ICT Academy at the University

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Abstract. The effectiveness of ICT applications in the institutional management process is often hampered by many non-technical factors that are not prepared by the institution starting from the preparation of people, culture, organizational mechanisms, and even technical maintenance. Utilization of Information and Communication Technology (ICT) in the field of academic, administrative services in tertiary institutions becomes a necessity, not just prestige or lifestyle for modern tertiary education management. But in its implementation, many obstacles encountered by universities in implementing ICT are the institutional management process, both technical and non-technical factors. The effectiveness of ICT implementation in the management of tertiary institutions needs more attention, given its quite central role in the managerial decision-making process or other decisions. To increase the effectiveness of this implementation, which obviously will affect the efficacy of the achievement of the implementation of education carried out by the institution, the factors that influence the effectiveness of the application of ICT in institutional management, especially in terms of academic administration need to be examined more continued. This is intended to make the process of educational governance in higher education more effective and efficient so that it can support the achievement of high performance from the institution. This research aims to create an integrated academic system at tertiary institutions so that all educational processes can be easily carried out and known.

1. Introduction

Nowadays, the competition in tertiary institutions seems to be getting tougher. Rapid changes in the world in terms of technological progress (products, services, and processes) as well as the socio-economic life of the community, encourage the need for an anticipatory step through the policies and strategies of higher education so that later they can survive in all fields. The success of a college is not only seen from one factor, but many factors determine success — both internal and external factors[1]. Internal factors include the adequate number and quality of lecturers, supporting facilities and facilities, students as potential drivers, satisfying services, and so on while external factors are the relationship between universities and the community, government, and other tertiary institutions. Based on internal and external factors, universities are required to have a strategy to survive. The approach is an internal strategy that is optimizing something operational in tertiary institutions, such as the teaching and learning process, arranging room schedules, lectures, exam schedules all of which are tasks of the teaching section and external strategies namely strategies for a college to be of interest to the public, companies, and government like holding seminars, workshops, training lecturers and students, participating in scientific work, research that can provide results, sending lecturers to have higher levels so that knowledge gained is broader[2].
The success and progress of tertiary institutions can also be seen from the quality of tertiary institutions. The application of competency-based education is a government decision, in this case, the Ministry of National Education, to improve the quality of education. Improving the quality of education is a crucial requirement for producing human resources who can play a role globally. Therefore the program to improve the quality of education must be a development priority in all regions[3].

The world of education is now increasingly competitive, where the competition for organizing institutions is getting tougher. This is marked by efforts to improve the quality of teaching, research, provision of facilities, and experienced HR (Human Resources) to build relationships both at home and abroad[4].

The use of information systems for every internal activity in a tertiary institution will also be a factor in the success and progress of the tertiary institution.

2. Literature Review

2.1. Information Technology

There are several theories discussed related to information systems that can be described in the section below:

Development of Information Technology Information Technology (IT) includes all integrated tools and methods to be used in capturing or capturing data (capture), saving (saving), processing (sending), distributing, or presenting information needs electronically in various formats, which is useful for the user information. This technology can be a combination of hardware and software from a computer, non-computer (manual), as well as procedures, operators, and managers in a system that is integrated[5]. The development of IT has resulted in changes in industry structure and business organization[6] management practices in competing and carrying out activities to serve customers, so that with the rapid development of Information Technology that has changed business and existing management concepts, it also has an impact on information needs for managers in internal accounting and external to support in solving problems for decision making, seizing opportunities and achieving goals[7].

2.2. Information System

Information Systems is a set of operational management functions to those who can produce an appropriate, fast, and transparent decision, which is a systematic and orderly arrangement of information networks that connects every part of a system so that communication is possible between functional parts. The following understanding of Information Systems according to some experts: Information System is a system within an organization that is a combination of people, facilities, technology, media, procedures and controls aimed at obtaining essential communication lines, processing certain types of routine transactions, provide management signals of critical internal and external events and provide a basis for information for ethical decision making[8].

Information systems are developed and built because they have significant benefits for system components in an organization or company management. The benefits derived from information systems can be classified as follows[9]:

- Benefits of reducing costs
- The advantage of lowering mistakes
- Increase the speed of activity
- Improve management planning and control

The benefits of information systems in the form of tangible benefits (intangible benefits) and intangible (intangible benefits)[10], namely:

Physical advantages include:
- Reduction in operating costs
- Reduction of telecommunications errors
Intangible benefits include:
- Improved services
- Increased job satisfaction of personnel
- Increased decision making

2.3. Information
Information is the result of data processing so that it becomes an essential form for the recipient and has usefulness as a basis for making decisions that can be felt directly or indirectly in the future. [11]. The information has a quality level. Some things that are determined are:
- Ease of obtaining it.
- Extensive nature and completeness.
- Accuracy.
- Match.
- Timeliness.
- Clarity.
- Flexible.
- It can be proven.
- There is no prejudice.
- It can be measured.

