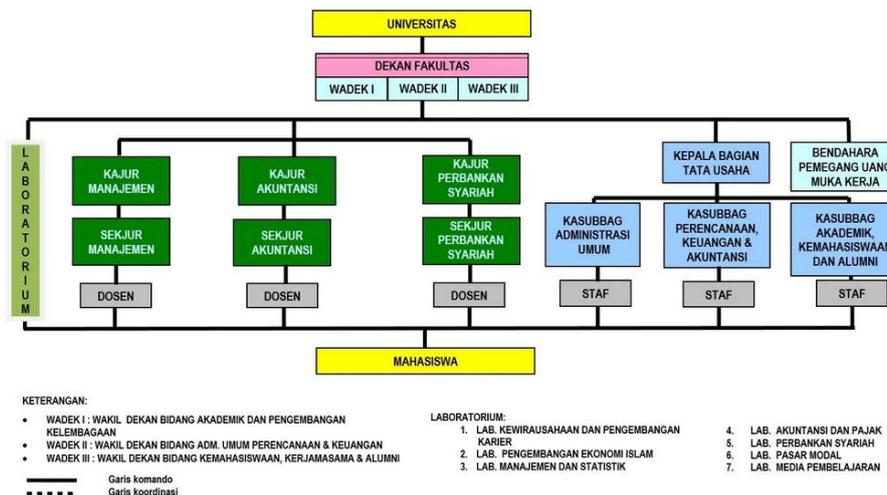
There are two data sources for this research that serve as a means to facilitate problem analysis: First, primary data. Researchers used this data to determine the implementation of the Integrated Online System (IOS) in improving technology management-based learning capabilities at the Faculty of Economics, namely by conducting direct interviews with the Chair and Secretary of the Sharia Banking Study Program, the Dean of the Faculty of Economics, and student users. Second, secondary data. In this research, the data obtained are documents relating to student data using IOS from the Sharia Banking Study Program to determine the implications and obstacles to implementing IOS. This data is a complement to the research object.

Qualitative data collection methods to combine data are needed in this research, namely using three methods, observation, interviews and documentation. Data analysis is an interaction that deliberately seeks interview notes, field notes, and various sources that are understood by the analyst. So, in drawing conclusions, researchers analyzed the Integrated Online System (IOS) implementation model in improving technology management-based learning capabilities in the Faculty of Economics, so that the data could be concluded or become more detailed and rooted.

Checking the validity of information must actually be carried out with the aim that subsequent information can be trusted and can be supported logically. Moreover, it is a stage to reduce errors during the time spent to obtain research information that will clearly influence the final results of an exploration result (Winardi, 2023). The diligent activity carried out by the researcher was reading related literature, re-reading research results or documentation related to findings in the field regarding the Integrated Online System (IOS) implementation model in improving technology management-based learning capabilities at the Faculty of Economics. The triangulation technique used by the author is source triangulation. This technique aims to examine data using something other than data or as a data comparison. In this case, testing the credibility of the Integrated Online System (IOS) implementation model data in improving technology management-based learning capabilities at the Faculty of Economics. From these data sources, they are then categorized, describing which views are the same, which are different and which data are specific to the data source to produce a conclusion.

