Analysis of information technology governance in the planning and organization of e-learning at Universitas Negeri Malang

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Analysis of information technology governance in the planning and organization of e-learning at Universitas Negeri Malang

E Sutadji[1], W N Hidayat[2,*], S Patmanthara[2], S Sulton[3], N A M Jabari[4] and M Irsyad[2]

[1] Department of Mechanical Engineering, Universitas Negeri Malang, Malang, Indonesia
[2] Department of Electrical Engineering, Universitas Negeri Malang, Malang, Indonesia
[3] Department of Educational Technology, Universitas Negeri Malang, Malang, Indonesia
[4] Department of Computer, Palestine Technical University, Palestine

*wahyu.nur.ft@um.ac.id

Abstract. Learning paradigm in the 21st century has changed, so that the utilization of information and communication technology in education is absolutely necessary. E-learning becomes one of the alternatives that bring together technological support with the current learning needs. Universitas Negeri Malang (UM) is one of the universities that have a concentration on the implementation and development of e-learning for the implementation of education. The development of e-learning based learning should be balanced with evaluation or audit of the information system so that threats or losses can be avoided or prevented. This study aims to determine the extent to which e-learning performance of the UM viewed from the governance of information technology in planning and organization on e-learning using COBIT 4.1 framework and provide recommendation governance improvement after knowing the gap between the current governance with the expected governance. Data collection techniques were conducted with interviews and questionnaires with UM e-learning managers. Data analysis method is done through mapping of maturity level of planning and organization of information technology governance by using descriptive analysis. The result of research mentioned that maturity level of planning and organization of information technology governance of UM e-learning, which is at level 1.88 which means that managers have realized the need of IT development and formation of more professional organization. The GAP analysis between expected conditions and current conditions averages 1.12. Recommendations that can be given to the development of e-learning UM is to form organizations and sharpen the vision and mission of system development better.

1. Introduction

The rapid development of Information Technology (IT) will greatly affect all areas of life. Education is one of the fields that is influenced by the development of IT, one of the positive impacts is making people who play a role in education will be connected to each other more easily and comfortably. So that IT also allows interaction between teachers and students without time and place limits. Many innovations are created to have a positive impact on education, such as the use of computers as a means of presentation, e-learning to improve students' learning motivation [1], smartphones to support student learning [2-4].

According to Patmanthara and Hidayat, existing technological developments also affect the governance system and the implementation of lecture activities [5]. The use of Information and Communication Technology (ICT) in the learning system has changed the conventional pattern learning system or traditional patterns into modern patterns of media [6]. Integrating ICT in learning is the right step for learning centered on students, improving effective communication skills, problem-solving skills, and critical thinking skills, creative, adaptive, and reflective. Unfortunately, the rapid development of ICT has not been used optimally in the learning process [7].

In general, these learning activities are carried out in universities by making lecturers as educators based on the curriculum used. In general, the learning process is carried out by face-to-face, as well as lecture activities conducted at the Universitas Negeri Malang. E-learning is one of the impacts of technological developments in the field of education [8]. This electronic learning system can improve the competence and quality of human resources [9]. E-learning is a new way of teaching and learning that uses electronic media, especially the internet as an E-learning learning media allows students to gain productivity and knowledge through computers in their respective places without having to come to the classroom so that they can do distance learning systems [10].

As an example of the implementation of IT in education there is at the Universitas Negeri Malang (UM), UM is one of the universities that has a concentration on the use and development of e-learning for the implementation of education. E-learning UM utilizes Moodle as a Learning Management System (LMS) which has the function to manage classes, create material, discussion forums, evaluations and assessment systems [11]. UM e-learning has been used by several lecturers in conducting learning activities. But until now there has been no evaluation or audit of the UM e-learning information system that was carried out to determine its weakness.

From this background, to find out the maturity level of E-Learning learning using COBIT (Control Objectives for Information and Related Technologies). The selection of COBIT framework in this thesis research is because the COBIT framework is a tool that has the most appropriate coverage in terms of research needs, including to measure the performance of service delivery to be more useful for end users by using DS (Deliver and Support) domains and to measure supervision performance by using the ME (Monitor and Evaluate) domain, the steps to determine the maturity value of a measurement result are detailed, clear and complete compared to several control frameworks such as COSO, ISO 27000 series, and ITIL.

This study aims to: (1) To determine the extent to which the UM e-learning performance is viewed from the governance of information technology in planning and organization in e-learning using the COBIT 4.1 framework, and (2) Providing recommendations for governance improvements after knowing the gap between governance at present with expected governance.