To obtain information that is useful for the recipient, it is necessary to explain how the cycle that occurs or is needed in producing information consisting of the following stages[12]:
- Data collection, at this stage, there is a process of collecting original data in specific ways such as sampling.
- Input, at this stage, is the process of entering data and data processing procedures into a computer through an input device such as a keyboard.
- Data processing, at this stage, is the stage where the data is processed by the procedures that have been entered.
- Output, at this stage, is the result of processing data that will be displayed on output devices such as monitors and printers as information.
- Distribution, after the data processing is carried out, the information generated must be immediately distributed.

![Figure 1. The information cycle](image)
2.4. Database
A database is a collection of databases in which one may not be connected, but in general, has a relationship in the system[13]. The system is composed of many files. Such as the University database consists of several entities; for example, Students, Lecturers, Subjects, Classes, Faculties. In the Relationship between Students and Subjects, namely Students taking Courses, Students and Lecturers use Classes as a place for the teaching-learning process, Lecturers bring Courses, and Students take Faculty Fields. Database Management System is software designed to assist in the maintenance and utility of large amounts of data sets[14]. Database Management Systems can be an alternative for exclusive use for applications, such as storing data in files and writing application code specific to its settings. Some essential components in tertiary institutions that can implement information systems in their activities are as follows.

3. Methodology
The research methods carried out to design-related information systems are:
- Observation (Observation)
  Done by observing the object being studied in this case, namely information technology in the form of information systems that are applied to tertiary institutions.
- Library (Library Research)
  Using books, previous research, and journals related to the topics in this study.

4. Proposed System Implementation
Various problems that exist in the world of education today have been able to be overcome by utilizing a computer network that can provide communication facilities, exchange of data and information that is fast and accurate and makes the distance between users become not relevant. With the existence of network, users can speak in the form of text and audio visual, the variety of facilities that can be provided by a network is very dependent on the type and version of the application used and of course must be supported with adequate hardware conditions as a prerequisite in the use of application software[15].

![Image: ICT and Pedagogy Mind Map](image_url)

**Figure 2. ICT and Pedagogy Mind Map**

An academic information system is the solution most widely used in managing academic data of educational institutions in Indonesia. In addition to simplifying the data management process, this information system also minimizes operational costs that must be incurred by related institutions. This is very much by the country's current uncertain economic conditions[15].
Indeed academic information systems do not aim to shift conventional systems that already existed before. However, the old process still needs to be used in several learning processes such as face to face between students and teachers.

5. Results
Information technology plays an important role in universities, especially in terms of academic activities for processing data. More and more academic data that will be processed requires that this activity is carried out quickly, accurately and the information generated is good. This can be done with the role of information technology that is supported by good applications such as web-based applications or single users.

6. Conclusion and Future Scope
Education in Indonesia is slowly experiencing a shift from an educator-oriented system to a student-oriented system. Also, distance education is starting to open up and is increasingly developing. What's more, now, information and telecommunications technology have made it possible to create a learning environment related to networks that provide learning resources and services electronically to students. Therefore conventional education should provide an alternative way of learning that is loaded with technology.

The development of information technology also affects activities at tertiary institutions, especially in academic activities. This can be seen that more and more universities have used information systems in their educational activities.

References
[1] K. Aoki, “The use of ICT and e-Learning in higher education in Japan,” World Acad. Sci. Eng. Technol., 2010.
[2] Cisco Networking Academy, “Cisco Networking Academy,” 2015, 2015.
[3] R. Hardi and Z. Zaini, “Implementasi Sistem Keamanan Komputer Menggunakan Sistem Terintegrasi Client Server Metode Service Oriented Architecture (Soa),” JTT (Jurnal Teknol. Terpadu), 2018.
[4] H. Resource and D. Group, “Council of Scientific and Industrial Research Human Resource Development Group,” R D Manag., 2012.
[5] W. J. Orlikowski and D. C. Gash, “Technological Frames: Making Sense of Information Technology in Organizations,” ACM Trans. Inf. Syst., 1994.
[6] R. Hardi, “The Development of Smart Campus System in Indonesia,” Mulia Int. J. Sci. Tech., vol. 2, no. August, pp. 17–25, 2019.
[7] M. Kluber, “Information technology,” in Equity Markets in Transition: The Value Chain, Price Discovery, Regulation, and Beyond, 2017.
[8] S. K. Boell and D. Cecez-Kecmanovic, “What is an information system?,” in Proceedings of the Annual Hawaii International Conference on System Sciences, 2015.
[9] L. P. Macfadyen and S. Dawson, “Mining LMS data to develop an ‘early warning system’ for educators: A proof of concept,” Comput. Educ., 2010.
[10] I. Technology, “Information Systems and Technology in Organizations ;,” ESMT Berlin, 2016.
[11] L. Thomas, “Information,” in American Literature in Transition, 2000-2010, 2017.
[12] P. Clough, R.; Taylor, “Report Information,” ProQuest, 2014.
[13] M. Abzalov, “Database,” in Modern Approaches in Solid Earth Sciences, 2016.
[14] A. Pavlo et al., “Self-Driving Database Management Systems,” in 8th Biennial Conference on Innovative Data Systems Research, 2017.
[15] N. Ale Ebrahim, “Introduction to the Research Tools Mind Map,” Res. World, 2013.