

Management Information Systems Doctorate Program of Educational Management (DOCPEM)

Mukhneri Mukhtar
Universitas Negeri Jakarta
Jakarta, Indonesia
mukhneri@unj.ac.id

Andi B. Fransiska
Education Departement of Banten
Provinces
andibakhtiar@gmail.com

Mochamad Wahyudi
STMIK Nusa Mandiri
Jakarta, Indonesia
wahyudi@nusamandiri.ac.id

Abstract- This research on the application of management information systems (MIS) in the doctorate program of educational management (DOCPEM) at the State University of Jakarta, is aimed to measure how to handle problems by designing the information systems that can solve the problems faced by the students, lecturers, and study program coordinators. In this case, the higher education capability to provide the best service needed by the internal and external customer (students, lecturers and study program coordinators). This study uses the research and development approach with the Systems Development Life Cycle model (SDLC), consisting of three phases, namely; definition phase (feasibility analysis, and requirements), construction phase (system design, system building and system testing), and implementation phase (installation, operations, and maintenance). The results of this management information systems (MIS) of DOCPEM are: 1) the information system using cloud computing application, 2) the information technology employing tools online form generator tools, digital signage application, office application, remote viewer and RSS Feeder, and 3) the DOCPEM built into a complete application which is needed by the students, administrator, stakeholders and public.

Keywords: *Management Information Systems (MIS), Infrastructur Information Systems (IIS), Information Technology (IT) and Design Information System of DOCPEM*

I. INTRODUCTION

Management Information systems is a very important aspect in providing efficient and effective information system services in universities, which serves to meet the needs of internal and external customers. Information system is required by students, lecturers, program coordinator, director, and rector for the implementation of educational activities in universities. According to Paulsen in Babo and Azevedo “student information systems provide the ability to enter student information into a database that will provide an electronic grade book, student course schedules, and other student-related data needs for school, college, or university” [1]. The current problem faced by the doctoral education program is the high workload experienced by the program

coordinator in providing information to the students, so that the information service is not maximal. Hill and McShane explained that “information overload occurs when the volume of information received exceeds a person’s capacity to get through it” [8]. This can be seen from the number of students taking doctoral program in education management that need support services reaches the total number of 625 people. On the other hand, there are only 12 lecturers and one coordinator that cater to the students’ needs. To serve the needs of these students and lecturers information systems based on information technology needs to be designed in the form of management information system (MIS). Stevenson describes “Management Information System (MIS) in concerned with providing an management with the information it needs to effectively manage” [24]. Schermerhorn suggested: “an important key to managerial performance in this new word is information technology, or IT, and the way it helps us acquire, store, procees, analyze, and transmit information” [21]. So it is expected to manage the information system will be able to meet the needs in lecture services, guidance, proposal seminars, results seminars, closed exams and open examinations. Lussier: “useful information has three quality: 1) timely-current and available when you need it, 2) relevant-suted to the situation, accurate, complete but concise, and 3) understandable-in a form that is easy to comprehend” [14].

II. BASIC THEORY

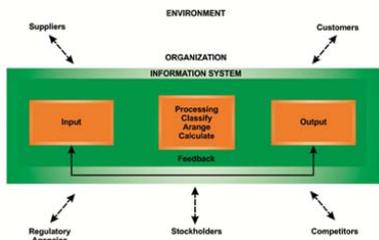
A. Management Information Systems

Management information system is a strategy used by the organization to streamline the overall information used to achieve organizational goals. In managing the information, managers can use the computer as one of the information technology that can bring together various sources of information in accordance with the needs of the organization. Schermerhorn, Jr. described that: “management information systems, or MIS, meet the specific information needs of managers as the make a varyaty of day-to-day decision” [22]. William and Sawyer suggested: “Management information system (MIS) is a computer-based information system that

uses data recorded by a TPS as input into programs that produce routine reports as output” [27]. Kroenke and Boyle described “Management information systems, which we define as the management and use of information systems that help organizations achieve their strategies” [12].

