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ASSESSING VIRTUAL LEARNING ENVIRONMENT IN MALAYSIA'S PUBLIC UNIVERSITY

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Abstract

Public Universities in Malaysia are having many programs offered to their students and using e-learning or VLE as their platform, which mostly enrolled by distant learning students. However, no research report found on the current state of VLE practices whether they should be maintained or improvised. Assessment on process capability should be done to ensure quality operation of VLE. This study aims to assess the process being carried by the higher education provider to identify which process of VLE practice require critical improvement. Using e-Learning Maturity Model (eMM), a group of active lecturer/instructor in e-learning was selected to assess current practices of VLE. The study identifies major processes which require critical improvement based on specific dimensions to enhance VLE operations in higher education institutions. Majority of VLE processes were found to be inadequately practiced. Infrastructure of the VLE platform require serious makeover while teaching and learning support towards students and teacher demands attention. Continuous improvement effort is neglected. Involvement of administrators, librarians, and students as the assessor of the VLE practice to accommodate more specific results are recommended for future study.

Keyword: Virtual Learning Environment (VLE); maturity assessment; public university; e-Learning Maturity Model (eMM).

INTRODUCTION

Education design and concept evolved when technology make changes to the paradigm of learning into modern education (Sun, Tsai, Finger, Chen, & Yeh, 2008; Wang, Wang, & Shee, 2007). Embedment of technologies to increase the effectiveness of teaching and learning has become an interest to education provider in establishing e-learning or virtual learning environment. As integrate utilization of Internet and technology increased, e-learning offers broader opportunities to the education practice (Jia, et al., 2011). E-learning or Virtual Learning Environment (VLE) can be defined as a provision of a web based communication medium, which enable students to access different learning tools, such as program information, course content, teacher assistance, discussion boards, document sharing systems, and learning resources at their own convenience (Van Raaij & Schepers, 2008; Motaghian, Hassanzadeh, & Moghadam, 2013). In addition, the application of VLE system is said to be the game changer of correcting mistakes and weaknesses of traditional learning methods (Hassanzadeh, Kanaani, & Elahi, 2012). Furthermore, the emergence of distance learning seen to be depending on the strength of the VLE's to serve a larger population of distant learners (Firat, 2016).

Virtual Learning Environment (VLE) or e-learning rely strongly on the greatness of intelligent learning platform called as Learning Management System (LMS). Some education providers may use open source LMS like Moodle, ATutor, Eliademy, Canvas or Chamilo while others may opt into commercial ones or established their own. These LMS is likely the core of VLE execution aspect and lessons' delivery. It replaces many responsibilities of human's task-oriented and increase efficiency of teaching and learning support.

At first, users' readiness was the matter of concerned as the perception of the students who engaged with VLE were studied in the early of 21st century. Then development of more sophisticated LMS interface and features increasingly being debated as the users' satisfaction studies were done to ensure learning effectiveness is achieved. On the other hands, challenges of VLE occurred more frequently with the existence of better and more sophisticated function of LMS. Challenges like ease of access and use, user friendliness, security, social media integration and information quality (DeLone & McLean, 2003; Ozkan & Koseler, 2009; Oztekin, Kong, & Uysal, 2010; Wang, Wang, & Shee, 2007; Au, Ngai, & Cheng, 2008), change the paradigm of VLE to be more reliable to be used as the aim is to provide equal education to everyone anywhere (Hassanzadeh, Kanaani, & Elahi, 2012).

VIRTUAL LEARNING ENVIRONMENT (VLE) IN MALAYSIA

Public Universities in Malaysia are having many programs offered to their students and using e-learning or VLE as their platform, which mostly enrolled by distant learning students. Furthermore, many public universities have also integrated physical classroom session with VLE. Currently, all 18 Public Universities in Malaysia are offering VLE to enhance teaching and learning session.

According to our literature review, there are few researchers from Malaysia who have done research particularly on studying the e-learning phenomenon in Malaysia. The research focus can be identified as the following table:

