

THE DEVELOPMENT OF E-LEARNING MATURITY MODEL (EMM) FOR HIGHER EDUCATION INSTITUTION IN INDONESIA

Siska Komala Sari¹, Bambang Hariyanto², Warih Maharani³

¹Magister Teknik Informatika, Fakultas Teknik Informatika, Universitas Telkom

Abstrak

Era Modern abad 21 ditandai oleh perkembangan yang cepat di bidang Teknologi, Informasi dan Komunikasi (Baca:TIK). Manfaat aplikasi-aplikasi TIK telah dirasakan hampir disemua sendi kehidupan di dunia secara umum, dan khususnya di Indonesia. Salah satu aplikasi TIK yang sangat penting di dunia pendidikan adalah e-Learning.

Walaupun perkembangan e-Learning di pendidikan tinggi di Indonesia telah terjadi sedemikian pesat, tidak ada alat bantu yang dapat digunakan untuk mengevaluasi proses perancangan, pengembangan dan implementasi e-Learning. e-Learning di dunia, khususnya di Selandia Baru telah berkembang lebih awal ketimbang Indonesia, dan disana telah ada alat bantu yang dapat digunakan untuk mengevaluasi e-Learning yaitu e-Learning Maturity Model (eMM). EMM memiliki 5 (lima) area proses atau kategori, 35 (tiga puluh lima) proses dan 5 (lima) dimensi. Setiap proses harus dinilai secara praktis dalam setiap dimensi dengan menggunakan pernyataan-pernyataan praktis.

Penelitian ini menghasilkan eMM baru sebagai hasil modifikasi terhadap eMM (e-Learning Maturity Model) asal yang dapat digunakan untuk mengukur kapabilitas proses e-learning di Indonesia. Modifikasi ini menggunakan teori analisis Root-Cause, dan dipengaruhi oleh 7 (Tujuh) faktor, yaitu: regulasi pendidikan, Process, Product, People, Dimensi organisasi, Dimensi Sumber Dana dan Kondisi Indonesia (e-readiness dan Jenis e-Learning).

Kata Kunci : e-Learning, e-Learning Maturity Model (eMM), Root-Cause analysis, Modifikasi, dimensi

Abstract

Modern Era of the 21st century is characterized by rapid development of information and communication technology (ICT). The benefits of ICT application has been felt in almost all the of community life in the world in general and in Indonesia in particular. One very important application of ICT in education is the e-Learning.

Although the development of e-Learning in higher education in Indonesia has been so rapid, there are no tools that can evaluate the process of design, implementation and development for e-Learning. e-Learning in the world, particularly in New Zealand has made progress earlier than in Indonesia, and there has been a tool that can evaluate e-Learning is referred to as e-Learning Maturity Model (eMM). EMM has 5 (five) process area or categories, 35 (thirty five) processes and the 5 (five) dimensions. Each process has to be assessed practically in every dimension by practical statements.

This research produce new eMM result from the Adaptation of existing eMM (e-Learning Maturity Model) that can be applied to measure the maturity and capability of e-learning process in Indonesia. The Adaptation is using the root-cause analysis and it was affected by seven factors, namely: education regulation, Process, Product, People, Dimension of Organization, Dimension of Resource of Funds and Indonesian Condition (e-readiness & Type of e-Learning).

Keywords : e-Learning, e-Learning Maturity Model (eMM), Root-Cause analysis, Adaptation, dimension