B. Information Systems

The efficiency and the effectiveness in the use of management information system is strongly influenced by comprehensive information systems, comprising of collecting, analyzing, storing, disseminating, and transferring of information by using people, software, and hardware in the form of a systematic network. Rainer, Prince, and Watson suggested: “an information system (IS) collects, stores, analyzes, and disseminates information for a specific purpose” [19]. Kroenke and Boyle added: “an information systems (IS) is an assembly of hardware, software, data, procedures, and people that produces information” [12].



Source: Laudon Kenneth C, Jane P. Laudon [13]

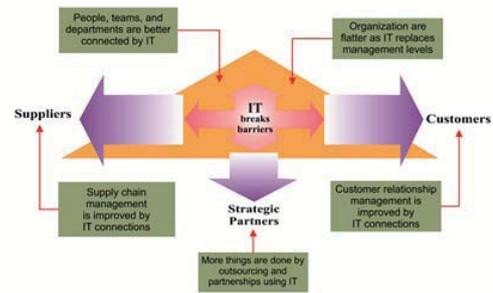
Fig 1: Functions of an Information System

C. Information System Infrastructure

The infrastructure used in the information system is: first; Software: 1) cloud computing (google drive and dropbox), 2) remote access (teamviewer and ATV AHD), 3) form generator (jotform), 4) RSS feeder (feedburner), 5) digital signage system (Xibo) and 6) Spreadsheet (microsoft excel, second; hardware: 1) personal computer, 2) LED television, 3) CCTV, 4) mobile phone android & iOS, and 5) printer.

D. Information Technology

Information technology is an effective and efficient means in conveying information to each member of the organization according to their needs, wherever and whenever the need arises. Schermerhorn, Hunt, Osborn, and Bien defined: “information technology is the combination of machines, artifacts, procedures, and systems used to gather, store, analyze, and disseminate information for translating it into knowledge” [21]. While Williams and Sawyer viewed: “Information technology (IT) is a general term that describes any technology that helps procedure, manipulate, store, communicate, and / or disseminate information” [27].



Source: Schermerhorn [21]

Fig 2: Process of Information Technology (IT)

Kinicki and Williams explore some of the important aspects of information technology: “1) the internet along with intranets and extranets, 2) e-mail, 3) videoconferencing, 4) group support system, 5) telecommuting, 6) handheld devices, and 7) blogs” [11]. Soon, Beng, Skulkerewathana, and Daft suggested: “an organization’s information technology (IT) consists of the hardware, software, telecommunication, data base management, and other technology it uses to store data and make them available in the form of information technology has positive implications for the practice of management” [23].

III. RESEARCH FRAMEWORK

DOCPM (Study Program of Doctoral Educational Management) is a study program that produces doctorate at Universitas Negeri Jakarta Indonesia. Information system used in DOCPM is designed to cater to the needs of students, lecturers and study coordinators, in accordance with the functions and main tasks that exist in the universities. Mejia, Balkin, and Cardy suggested that: ‘the study of the design, implementation, management, and use of information technology applications in organizations is know as MIS, or management information systems’ [16]. Added Fitzsimmons and Bordoloi: “Design a service delivery system is a creative process that begins with and service concept and strategy to provide a service with features that differentiate it from the competition” [5].

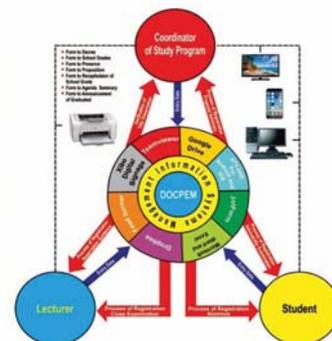


Fig 3: Information System of DOCPM Framework Design

IV. REVIEW OF PREVIOUS STUDIES

A. Juha Kettunen [10]

In a journal titled “Management Information Systems in Higher Education”. The information is typically collected from various data source. The characteristics underline here is the needs to plan a management information system (MIS) in order to support the management process. The purpose of this article is to show how the MIS can be planned to support the management process using the balance scorecard approach. An example is given from the Turku University of Applied Sciences (TUAS).