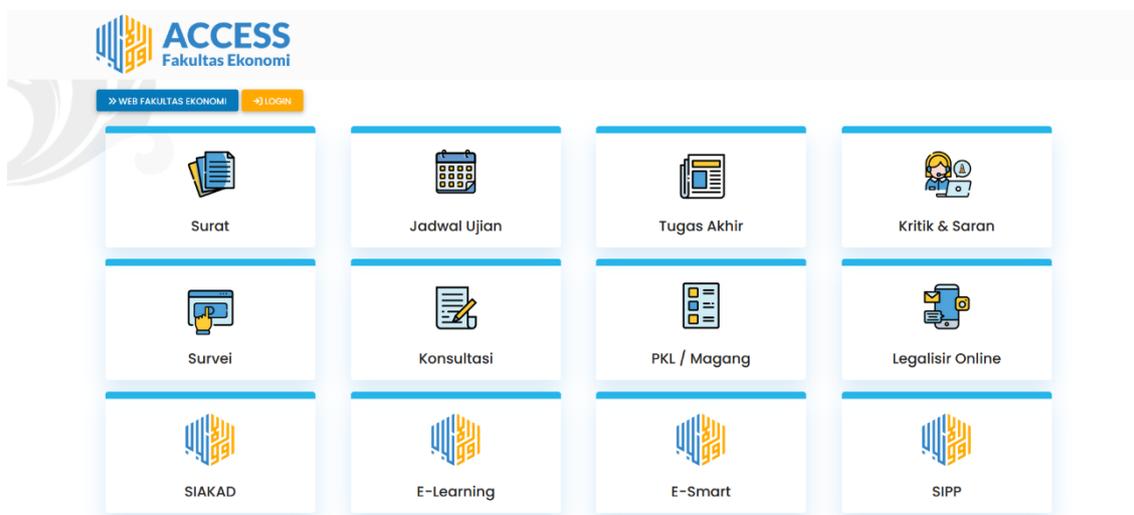
III. Results and Discussion

In this chapter, the contract researcher presents research data that describes the research setting, namely the profile of the Sharia Banking Study Program, Faculty of Economics and the profiles of informants, both from deans, heads, study program secretaries and students using the Access application.



Source: Official Website of the Faculty of Economics
 Figure 1 Organizational Structure of the Faculty of Economics UIN Maulana Malik Ibrahim Malang

Facilities and Infrastructure The Faculty of Economics has seven types of facilities and infrastructure used in carrying out the faculty's academic and non-academic activities. The seven facilities and infrastructure are lecture halls, laboratories, meeting rooms, office rooms, lecturer rooms, development unit rooms and bathrooms. The Faculty of Economics has 21 lecture rooms which are used to support the faculty's teaching and learning activities. The Faculty of Economics has eight laboratory rooms and one exam room which are used to support the faculty's teaching and learning activities. The Faculty of Economics has one meeting room, five office rooms and six lecturer work rooms which are used to support all Higher Education Tri Dharma activities. The Faculty of Economics has three development unit rooms which are used for the Tax Center, Library and Tracer Study.



Source: Faculty of Economics website

Figure 2. Integrated Online System (IOS) Application of the Faculty of Economics

The Faculty of Economics has 80 permanent lecturers spread across four study programs with both civil servant and non-civil servant status. A total of 5 people have the functional position of Professor, 8 people have the functional position of Associate Professor, 21 people have the functional position of Lector, 44 people have the functional position of Expert Assistant, and 2 people have the functional position of Teaching Staff. Apart from permanent lecturers as teaching staff, the Faculty of Economics also has 12 employees, both civil servants and non-civil servants, who help in streamlining the faculty's administrative activities.

The Sharia Banking Study Program has 14 civil servant lecturers, with 1 professor, and 7 non-PNS permanent lecturers. In this research, there were 10 informants, namely:

- a. Head/Dean of the Faculty of Economics, Maulana Malik Ibrahim State Islamic University, Malang, represented by the Deputy Dean for Academic Affairs and Institutional Development, Prof. Dr. H. Siswanto, M.Si. His main duties are to assist the Dean in leading the implementation of education, research and community service.
- b. Head of the Sharia Banking Study Program, Maulana Malik Ibrahim State Islamic University, Malang, namely: Head of the Study Program, Dr. Yayuk Sri Rahayu, MM, and Study Program Secretary, Ulfi Kartika Oktaviana, SE., Ak., M.Ec. The Head of the Study Program leads the implementation of academic and/or professional education in the field of Sharia Banking, while the Secretary of the Study Program has the main duties of assisting the Head of the Study Program in carrying out administrative matters and running the work program of the Sharia Banking Study Program
- c. There are 3 lecturers in the Sharia Banking Study Program at the State Islamic University of Maulana Malik Ibrahim Malang, namely: Ahmad Tibrizi Soni Wicaksono, ME, Kurniawati Meylianingrum, ME, Tiara Juliana Jaya, M.Sc.
- d. Staff of the Academic Section of the Sharia Banking Study Program, namely: Veby Holiarse, SE
- e. IOS Operator Faculty of Economics, namely: Hari Robiansyah, ST
- f. There are 2 students who use the IOS application, namely: Dhiya Ulhaq Arkaan and Khusnul Khotimah.

