A 3D BASED APPROACH FOR E-LEARNING QUALITY IMPROVEMENT THROUGH EMM

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ABSTRACT

The E-Learning Maturity Model (eMM) is a framework for quality improvement, by which institutions can assess and compare their capability to sustainably develop, deploy and supported-learning. This paper presents a three-dimensional (3D) approach to e-Learning quality Improvement. In the approach the eMM is applied in "Diagnosis" phase as an assessment tool for e-Learning process improvement in institutional context where the key elements necessary for improvement in e-learning activities are identified.

The "Development" phase of the 3D approach concentrates on putting together improvement or change packages to target areas of deficiency. In strategic point of views, the packages are translated into implementation plans in a short term, a mid term, and a long term. In "Delivery" phase of the approach, the main focus is the human resource and marketing efforts for implementing the change packages in operational point of views. The 3D approach described can be beneficial in guiding individual institution's understanding of their-learning capability and providing educational Institutions with a roadmap for e-learning process improvement as well as providing a framework for strategic and operational planning and investment.

KEYWORDS-component: E-learning, Process Improvement, e-Learning Maturity Model, eMM, e-Learning Life Cycle, Capability Maturity Model Integration (CMMI)

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INTRODUCTION

Today e-learning is an important role for learning Management in Thailand. E-learning can be use full in helping students keep the conceptual knowledge more durable than classroom learning. Besides, learning management is also in the same standard. In particular, checking and supporting the students' knowledge can be done automatically and they can learn everywhere at all times . Some researches in Thailand we found that the main problem in the development of e-learning in Thailand is instructors are not interested to designing teaching materials, including a lack of time to do this.

As a measure to elevate quality e-Learning to a universal standard in order to achieve a mutual working objective, universities in Thailand should lay more special emphasis on the significance of development in terms of Capability Maturity. In connection to this, the Capability Maturity Model Integration (CMMI) is to be adapted and applied direct onto improvement's process, hence it is considered as the most effective means in upgrading working system within the organization.

This paper presents a three-dimensional (3D) approach to e-Learning quality improvement. In the approach the eMM is applied in "Diagnosis" phase as an assessment tool for e-Learning process improvement in institutional context where the key elements necessary for improvement in e-learning activities are identified. The "Development" phase of the 3D approach concentrates on putting together improvement or change packages to target areas of deficiency. In strategic point of views, the packages are translated into implementation plans in a short term, a mid term, and a long term. In "Delivery" phase of the approach, the main focus is the human resource and marketing efforts for implementing the change packages in operational point of views.

This paper is organized as following,

Section 1 Introduction.

Section 2 explains the Maturity Thinking and e-learning Maturity Models.

Section 3 discusses the e-Learning Maturity Model (eMM) model ,

Section 4 presents A 3D Approach in Evaluation e-learning Maturity Model
Section 5 discusses Using eMM in e-learning Development 3D View and
Section 6 Conclusion and an acknowledgement.

MATURITY THINKING AND E-LEARNING MATURITY MODELS:

Capability maturity models typically identify five or six 'maturity' – or 'capability' – levels, from low to high. The number of organisational 'foci of assessment' – the viewpoints through which the organizations are examined – for "Maturity Models" varies depending on the model.

Probably the best known derivative maturity model is the CMM (Capability Maturity Model) for software engineering. Also, other software engineering maturity models have been developed, including 'Standard Process Improvement and Capability dEtermination' (SPICE), the basis of ISO 15504. The recent development of the CMMI model (CMMI 2000, SEI 2002) – covers not only software development, but product development. This is an indication of the continued importance of maturity models in product development.

In the area of e-Learning development and implementation, and management, there are numerous studies with specific aspects with some sort of e-Learning measures for improving the evaluation of the capability and maturity in e-Learning.

Apply the CMM and SPICE in the area of e-Learning in order to explore whether similar insights could be generated for institutions engaged in online delivery of teaching. They suggest that this model offers a means for institutions to identify systemic weakness in their e-Learning development, delivery and management that potentially can inform future resourcing and strategic priorities.

Designed to evaluate the operational viability of a method based on the e-Leaning Maturity Model developed at the University of Wellington, New Zealand, which in turn was derived from Carnegie Mellon's widely accepted Capability Maturity Model. A successful

benchmarking effort should be able to inform an institution's planning and resourcing processes and the outcomes.