2. Method

2.1. COBIT 4.1 evaluation standart

COBIT is a framework that is structured to provide clear policies and good practices in IT governance by helping management understand and manage risks related to IT governance. The process in COBIT is grouped into 4 domains as in Figure 1, namely: (1) Plan and Organize (PO); (2) Acquire and Implement (AI); (3) Deliver and Support (DS); and (4) Monitor and Evaluate (ME)

In this study focused on planning and organization (PO) domain, the succesfully implementation of e-leaning at Universitas Negeri Malang can be seen from planning and organizational stages. Planning and organization are important to be audited in advance to find out the strategic effectiveness that will be implemented [12]. Planning is a benchmark for the implementation of Elearning in learning at the Universitas Negeri Malang.

2.2. Data collecting

Some data collection techniques can be used in identifying existing conditions (as is) and the conditions to be achieved (to be) are as follows: interviews, surveys, use of questionnaires, review of documents,

observation, informal brainstorming, and group sessions [13]. In this study, data collection techniques were carried out by interviews and questionnaires with the managers of e-learning UM totaling 5 people.

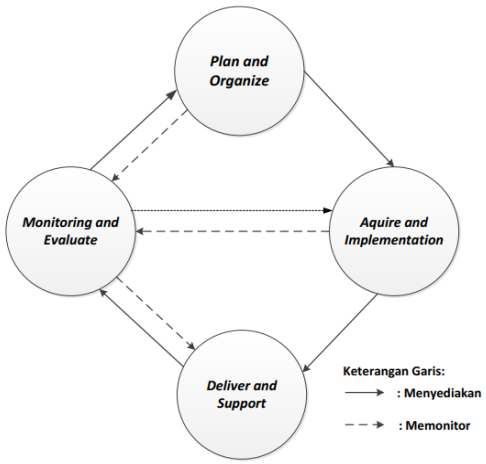

Figure 1. Domain cycle in COBIT [14].

2.3. Research instrument

This stage produces the maturity value of each process from the results of interviews conducted based on COBIT 4.1 by adjusting the questions to the object of research, namely Elearning. Each answer to the question is scored between 0 s.d 5, which is a representation of COBIT's maturity level 4.1. The lattice of the interview instrument can be seen in Table 1. In Table 1 follow the High Domain from the COBIT framework.

Table 1. Research instrument of COBIT 4.1 in plan and organize domain.

Domain	Domain Name	Question Item
PO1	Define a Strategic IT Plan	1-6
PO2	Define the information Architecture	7-8
PO3	Define a technological direction	9-10
PO4	Define the IT Organization and Relationships	11-13
PO5	Manage IT investment	14-15
PO6	Communicate management aims and direction	16-18
PO7	Manage human resource	19-22
PO8	Manage quality	23-24
PO9	Assess and manage IT risk	25-26
PO10	Manage Project	27-30

2.4. Data analysis

Data analysis was done through mapping the maturity level of planning and organization of information technology governance using descriptive analysis [15]. The results of the interview scores for each process are averaged and rounded down to determine the maturity level of each process in the focus of the PO domain. The scale of the research instrument is 0-5.

Then calculate the value of each level of Maturity Model by dividing the number of answers with the number of respondents in each IT process. The Maturity Index obtained is then made into a scale that will be mapped again into the maturity level to determine its maturity level. The Maturity and Maturity Level Indexes are shown in Table 2.

Table 2. Maturity index and maturity level scale [16].

Maturity Index Scale	Maturity Level	Meaning
4,51 – 5, 00	5	Optimized
3,51 – 4,50	4	Arranged
2,51 – 3,50	3	Determined
1,51 – 2,50	2	Can be repeated
0,51 – 1,50	1	Initiation
0,00 – 0,50	0	There is no

3. Result and discussion

The overall mean value of the maturity level of the processes in the PO domain is rounded down like counting each process. The maturity level value of the entire PO process identified is 1 on a scale of 0 s.d 5. This value states that the implementation of e-learning in planning and its organization is still at an early stage, the implementation of e-learning has not been organized and directed by a series of procedures and policies that govern it. Where the Universitas Negeri Malang is still reactive in implementing and implementing e-learning in learning activities. To be seen in Table 3.

Table 3. Level of plan and organize domain.