Table 1. Data from Informants from the Faculty of Economics

| No | Informant's Name | Informant Position |
|----|---|--|
| 1 | Prof. Dr. H. Siswanto, M.Sc | Deputy Dean for Academic Affairs and Institutional Development |
| 2 | Dr. Yayuk Sri Rahayu, MM | Head of the Sharia Banking Study Program |
| 3 | Ulfi Kartika Oktaviana, SE., Ak., M.Ec. | Secretary of the Sharia Banking Study Program |
| 4 | Ahmad Tibrizi Soni Wicaksono, ME | Lecturer in the Sharia Banking Study Program |

| | | |
|----|------------------------------|---|
| 5 | Kurniawati Meylianingrum, ME | Lecturer in the Sharia Banking Study Program |
| 6 | Tiara Juliana Jaya, M.Sc. | Lecturer in the Sharia Banking Study Program |
| 7 | Veby Holiarse, SE | Academic Staff, Lecturers, Sharia Banking Study Program |
| 8 | Hari Robiansyah, ST | IOS Operator, Faculty of Economics |
| 9 | Dhiya Ulhaq Arkaan | Sharia Banking Study Program Students |
| 10 | Khusnul khotimah | Sharia Banking Study Program Students |

Source: Data processed.

Presentation of Research Results

In presenting data, this chapter discusses data that has direct relevance to the research subject. After examining data related to *the Integrated Online System (IOS)* implementation model in improving technology management-based learning capabilities at the Faculty of Economics, with the following data presentation:

First, Motivation for implementing *the Integrated Online System (IOS)* in improving technology management-based learning capabilities at the Faculty of Economics. The answers of three Faculty and Study Program Leaders stated that the motivation for implementing *the Integrated Online System (IOS)* to improve technology management-based learning capabilities in the Faculty of Economics is more about: (1) Optimizing Resources; (2) Improving the Quality of Learning; and (3) Better Monitoring and Evaluation. So, IOS can help in the efficient management of available resources, including facilities, personnel, and time. Then, through IOS, faculties can provide learning content that is more interactive, high quality and relevant. Furthermore, IOS can assist in tracking and evaluating student and teacher performance. The conclusion from the answers of the Sharia Banking Study Program lecturers states that the motivation for implementing *the Integrated Online System (IOS)* to improve technology management-based learning capabilities in the Faculty of Economics is more about: (1) Innovation and Curriculum Development; (2) Increasing Research and Innovation; and (3) Competition in Education. So, with IOS, faculties can more easily update and develop their curriculum. Then, the use of technology in learning can also facilitate collaboration, research and innovation between students and teaching staff. Furthermore, improving technology in learning is an increasingly urgent need in the world of education. Conclusions from the answers from IOS operators, Academic Staff, and Sharia Banking Study Program Students state that the motivation for implementing *the Integrated Online System (IOS)* to improve technology management-based learning capabilities in the Faculty of Economics is more about: (1) Administrative Efficiency; (2) Follow industry standards; (3) Interest of students and teachers; and (4) Improve accessibility. So, implementing IOS can help faculties in complying with industry standards and educational regulations that may apply. Then, IOS can help with faculty administration, such as managing student data, scheduling and financial administration. Furthermore, the application of technology in learning can be an attraction for prospective students and teachers. IOS allows easier and more flexible access for students and teaching staff.