In specific area of education has proposed a maturity model for computing education which is inspired by the SEI's CMM.CMM can be used to rate educational organizations according to their capability to deliver high quality education on a five level scale.

The work focuses on the development of a maturity framework for higher educational sector that would enable education providers to improve quality of the existing educational processes and also aid the cost-effective development of value-added and practical processed that have been overlooked in the past. For this purpose they have selected CMM as our base model and People Capability Maturity Model (P-CMM) and CMMI as helping models for quality improvement in higher education sector.

International literature in improving student learning in a subject and how to assess the effectiveness of these learning strategies . A model based on the principles of the CMM in the design perspective in order to encourage the learners to reflect on their learning and to evaluate the effectiveness of their learning.

THE E-LEARNING MATURITY MODEL

The e-Learning Maturity Model (eMM) model was developed in New Zealand based on two complementary models, the Capability Maturity Model (CMM) from the Software Engineering Institute (SEI 2002) and SPICE (SoftwareProcessImprovementandCapability Determination).

Capability is perhaps the most important concept in the eMM. The eMM can be used by organizations to "assess and compare their capability to develop, deploy and support e-learning", according to [6], [8]. As to Figure 1, Process Dimensions and e-Learning Maturity Model (eMM) pop up the following illustrative descriptions.

The authors identify five dimensions of capability:

-Delivery,

-Planning,

-Definition,

-Management, and

- Optimisation.

Five e-Learning KPAs were also proposed:

-Learning,

- Development,

-Support,

-Evaluation, and- Organization.

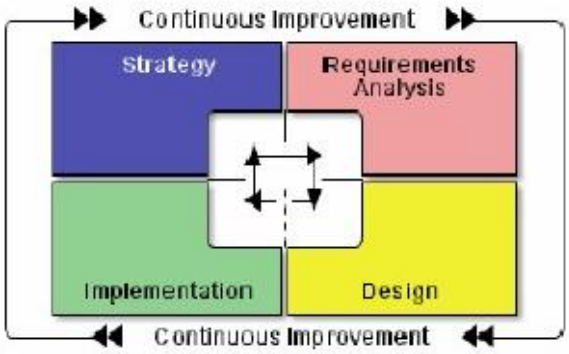

Figure 1: Process Dimensions and in E-Learning Maturity Model (eMM)

The eMM divides the capability of institutions to sustain and deliver e-learning into five major categories or process areas in Figure 1 that indicate clusters of strongly related processes.

A 3D APPROACH IN EVALUATING E-LEARNING MATURITY MODEL

When viewed in its totality, your e-learning priorities are essential elements representing the E-Learning Tactical Process Model. This paper presents a three-dimensional (3D) approach to e-learning quality improvement by applying eMM in "Diagnosis," "Development," and "Delivery" phases.

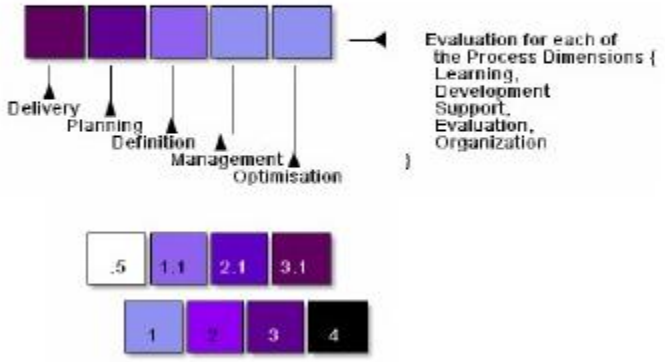

Figure2: . e-Learning Development Lifecycle

Based on the operational principles in Figure 2, e-Learning Development Lifestyle is naturally composed of Strategy,RequirementsAnalysis, Design and Implementation.

In the Diagnosis phase the eMM is applied as an assessment tool. In the context of e-learning there are five process areas for the institution to consider in process improvement: Learning, Development, Co-ordination, Evaluation, and Organization. This phase uses eMM as a 'lens.' to identify any potential gaps which exist in the current set of eMM practices in each process area.

The key elements are necessary for improvement in e-learning activities are identified and prioritized in the Diagnosis phase.