Domain	Domain Name	Existing Condition Level	The levels to be achieved	GAP
PO1	Define a Strategic IT Plan	1.625	3	1.37
PO2	Define the information Architecture	4	5	1
PO3	Define a technological direction	2	3	1
PO4	Define the IT Organization and Relationships	1	2	1
PO5	Manage IT investment	1.5	2	0.5
PO6	Communicate management aims and direction	2.3	3	0.7
PO7	Manage human resource	2.5	3	0.5
PO8	Manage quality	1	2	1
PO9	Assess and manage IT risk	1	2	1
PO10	Manage Project	2	3	1
	Average	2	3	1

3.1. PO1 define a strategic IT plan

Gap Analysis : E-learning strategic planning is needed to manage e-learning resources in line with institutional needs

Recommendation: Need to develop a strategic plan for e-learning UM as a guideline for e-learning development. There is management of e-learning throughout Universitas Negeri Malang at every level, starting from study programs, departments, faculties and universities or at least there are helpdesk in each study program to succeed online learning programs.

3.2. PO2 define the information architecture

Gap Analysis : An information architecture consisting of data and security has been well designed through PTIK.

Recommendation: Need to be further developed for data architecture related to e-learning log systems that can be used for big data analysis in the future

3.3. PO3 define a technological direction

Gap Analysis : The realization of technological infrastructure planning that is important in allocating resources effectively. E-learning implementation has been implemented in accordance with existing technological developments.

Recommendation: The need to define infrastructure planning in the implementation of e-learning, including updating infrastructure such as internet networks, server capacity and security systems.

3.4. PO4 define the IT organization and relationships

Gap Analysis : There is no planning for Human Resources (HR) to manage e-learning. There is no regulation on the relationship of IT organizations to the implementation of e-learning in each level.

Recommendation: Developed technical guidelines for implementing e-learning for managers at the university, faculty and department / study program level.

3.5. PO5 manage the IT investment

Gap Analysis : There is no good management system in e-learning management and there is no analysis of the benefits of using e-learning

Recommendation: There needs to be communication between stakeholders

3.6. PO6 communicate management aims and direction

Gap Analysis : There is control in policies, plans and procedures in implementing e-learning.

Recommendation: The need for policies in the implementation of e-learning through directives from leaders for the sustainability of e-learning activities in supporting the implementation of the curriculum.

3.7. PO7 manage human resources

Gap Analysis : The e-learning management personnel improve their competence and expertise by participating in training.

Recommendation: There needs to be training for elearning personnel, as well as training related stakeholders to prepare for the implementation of e-learning. Procurement of human resources in charge of managing e-learning and held as needed.

3.8. PO8 manage quality

Gap Analysis : E-learning implementation, monitoring and evaluation activities have not been optimal.

Recommendation: Analyzing the wants and needs of users, especially students in applying e-learning in lectures. There needs to be monitoring and evaluation of the implementation of e-learning based on the quality and traffic of using e-learning.

3.9. PO9 asses and manage IT risk

Gap Analysis : There is no e-learning system measurement and evaluation.

Recommendation: Need to plan periodic e-learning evaluations. Need to formulate reference for handling e-learning risks.

3.10. PO10 manage project

Gap Analysis : There is already an initial guidance for IT project management, but it has not been well documented and Managers develop and use techniques and methods for managing projects and documenting them properly.

Recommendation: Management of e-learning projects should involve stakeholders in the application of e-learning. The e-learning project is in accordance with the predetermined e-learning strategic planning.

E-learning is a big step in education, thousands hundreds of users access online learning platforms on various platforms with offerings different academic. E-learning in Universitas Negeri Malang have a focus on improving the quality of tertiary education by optimizing computer resources and communication technology (internet) through a LMS. The creation of quality e-learning is based on good planning factors. Planning factors include the blueprint for the concept of system development and management. That domains must be planned as well as possible so that in the future the implementation can be in accordance with the achievement targets, both with full online learning models and blended learning [17].

4. Conclusion

The implementation of e-learning UM in terms of IT planning and organization is still in its early stages. The implementation of e-learning has not been organized and directed by a series of procedures and policies that govern it. UM e-learning management is still carried out reactively and does not have a mature development roadmap.

Suggestions for E-learning development at the Universitas Negeri Malang are: (1) Making policies regarding the governance of standard e-learning accompanied by a measurable roadmap for the development and implementation of e-learning; (2) The existence of stakeholder support is related to the implementation of e-learning such as the e-learning management unit, faculty, lecturers and students as the object of the e-learning system.

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