Second, procedures for implementing *the Integrated Online System (IOS)* in improving technology management-based learning capabilities at the Faculty of Economics. The conclusion from the answer from the Head of the Faculty of Economics and Sharia Banking Study Program states that the procedures for implementing *the Integrated Online System (IOS)* to improve technology management-based learning capabilities in the Faculty of Economics are more about: (1) Continuous evaluation; (2) Performance measurement; and (3) Curriculum integration. So, carry out regular evaluations of IOS implementation to ensure that this system continues to meet needs and can be upgraded according to changing technological and educational needs. Then, establish performance metrics to measure the impact of IOS implementation, such as participation rates, learning outcomes, and user satisfaction. Next, integrate IOS into the curriculum as a whole, so that technology becomes an integral part of the learning process. The conclusion from the answer from the Sharia Banking Study Program Lecturer states that the procedures for implementing *the Integrated Online System (IOS)* to improve technology management-based learning capabilities in the Faculty of Economics are more about: (1) User training; (2) Identification of needs; and (3) Platform selection. So, Provide training to teaching staff and students so that they can utilize IOS effectively. Then, carry out a needs analysis to understand what is needed to improve learning capabilities at the Faculty of Economics. Next, choose an IOS platform that suits faculty and user needs. Consider aspects such as security, scalability, and ease of use. The conclusion from the answers from IOS Operators, Academic Staff, and Sharia Banking Study Program Students states that the procedures for implementing *the Integrated Online System (IOS)* to improve technology management-based learning capabilities at the Faculty of Economics are more about: (1) Quality content; (2) Technology Infrastructure; (3) Technical Support; (4) Data Security. So, make sure that the necessary technological infrastructure, such as a fast internet connection and adequate hardware, is available to support IOS. Then, ensure that the learning content provided through IOS is high quality, relevant and *up-to-date*. Next, provide accessible technical support for faculty and students to address technical issues that may arise. Then, ensure the security of students' and staff's personal and academic data by implementing appropriate data protection measures.

Third, the implications of implementing *the Integrated Online System (IOS)* in increasing technology management-based learning capabilities at the Faculty of Economics. The conclusion from the answer from the Head of the Faculty of Economics and Sharia Banking Study Program states that the procedures for implementing *the Integrated Online System (IOS)* to improve technology management-based learning capabilities in the Faculty of Economics are more about: (1) Increasing accessibility; (2) Increased monitoring and evaluation; and (3) Increased integration of the latest technology. So, IOS can increase student and lecturer access to educational resources, including learning materials, assignments, and reviews, which can be accessed online from anywhere. Data and statistics from IOS can be used to track student learning progress and provide better feedback for improvement. By implementing IOS, the Faculty of Economics can integrate the latest technology in teaching methods, such as data-based learning, artificial intelligence, or *augmented reality*. The conclusion from the answer from the Sharia Banking Study Program Lecturer states that the procedures for implementing *the Integrated Online System (IOS)* to improve technology management-based learning capabilities in the Faculty

of Economics are more about: (1) Developing more creative learning content; (2) Improving the quality of learning; and (3) Saving resources. So, lecturers can use various online media and tools to create more interesting and varied learning materials. By enabling easier access to learning resources and tools, IOS can contribute to improving the quality of learning in the Faculty of Economics. Although initial implementation may require an investment, IOS can reduce material printing and physical administration costs. The conclusion from the answers from IOS Operators, Academic Staff, and Sharia Banking Study Program Students stated that the procedures for implementing *the Integrated Online System* (IOS) to improve technology management-based learning capabilities in the Faculty of Economics are more about: (1) Increasing administrative efficiency; (2) Increasing student involvement; (3) Increased collaboration; and (4) Time flexibility. So, administrative processes, such as registration, course selection, and document archiving, can be simplified and accelerated with the implementation of IOS. Through interactive features such as online discussion forums, quizzes, and online challenges, students can be more involved in learning. IOS enables collaboration between students, lecturers and fellow students through *online platforms*, supporting the exchange of ideas and increased social interaction. Students can access learning materials at any time according to their schedule, allowing for more flexible learning.

Fourth, the obstacles to implementing *the Integrated Online System* (IOS) in improving technology management-based learning capabilities at the Faculty of Economics. The conclusion from the answers from the Faculty Leaders and the Head of the Sharia Banking Study Program states that the procedures for implementing *the Integrated Online System* (IOS) to improve technology management-based learning capabilities in the Faculty of Economics are more about: (1) Infrastructure limitations; (2) Skills of teaching staff; (3) Availability of learning content; and (4) Availability of technical support. So, the Faculty of Economics may face obstacles related to the availability of sufficient technological infrastructure, such as adequate hardware, internet networks and server space. Faculty and teaching staff may need to develop new skills to effectively use technology in online learning. Faculty need to ensure that there is enough relevant, high-quality learning content to support online learning. A team or personnel is needed who can provide efficient technical support in overcoming technical problems that may arise. The conclusion from the answer from the Sharia Banking Study Program Lecturer states that the procedures for implementing *the Integrated Online System* (IOS) to improve technology management-based learning capabilities at the Faculty of Economics are more about: (1) Time management; (2) Evaluation and monitoring; and (3) Interactive Quality. So, a team or personnel is needed who can provide efficient technical support in overcoming technical problems that may arise. Students and lecturers need to manage their time well in online learning, considering the flexibility offered by the system. The faculty needs to develop effective evaluation and monitoring methods to ensure the effectiveness of technology management-based learning. The conclusion from the answers from IOS Operators, Academic Staff, and Sharia Banking Study Program Students states that the procedures for implementing *the Integrated Online System* (IOS) to improve technology management-based learning capabilities at the Faculty of Economics are more about: (1) Quality of interaction; (2) Changes in academic culture; (3) Data security issues; and (4) Availability of internet access. So, online learning may experience a decrease in the quality of interaction between lecturers and students if it