CHAPTER 1 THE PROBLEM

1.1 Rationale

Modern Era of the 21st century is characterized by rapid development of information and communication technology (ICT). The application of ICT has been felt in almost all the benefits of community life in the world in general and in Indonesia in particular. One very important application of ICT in education is the e-Learning. Definition by LearnFrame.Com in Glossary of eLearning Terms [1], E-Learning is an education system that uses electronic applications to support teaching and learning with media Internet, computer networks, and standalone computers. E-learning can use Internet technology that can transmit data in the form of video, voice, image and text so that students and faculty members who separate the distance and time can interact with each other. Ideally, the technology can support e-learning for anyone interested in learning, which have time constraints, distance constraints and physical limitations. Indonesia with a demographic that consists of the islands are separated by a strait of the sea even in desperate need of course e-Learning technology, as very supportive of the deployment process of science. By using e-Learning technology, the learning process is not limited by place and time. If the e-Learning is well managed, and infrastructure areas in Indonesia are ready to implement e-Learning, then it is an open opportunity to be able to access from anywhere across Indonesia

e-Learning in Indonesia began to evolve in line with the development of ICT infrastructure. Here are some of the ICT infrastructure development program in Indonesia [2]:

- a. 1999-2000 *Jaringan Internet* (Jarnet)
- b. 2000-2001 *Jaringan Informasi Sekolah* (JIS)
- c. 2002-2003 *Wide Area Network Kota* (WAN Kota)
- d. 2004-2005 Information and Communication Technology Center (ICT Center)
- e. 2006-2007 Indonesia Higher Education Network (Inherent)
- f. 2007- now *Jejaring Pendidikan Nasional* (Jardiknas)
- g. 2008- now Southeast Asian Education Network (SEA EduNet)

Along with the development of ICT infrastructure is an institution of higher education in Indonesia began to develop e-Learning is used in the lecture. Some colleges use e-Learning platforms such as Moodle open source, for example Gunadarma university (<http://elearning.gunadarma.ac.id/>), Bandung Institute of Technology (<http://kuliah.itb.ac.id/>), Parahyangan University (<https://elearning.unpar.ac.id/>), University of Indonesia (<http://scele.ui.ac.id/>) and many others. While other colleges develop their own e-Learning platform, for example; Bina Nusantara University (<http://online.binus.ac.id/>), Gadjah Mada University (<http://elisa.ugm.ac.id/>), Open University (<http://www.ut.ac.id/>), University Computer Indonesia (<http://kuliahonline.unikom.ac.id/>) and many others.

Although the development of e-Learning in higher education in Indonesia has been so rapid, and experience an improvement process, there are no tools that can evaluate the process of improvement, whereas the improvement process needs a measurement system.

e-Learning in the world, particularly in New Zealand has made progress earlier than in Indonesia, and there has been a tool that can evaluate e-Learning is referred to as e-Learning Maturity Model (eMM) [3]. eMM is a quality development Model That Is useful for an institution to assess the ability of developing, implementing and supporting e-learning. What is meant by the ability of the models in the context of eMM is the institution's ability to Ensure that the design, development and installation of e-Learning is in conformity with the needs of students, faculty, staff and institutions.

In order to improve the quality of e-Learning application in Indonesia, needed a device to held a measurement system. Measurement system is an important tools to help an improvement process. There is a measure of e-Learning from New Zealand, the eMM (e-Learning Maturity Model) that can be adapted. However, this needs to be adapted so that eMM could be applied in Indonesia, because eMM is generated from research in developed countries, which of course has the infrastructure readiness and preparedness culture is superior to Indonesia.

A Model result of this adaptation is the initiation step in Indonesia, so it must have the possibility of sustainable development. The purpose of this initiation is also to introduce e-Learning community in Indonesia to the world of e-Learning community, as well as to familiarize Indonesia e-Learning with the attributes associated with the implementation of e-Learning and the most important is to have a measurement system that can be used to hold a continuous improvement.

1.2 Theoretical Framework

This research intends to produce new products result from the Adaptation of existing products, the eMM (e-Learning Maturity Model) that can be applied to measure the maturity and capability of e-learning process in Indonesia to have a continuous improvement process. The process of adaptation of the original eMM (from New Zealand) to adapted eMM using several factors, factor system builders (people, process, product), the dimensions to be aware of when to bring up and develop e-learning at an institution and of course the cultural differences between Indonesia and New Zealand which will be a filter to do the adaptation. This is so that the measurement of e-Learning in higher education in Indonesia by using eMM is possible.

eMM uses a framework of thinking CMM (Capability Maturity Model) to determine the area to be assessed and SPICE (Software Process Improvement and Capability Determination) to be used as a management process and guidelines for assessing / improving the processes considered earlier.