B. Gulsim Kadyrovna Sagitova [6]

In a journal titled “Management Information System for Higher Educational Institutions During Kazakhtan Transition to Knowledge Economy” the performed research is devoted to topical problems of realization and usage of management information systems in Kazakhstan higher educational institutions. In this article role and place of information systems in management of modern social institution are formulated. The author proposed the management information system for higher educational institution, the most adequate response to the needs of Kazakhtan universities, and explained its advantages and opportunities.

C. Thassanee Rodmunkong and Panita Wannapiroon [25]

In their journal titled “The Design of Cloud Computing Management Information System Accordance with Thai Qualifications Framework for Higher Educations”. The objectives of this research were to develop and evaluate the cloud computing management information system. The findings revealed that 1) cloud computing management information systems in accordance with Thai qualification framework for higher education was appropriate and 2) the evaluation of cloud computing management information systems in accordance with Thai qualifications framework for higher education from the five experts indicated that this system was appropriate at the high level.

D. Hassan Aldarbesti, J.P. Saxena [7]

In a journal titled “Management Information System for Education’ explained that management information system (MIS) has assumed great importance in this context. Education Management Information System (EMIS) has played an important role in developing appropriate plans, strategies and policies for improving the education system.

E. Yasin M. Karfaa, Hidayah Bte Sulaiman, Salman Yussof [28]

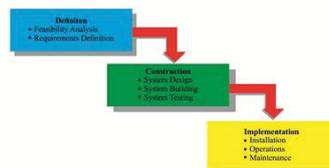
In their journal “Management Information Systems for Supporting Educational Organizations: A Case Study Through One Private University in Malaya” explained about the Management Information System (MIS) in a university, including important institutional activities such as rational database, applications of managing admissions, registration,

and financial aid, managing human resources, and for bugeting the fiscal controls.

V. RESEARCH METHODOLOGY

A. Research Steps

The approach used in this research is development research, using Systems Development Life Cycle (SDLC) method, which is illustrated in the following figure.



Source: Brown, DeHayes, Hoffer, Martin and Perkins [3]

Fig 4: Steps of Systems Development Life Cycle

The first stage is to define the problem of information systems, by assessing the information needs of students, lecturers and study program coordinator, which is accomplished by spreading questionnaires and conducting interviews.

Secondly, designing the information systems, by identifying the needs of students, lecturers and coordinators. The information about these needs is then sorted based on priority scales. Next is to identify the program or software and hardware that can be used to receive, process, store and transfer the information, which then further build an information system based on information technology and do the trial.

Thirdly, implementing an information system starting from socializing the information system to the students, and obliging students to use the management information system to communicate with lecturer and program coordinator, until finally the program coordinator utilizing alumni and students, mlecturers and co-managers to build, maintain, and provide software and hardware for the continuity of the system.

B. Sample Selection Method

The sample of this study is 90 students, drawn from the available population of 625 students. Samples were taken using Slovin formula with random sampling technique.

C. Method of Collecting Data

The Methods used in data collection are questionnaires and in-depth interviews. Later these data are grouped in accordance with the needs of students, lecturers and program coordinator regarding the information systems.

VI. RESULT AND DISCUSSION

A. Findings

The design of DOCPEM Information system resulted in the engagement of some components which are built by the

interconnection among software, hardware and applications used based on their specific function. In general, DOCPEM is developed by information technology function. The function required to develop DOCPEM includes Cloud Computing System, form generator, Digital signage, office application, Remote viewer, and RSS Feeder.

First, the cloud computing application. Cloud computing is a mandatory application that is needed to facilitate DOCPEM to do data interchange between users, and the applications involved. Cloud computing provides shared computer processing resources and data to computers and other devices on demand. Using this feature, data transaction between users (could be students or lectures) simultaneously will be updated into database through cloud platform. For this research, cloud computing application chosen are Google Drive and Dropbox. In the beginning, Google drive is used to synchronize between personal computers which is located in the office of the study program and the server application. Next, cloud computing function was simplified using Dropbox to make sure that only important data and component that needed to be synchronized.