is not managed well. Implementing IOS can require changes in academic culture that may not always be well received by all parties. Managing student data and online teaching and learning processes requires special attention to personal data security issues. Students may face problems with stable and fast internet access, especially if they live in areas with poor connectivity.

Research Findings

The disclosure of all cases regarding the implementation of *the Integrated Online System* (IOS) in improving technology management-based learning capabilities at the Faculty of Economics contained several unique aspects in 4 aspects (motivation, procedures, implications and obstacles).

The following is a mapping of research findings obtained from interviews with several informants based on triangulation of data sources.

Table 2. Research Findings Based on Triangulation of Data Sources

| Indicator | Research Findings |
|------------------|--|
| Motivation | (1) Resource optimization (2) Improving the quality of learning (3) Better monitoring and evaluation (4) Innovation and curriculum development (5) Increased research and innovation (6) Competition in education (7) Follow industry standards (8) Administrative efficiency (9) Interest of students and teachers (10) Improved accessibility |
| Procedures | (1) Continuous evaluation (2) Performance measurement (3) Curriculum integration (4) User training (5) Identify needs (6) Platform selection (7) Technological infrastructure (8) Quality content (9) Technical support (10) Data security |
| Implications | (1) Improved accessibility (2) Increased monitoring and evaluation (3) Increased integration of the latest technology (4) Development of more creative learning content (5) Improving the quality of learning (6) Saving resources (7) Increasing student involvement (8) Increased administrative efficiency (9) Increased collaboration |

| | |
|------------|--|
| | (10) Time flexibility |
| Constraint | (1) Infrastructure limitations (2) Skills of teaching staff (3) Availability of learning content (4) Availability of technical support (5) Time management (6) Evaluation and monitoring (7) Changes in academic culture (8) Quality of interaction (9) Data security issues (10) Availability of internet access |

IV. Conclusions

Based on the results of the discussion above, several conclusions can be drawn regarding the implementation of *an Integrated Online System* (IOS) based on technology management in improving learning capabilities at the Faculty of Economics, namely: first, motivation for implementing *the Integrated Online System* (IOS) in improving technology management-based learning capabilities at the Faculty of Economics, namely: optimizing resources, improving the quality of learning, better monitoring and evaluation, innovation and curriculum development, increasing research and innovation, competition in education, following industry standards, administrative efficiency, student and faculty engagement, increased accessibility. Second, procedures for implementing *the Integrated Online System* (IOS) in improving technology management-based learning capabilities at the Faculty of Economics, namely: continuous evaluation, performance measurement, curriculum integration, user training, needs identification, platform selection, technology infrastructure, quality content, technical support, data security. Third, the implications of implementing *the Integrated Online System* (IOS) in improving technology management-based learning capabilities in the Faculty of Economics, namely: increasing accessibility, increasing monitoring and evaluation, increasing integration of the latest technology, developing more creative learning content, improving learning quality, saving resources, increasing involvement students, increased administrative efficiency, increased collaboration, and time flexibility. Fourth, obstacles in implementing *the Integrated Online System* (IOS) in improving technology management-based learning capabilities in the Faculty of Economics, namely: limited infrastructure, skills of teaching staff, availability of learning content, availability of technical support, time management, evaluation and monitoring, changes in academic culture, quality of interaction, data security issues, and availability of internet access.

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