1.3 Conceptual Framework/Paradigm

This sub chapter will discuss research variables and the relationship with the conceptual research.

At least there are 6 (six) research variables applied in this study namely:

Table 1-1-1 Research Variables

No	Relationship with Conceptual Research	Variable
1	the category of areas to be assessed using the EMM	Proses Area
2	Derivative processes that are in a process area	Process
3	Assessment point of view for each process	Dimension
4	Defining each dimension for each process	Practice Statements
5	Maturity level of an application / organization that is measured	Maturity Level
6	Factors that influence the Adaptation eMM for Higher Education in Indonesia	Education regulation, Indonesia e-readiness, 3P, Dimension of organization, infrastructure, Resource of funds and Human Resources.

1.4 Statement of the Problem

The main problem to be solved in this study are:

1. What are the factors that can affect the process of eMM Adaptation becomes an appropriate eMM to be implemented in Indonesia higher education?
2. How to adapt the e-Learning Maturity Model (EMM) from New Zealand so it is suitable for use as a measure of the maturity of e-learning in Indonesia, particularly in higher education?
3. How the results of measurements of e-Learning in higher education in Indonesia when compared with the results of measurements of e-Learning in New Zealand?

1.5 Hypothesis

The hypothesis of this study are:

1. There are several factors that affect the eMM Adaptation for Indonesia.
2. It will produce an e-Learning Maturity Model which is suitable for use in measuring the processes associated with the implementation of e-Learning in higher education in Indonesia for continuously improving e-Learning.
3. e-Learning Maturity Model will be modified to measure the level of maturity and yield improvement of the process of implementing the proposed e-Learning in higher education in Indonesia.

1.6 Assumption

The assumptions of this study are:

1. There is not a measuring tool used to measure the process of implementing e-learning in Indonesia which has a 5 (five) process area and assessed within 5 (five) dimensions.
2. There are currently no special tools used to assess the implementation of e-learning in Indonesia.

1.7 Scope and Delimitation

The scopes and delimitations of this study are:

1. E-Learning study sites are the University of Bina Nusantara and Gunadarma University, Jakarta.

2. The data used are derived from student and faculty users of e-Learning at the study sites as well as from direct observations.
3. The study produced a picture of the implementation of e-learning at the two universities in Indonesia, but can not be summed up as an overall picture of e-learning in Indonesia.

1.8 Importance of the Study

The importance of this study is that higher education institutions in Indonesia will be able to know the extent of implementation of e-Learning in their institution had been applied when compared with the standards and processes are defined by eMM. Most importantly, this study will be the beginning to have a measurement system and initiate research on the measurement system which is useful for the continuous improvement process for e-Learning in Indonesia. The result of this research is measurement system which is the initial result, which can be continuously improved.

1.9 Definition of Terms

Terms used in this thesis are as follows:

eMM	:	e-Learning Maturity Model
Binus	:	Bina Nusantara University
UG	:	Gunadarma University
SPICE	:	Software Process Improvement and Capability Determination
CMM	:	Capability Maturity Model
ICT	:	Information and Communication Technology

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on all the stages that have been undertaken in this study, it can take several conclusions as follows:

1. Adaptation of e-learning Maturity Model (eMM) to be applicable in Indonesia produce an adapted eMM process which has 5 areas and 26 processes are assessed in 5 dimensions by using 218 practical statements. In the end of the research it can be said that it is an adaptation process by deletion (or removal) any process or any practical statements which is not relevant to the condition in Indonesia. There was no any addition or modification, so it can be said as a simplification.
2. In this thesis, there are seven factors that affect the process of adaptation of eMM, namely: education regulation, Process, Product, People, Dimension of Organization, Dimension of Resource of Funds and Indonesian Condition (e-readiness & Type of e-Learning) but it still have not been approved that they are the best factors that can be used to adapt the eMM.
3. The adapted eMM as initial eMM for Indonesia resulting from the adaptation of each process and practical statement by looking at the conditions at the study site and 7(seven) factors as stated above is still need to be improved; the validation from the experts needs to be collected from more experts with more relevant specification.
4. Compared with the results of measurements on the process capability at New Zealand universities as measured using the original eMM, the process capability of universities in Indonesia are still in a lower level from the universities in New Zealand in General, Universities in Indonesia have not had any fully adequate assessment as the result in any dimension. But, in two Processes, Indonesia has a better assessment Value than New Zealand in Process E2 and E3.

5.2 Recommendations

1. After doing this research, it was realized that there is a process that is likely better to adapt the model, suppose the name is **Adaptation Process**. It is important to have a more scientific adapted model. It is recommended to do 3 (three) levels of the adaptation process as follows:
 - i. Macro Level adaptation procedure to adapt the model as a whole and the Process Area.
 - ii. Medium Level adaptation procedure to adapt the processes.
 - iii. Micro Level adaptation procedure to adapt the practical statements in a more systematic way.
2. Need to find the criteria at each level of adaptation process mention above and also the appropriate analytical techniques to do the adaptation process because the above process is different from the adaptation process has been performed in this thesis, so it may not be able to use the same analytical technique that has been done.
3. Need to have the expert judgement from the study location to compare between the assessment result and the reality in the study location to obtain a more accurate assessment results.
4. The measurement results should be compared with the level of satisfaction of e-learning users at the university to see the relevance.

Telkom
University

BIBLIOGRAPHY

- [1] Romi Satria Wahono. (2008, January) <http://romisatriawahono.net>. [Online].
<http://romisatriawahono.net/2008/01/23/meluruskan-salah-kaprah-tentang-e-learning/>
- [2] Direktorat Dikmenjur, *Buku perkembangan ICT Dikmenjur*. Jakarta, Indonesia: Direktorat Dikmenjur, 2005.
- [3] Stephen Marshall and Geoff Mitchell. (2002) Proceedings of the 19th Annual Conference of the Australian Society for Computers in Learning in Tertiary Education (Auckland, 2002). [Online].
<http://www.unitec.ac.nz/ascilite/proceedings/papers/173.pdf>
- [4] Mohammad Ali. (2004, Agustus) A paper presented at Seminar-Workshop on E-Learning: The Seventh Programming Cycle of APEID Activities.
- [5] Stephen Marshall, "What are the key factors that lead to effective adoption and support of e-learning by institutions?," in *HERDSA*, Rotorua, New Zealand, 2008.
- [6] G Mitchell S Marshall. (2007, April-May) www.caudit.edu.au. [Online].
http://www.caudit.edu.au/educauseaustralasia07/authors_papers/Marshall-103.pdf
- [7] Karn G Bulsuk. (2009, August) KarnGBulsuk Website. [Online].
<http://www.bulsuk.com/2009/08/using-fishbone-diagram-to-perform-5-why.html#axzz21y6L4rBl>
- [8] Karn G Bulsuk. (2009, March) KarnGBulsuk Website. [Online].
<http://www.bulsuk.com/2009/03>
- [9] PROF. DR Sugiyono, *Metode Penelitian Bisnis (Pendekatan Kuantitatif, Kualitatif dan R&D)*. Bandung: Alfabeta, 2008.
- [10] Badrul H. Khan, "The People–Process–Product Continuum in E-Learning: The E-Learning P3 Model," *Educational Technology*, vol. 44, no. 5, pp. 33-40, September-October 2004.
- [11] Made Yudhi Setiani, Boedhi Oetojo Tri Darmayanti, "E-LEARNING PADA PENDIDIKAN JARAK JAUH: KONSEP YANG MENGUBAH METODE PEMBELAJARAN DI PERGURUAN TINGGI DI INDONESIA," *Jurnal Pendidikan Terbuka dan Jarak Jauh*, vol. 8, no. Nomor 2, pp. 99-113, September 2007.