The Development phase of the 3D approach concentrates on putting together improvement or change packages to target areas of deficiency. In strategic point of view, the goal of this phase is to describe the evolution of the institution as a whole by continually planning the change packages. The planning is emphasized in progression on the institution's Process Dimensions in eMM: Delivery, Planning, Definition, Management and Optimization. For implementation ofchange packages, we show an approach to define the implementation based on an e-learning Tactical Process Model (eTPM). The eTPM outlines the priorities in moving e-learning from strategy to delivery and continuous improvement. It is the infrastructure that contains and supports the e-learning programs and courses that the institution develops and delivers. In a holistic view, the institution's e-learning priorities are essential elements representing three TPM in three views:

-Instructional architecture,

-Technical architecture, and

- Organizational environment.

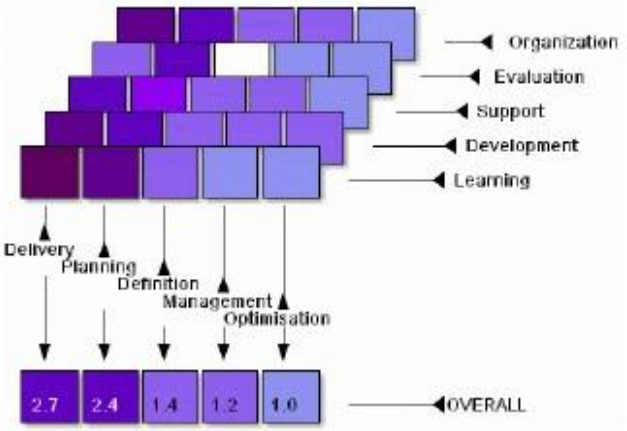

Figure 3. A 3-D View of e-Learning Maturity Model

In Delivery phase, the institution's eTPM is then translated into Delivery Plans in a short term, a mid term, and a long term. Each Delivery Plan defines priorities and processes for implementing a specific change package; evaluating the delivery process itself; and evaluating the effects of the change. In this phase, there are three interrelated priorities in considerations:

program-level evelopment, course-level development of learning products, and delivery at the program and course levels.

The 3D approach described in this paper can be beneficial in guiding an individual institution's understanding of their e-learning capability in eMM perspective, and providing the institution with a framework for quality improvement of e-learning development and delivery following the institution's eTPM. Using this approach the critical priorities and processes can be focused to assure implementation aligning development and delivery to the e-learning strategy and operations in institutional context.

USING EMM IN ELEARNING DEVELOPMENT 3D VIEW

This topic involves the adaptation of eMM for developing e-Learning, which signifies in the form of 3D view that comprises Diagnosis, Development and Delivery, as related earlier under the 4th topic - 1) Diagnosis : After obtaining results derived from analyzing and summarizingdefinitions in 5 process areas,

Table 1 show an example view of maturity indexed for each phase of e-learning development, representing the 2D view is then awarded. In relation to this, the vertical bar graph in Figure 4 is consequently built to bring up more clear-cut pictures. The higher climb-up thus witnesses the more efficiency of Process and vice versa.

For example, Record 1, Column 1, bar graph of Learning Process in terms of Delivery rockets up outstandingly, revealing how efficient it keeps going on. On the contrary, it is obvious that Management and Optimisation drop so heavily down to an astonishing extent that such unfortunate signs remind the need of prompt improvement.

Table 1:view of maturity indexes for each Phase of e-learning development

	Delivery	Planning	Definition	Management	optimization

Learning	3.10	3.00	1.50	1.00	1.00
Development	3.00	2.14	1.57	1.14	1.14
Support	2.83	2.00	1.33	1.50	1.00
Evaluation	1.67	2.67	0.67	1.00	1.00
Organization	3.00	2.22	1.89	1.11	1.00