The second tool is Online Form Generator. Online form generator is an application that helps DOCPEM to generate kinds of forms needed to collect data and information from users or customers. These data could be data from students, also alumnus. The data itself may vary based on the information needed. In some cases, to make sure that the students may proceed to the dissertation proposal seminar, certain documents and information are required to be completed. Online form generator helps in collecting any information from the students and alumnus easily, and all data will directly be presented in a spreadsheet documents. DOCPEM chooses Jotform (www.jotform.com) to generate form, collect data, and deliver information to cloud storage. This way, every personal computer connected to dropbox will be simultaneously updated with the recent submitted information.

The third tool is Digital Signage application. Digital signage is an application that displays and publishes information digitally. By using digital signage, all information regarding procedure, announcement, latest information, event and a broadcast video could be streamed continuously. DOCPEM uses Xibo as a digital signage application to broadcast, display and announce all information about study program. Also DOCPEM broadcasts a simple result of some forms from other application streamed into Xibo digital signage application which is fed by RSS feeder.

The fourth tool is Office Application. Office application functions to process documents which commonly used in office and administration work, such as letters, documents, and also presentations and numeric works and reports. In this research, DOCPEM uses Microsoft Excel application to collect and resume data and information sent from users through online form generator. Office application also enables DOCPEM to extract data collected into many forms of documents which can be generated using word processing such as Microsoft word. The documents generated by word

processing using collected data from spreadsheet documents such as Letter of Decree, Seminar invitation, Assessor sheet, scoring sheet, also Certificate of Achievement which is used as a legal statement to proceed into the next academic process.

The fifth tool is remote viewer. Remote viewer enables administrator (study program coordinator and associate administrator) to view servers or other display application in a remote mode. DOCPEM uses two applications in this category, first is ATV-AHD, an application to monitoring Closed Circuit Television (CCTV) installed in the study program office. The second one is TeamViewer, an application to access personal computer or server remotely. By this application, study program coordinator and associate administrator can have access to the computer and the server of digital signage remotely. In some situation, TeamViewer is also used to organize remote conference between program coordinator with administrator, to solve technical troubleshooting related to DOCPEM and its components.

The last tool is RSS feeder. RSS Feeder is a web based application which allows users to access updates to online content in a standardized, computer-readable format. DOCPEM uses feed burner to stream the content of collected data generated by Jotform. By broadcasting the data, Xibo enables data access and streams it into displays and will be updated periodically. By using this feature, XIBO enables to show a list of users and students who have already submitted or registered themselves using any kinds of forms generated by Jotform.

By using the six different functions mentioned above, DOCPEM is built into a complete application which mediates users (students, administrator, stakeholders, public) and redefines the culture of data transaction in the study program to an advance stage. Referring into system in basic stages, DOCPEM and its components can be illustrated by the picture below:



Fig 5: Stages of DOCPEM

B. Recommendation

The applications of this program require certain software, including: teamviewer, google drive, microsoft word and excel, JotForm, ATV-AHD for Android and iOS, dropbox, feedburner, and xibo digital signage. The use of the software is tailored to meet the needs of the study program, and they are obtained for free or periodically subscribed.

VII. CONCLUSIONS

The research conclusion of the management information systems (MIS) of DOCPEM is: first, an information system based on the cloud computing application. Second, information technology information by using these tools are online form generator, digital signage application, office

application, remote viewer and RSS Feeder, and third, the DOCPM built into a complete application that involves the students, lecturers, study program coordinators, stakeholders and public.

Based on the results of this study, it is recommended that: First, the use of the computing application could be maximized through continued research. Secondly, the software used in this program needs to be improved, especially to integrate the data in the MIS, and thirdly, in the future, it is expected that this program will be developed for all study programs in Jakarta State University.