- [12] Miniwatts Marketing Group. (2012, June) Internet World Stats. [Online].
<http://www.internetworldstats.com>
- [13] Mary Shaw, "What Makes Good Research in Software Engineering?," *International Journal of Software Tools for Technology Transfer*, pp. 1-7, 2002.
- [14] The Economist Intelligence Unit in co-operation with The IBM Institute, "E-readiness rankings 2009 The usage imperative," The Economist Intelligence Unit, London, 2009.
- [15] Badan Akreditasi Nasional Perguruan Tinggi, *Borang Akreditasi Perguruan Tinggi 2010*. Jakarta: BAN PT, 2009.
- [16] ISACA, "ISO Standards: ISO 12207, ISO 15504 & ISO 9126," ISACA - CETIC Meeting 2007.
- [17] unKnown. (2012, July) Concordia Web Site. [Online].
<http://web2.concordia.ca/Quality/tools/12fishbone.pdf>
- [18] Stephen Marshall and Geoff Mitchell, "Potential Indicators of e-Learning Process Capability," in *Proceedings of EDUCAUSE in Australasia*, Adelaide, Australia, 2003.
- [19] S.J. & Mitchell, G Marshall, "Applying SPICE to e-Learning: An E-Learning Maturity Model?," in *Proceedings of the Sixth Australasian Computing Education Conference (ACE2004)*, Dunedin. *Conferences in Research and Practice in Information Technology*, Adelaide, Australia, 2004, p. 30.
- [20] S. Marshall. (2005, January) www.utdc.vuw.ac.nz. [Online].
<http://www.utdc.vuw.ac.nz/research/emm/documents/SectorReport.pdf>.
- [21] Soekartawi, "Constraints in Implementing 'E-Learning' Using WebCT: Lessons from the SEAMEO Regional Open Learning Center," *Malaysian Online Journal of Instructional Technology*, vol. 2, no. 2, pp. 97-105, August 2005.
- [22] PUTU A. WIDHIARTHA. (2012, June) Ilmu Komputer. [Online].
www.IlmuKomputer.Com
- [23] Mark C. Paul, Bill Curtis, Mary Beth Chrissis, and Charles V Weber, "Capability Maturity Model for Software version 1," Carnegie Mellon University, Pittsburgh, Pennsylvania, Technical Report ISSN, 1993.
- [24] J Petch, Gayle Calverley, Hilary Dexter, and Tim Cappelli, "Piloting a Process Maturity Model as an e-Learning Benchmarking Method," *The Electronic Journal of e-Learning*, vol. 5, no. 1, pp. 49-58, 2007.

- [25] Van Loon H, "Process Assessment and ISO 15504 ," Springer, ISBN, 2007.
- [26] Romi Satria Wahono. (2009, Maret) <http://romisatriawahono.net>. [Online].
<http://romisatriawahono.net/2008/04/01/elearning-sebagai-alat-bantu-pembelajaran/>
- [27] Gatot Hari Priowirjanto, Bagiono Djokosumbogo, Bondan S Prakoso, and Khalid Mustafa, "Sejarah Pengembangan Infrastruktur Teknologi Informasi dan Komunikasi, dari Jarnet hingga Jardiknas menuju ke South East Asian Education Network (SEA EduNet)," e-Indonesia Initiative, Jakarta, e-Indonesia Initiative 2008 (eII2008)- Konferensi dan Temu Nasional Teknologi Informasi dan Komunikasi untuk Indonesia 2008.
- [28] Soekartawi, "Prinsip Dasar E-Learning: Teori Dan Aplikasinya di Indonesia," *Jurnal Teknodik*, vol. VII, no. 12, Oktober 2003.
- [29] Soekartawi, "E-Learning di Indonesia dan Prospeknya di Masa Mendatang," Universitas Petra, Surabaya, Surabaya, 2003.