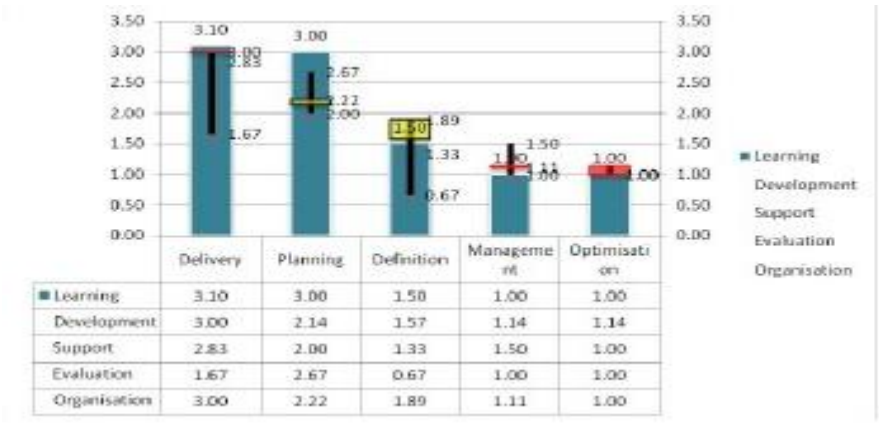

Figure 4. In seach of deficiencies based on the maturity levels of the "Learning"

Table 2: sample data for figure 5.

	Delivery	Planning	Definition	Management	optimization	
	2.72	2.41	1.39	1.15		
Learning	3.10	3.00	1.50	1.00	1.00	
	7.1%	6.9%	3.4%	2.3%	2.3%	
Development	3.00	2.14	1.57	1.14	1.14	
	6.9%	4.9%	3.6%	2.6%	2.6%	
Support	2.83	2.00	1.33	1.50	1.00	
	6.5%	4.6%	3.1%	3.4%	2.3%	
Evaluation	1.67	2.67	0.67	1.00	1.00	
	3.8%	6.1%	1.5%	2.3%	2.3%	
Organization	3.00	2.22	1.89	1.11	1.00	
	6.9%	5.1%	4.3%	2.6%	2.3%	
Total	13.60	12.03	6.96	5.75	5.14	43.49
Average	2.72	2.41	1.39	1.15	1.03	

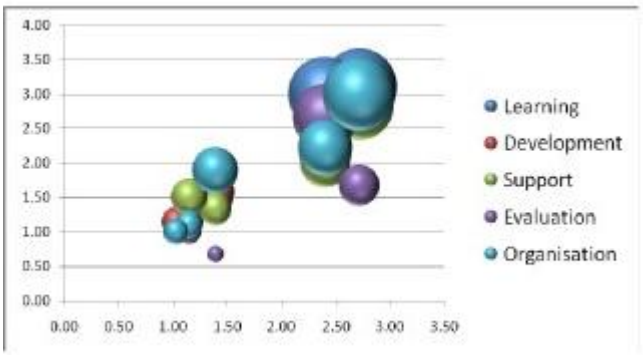

Figure 5. Colored Maturity Diagnose based on eMM

Table 2, Sample data for Figure 5. gives a better vision by means of circular diagrams in various colours, which are created from percentage calculation.

2) Development : Upon completing the 1) Diagnosis, now we come to focus on the Deficiency of Process that is visible from the graph in Figure 5 (Coloured Maturity Diagnosis based on eMM). It enables us to realize which terms should be bettered in order to achieve 3) Delivery : As seen from the graph, the group of smaller circles are situated mostly on the below-left. It reflects the inefficient state of Process, no doubt. So, it is vital for the prioritization of Process. That is to say the development should be performed in the sequent manner by starting from the smallest circle first. Once it becomes larger and can be moved adjacently to the upper- right of graph, it means efficiency of that Process now stays at the satisfactory level of high stability.

VI. CONCLUSIONS

The e-Learning Maturity Model is applied to university's development system for evaluation and comparison purposes of e-Learning. In other word, this so-called eMM is somewhat capability in bringing university up to international recognition standard. It is three-dimensional representation, i.e. Diagnosis, Development and Delivery, that originates quality improvement of

university's e-Learning. By this, we trust the qualified universities will have to pass through the good developing system.

At this initial stage of evaluation and comparison, none can tell exactly which level each university is in, since data collection is still getting on and incomplete due to limited assignment time. Decidedly, we choose eMM to adapt the process of development for universities in order to learn how advanced they presently are prior to pushing them to higher level. Lastly, in the analyst's humble opinion, this model will be bettered for universal acceptance and, conclusively, will benefit all universities in their future developments.

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