REFERENCES

- [1] Babo, Rosalina; Azevedo Ana. (2012). Higher Education Institution and Learning Management System: Adoption and Standardization. IGI Global: USA.
- [2] Bateman, Thomas S.; Snell Scott A. (2013). Management: Leading & Collaborating in a Competitive World. McGraw-Hill Irwin: New York.
- [3] Brown, Carl V.; DeHeyes Daniel W.; Hoffer Jeffrey A.; Martin Wainright E.; Perkins William C. (2014). Managing Information Technology. Pearson Education Limited.: England.
- [4] Daft, Richard L.; Marcic Dorothy. (2009). Management The New Workplace. South-Western Cengage Learning: Australia.
- [5] Fitzsimmons, James A.; Fitzsimmons Mona J.; Bordoloi Sanjeev K. (2014). Service Management: Operations, Strategy, Information Technology. McGraw-Hill: New York.
- [6] Gulsim, Kadyrovna Sagitova. (2012). Management Information System for Higher Educational Institutions During Kazakhtan Transition to Knowledge Economy. [http://www.idosi.org/wasj/wasj18\(Economics\)12/9.pdf](http://www.idosi.org/wasj/wasj18(Economics)12/9.pdf).
- [7] Hassan, Aldarbesti, J. P. Saxena. (2014). Management Information System for Education. <http://www.iosrjournals.org/iosr-jrme/papers>.
- [8] Hill, Charles W.L; McShane Steven L. (2008). Principles of Management. McGraw-Hill: Boston.
- [9] Jones, Gareth R.; George Jennifer M. (2009). Contemporary Management. McGraw-Hill International Edition: New York.
- [10] Juha, Kettunen. (2011). Management Information Systems in Higher Education. <http://pdfs.semanticscholar.org>.
- [11] Kinicki, Angelo; Williams Brian K. (2009). Management a Practical Introduction: McGraw-Hill Irwin: Boston.
- [12] Kroenke, David M.; Boyle Randall J. (2017). Using MIS. Pearson Education Limited.: England.
- [13] Laudon, Kenneth C.; Laudon Jane P. (2016). Management Information Systems: Managing the Digital Firm. Pearson Education Limited.: England.
- [14] Lussier, Robert N. (2009). Management Fundamentals: Concept, Applications, and Skill Development. South-Western Cengage Learning: USA.
- [15] Mcleod, Raymond; Schell Jr. George P. (2008). Management Information Systems. Pearson Prentice Hall: USA.
- [16] Mejia-Gomez, Luis R.; Balkin David B.; and Cardy Robert L. (2005). Management. McGraw-Hill: Boston.
- [17] O'Brien, James A. (2004). Management Information Systems. McGraw-Hill.: New York.
- [18] Rainer, Jr. R. Kelly; Prince Brad; Casey Cegielski. (2015). Introduction to Information Systems. John Wiley & Sons: Singapore.
- [19] Rainer, Kelly; Pince Brad; Watson Hugh. (2015). Management Information Systems; Moving Business Forward. John Wiley & Sons: United States of America.
- [20] Robbins, Stephen P.; Coulter Mary. (2012). Management. Pearson Educational Limited: England.
- [21] Schermerhorn, Jr. John R.; Hunt Jamest G.; Osborn Richard N.; and Bien Mary Uhl. (2011). Organizational Behavior. John Wiley & Son, Inc: USA
- [22] Schermerhorn, Jr. John R. (2011). Introduction to Management. John Wiley & Sons Pte Ltd: Asia.
- [23] Soon, Lim Ghee; Beng Chua Siew; Skulkerewathana Usa, and Daft Richard L. (2015). New Era Management in a Globalized Word. Cengage Learning Asia Pte. Ltd: Singapore.
- [24] Stevenson William J. (2009). Operations Management. McGraw-Hill Irwin: Boston.
- [25] Thassanee, Rodmunkong and Panita Wannapiroon. (2013). The Design of Cloud Computing Management Information System Accordance with Thai Qualifications Framework for Higher Educations. <http://www.ijeeee.org/Papers/226-ET062.pdf>
- [26] Valacich, Joseph S.; Schneider Christoph. (2016). Information Syastems Today, Managing in the Digital Word.: Pearson Education Limited.: England.
- [27] Williams, Brian K.; Sawyer Stacey C. (2015). Using Information Technology. McGraw- Hill International Edition.: New York.
- [28] Yasin, M. Karfaa, Hidayah Bte Sulaiman, Salman Yussof. (2015). Management Information Systems for Supporting Educational Organizations: A Case Study Through One Private University in Malaya. <http://www.ijrsrp.org/research-paper-1015/ijrsrp-p4616.pdf>