Table 1: Studies on e-learning in Malaysia

Researcher	Research	Objective
(Lee, Hong, & Ling, 2002)	An analysis of students' preparation for the virtual learning environment	appraise experiences with computers and attitudes toward computers
(Nordin, Embi, & Yunus, 2010)	Mobile Learning Framework for Lifelong Learning	generic mobile environment issues, learning contexts, learning experiences and learning objectives; crucial factors and design requirements for the mobile learning environment.
(Othman, Mohamad, Yusuf, Yusof, & Suhaimi, 2012)	An Analysis of e-Learning System Features in Supporting the True e-Learning 2.0	Features of e-learning
(Mahat, Ayuba, & Su Luan, 2012)	An Assessment of Students' Mobile Self-Efficacy, Readiness and Personal Innovativeness towards Mobile Learning in Higher Education in Malaysia	assess learners' self-efficacy, readiness and personal innovativeness towards Mobile learning
(Juhary, 2012)	Making Sense of e-Learning and Simulations: The Misunderstood Perceptions	Perception of students on e-learning and simulation in teaching and learning
(Yacob, Kadir, Zainudin, & Zurairah, 2012)	Student Awareness Towards E-Learning in Education	awareness of e-learning
(Omar, Hassan, & Atan, 2012)	Student Engagement in Online Learning: Learners Attitude Toward E-Mentoring	identify learner's attitudes toward e-mentoring

Researcher	Research	Objective
(Zakariah, Alias, Aziz, & Ismail, 2012)	E-Learning Awareness in a Higher Learning Institution in Malaysia	students' awareness on E-learning
(Endut, et al., 2012)	e-Learning for Universiti Teknologi MARA Malaysia (UiTM): Campus Wide Implementation and Accomplishments	Describe university's effort in e-learning.
(Zainuddin, Kamaluddin, & Hassan, 2012)	Exploring Malay Student's Commitment in Online Learning - A Case of Business Management Students	significant factors influencing Malay student's commitment in online learning
(Alwi, Mahirb, & Ismail, 2014)	Infusing Social Media in Teaching and Learning (TnL) at Tertiary Institutions: A Case of Effective Communication in Universiti Sains Islam Malaysia (USIM)	frequency of social media use among undergraduates in USIM and analyse their perception on the effect of social media towards effective communication in teaching and learning.
(Nor & Kasim, 2015)	Blended Learning Web Tool Usage among Accounting Students: A Malaysian Perspective	Usage frequency, influencing factors & potential improvements
(Chong, et al., 2016)	Access to, interest in and attitude toward e-learning for continuous education among Malaysian nurses	Interest in, preference and attitude towards e-learning
(Hew & Kadir, 2016)	Predicting the acceptance of cloud-based virtual learning environment: The roles of Self Determination and Channel Expansion Theory	roles of Self Determination Theory, Channel Expansion Theory, VLE content design and interactivity together with the trust-in-website, attitude toward knowledge sharing and school support

PROBLEM STATEMENT AND OBJECTIVE

Establishment of e-learning platform tremendously emerged once the higher education provider have come to be familiar with technology especially public universities in Malaysia. Table 1 shows that many of the research focus on the humanistic aspects like content delivery, computer application of VLE, users' engagement and awareness rather than measuring e-learning progress level. None were reporting the current state of VLE practices whether they should be maintained or improvised. Therefore, focus of this study is neither to measure the contents of the VLE course nor any features or methods that should be embedded in the VLE platform. This study aims to assess the process being carried by the higher education provider to identify which process of VLE practice require critical improvement.

UNIVERSITI TEKNOLOGI MARA (UiTM) AND VLE

Universiti Teknologi MARA engaged in VLE since 2005 with the establishment of i-Learn Centre (i-Lec) which operated under the Academic Affair Division (HEA). The adaptation of technology in learning being supervised and monitored by i-Lec using its Learning Management System (LMS) known as i-Learn (Nursyahidah Alias, Zazaleena Zakariah, Nor Zalina Ismail, & Mohd Norafizal Abd Aziz, 2012).

METHODOLOGY

Mohammadi (2015), mentioned many outstanding studies in relation of e-learning usage however, most of the study is merely on perceived studies on users of the e-learning which is not suitable to achieve this study focus. Few models were compared to find better approach in assessing VLE like E-learning Maturity Model (Marshal, 2014), Information System Success Model (DeLone & McLean, 2003), E-learning's Critical Success Factors (Bhuasiri, Xaymoungkhoun, Zo, Rho, & Ciganek, 2012), Technology Acceptance Model (Bagozzi, Davis, & Warshaw, 1992). Few scholars suggest that maturity assessment is much more compelling to study the success of particular e-learning progress rather than focusing on its features (Marshall & Mitchell, 2002; Neuhauser, 2004; Petch, Calverley, Dexter, & Campelli, 2007; Mettler, Rohner, & Winter, 2010; Clarke, Stoodley, & Nelson, 2013). In fact, maturity assessment able to assess maturing elements to act in upgrading the elements to perform better (Kohlegger, Maier, & Thalmann, 2009). Besides maturity assessment emphasize on how well such processes being used does, as it is designed to do; and a capability maturity model can be used as instrument to help institution to initiate, plan, manage and assess engagement practices (Clarke, Stoodley, & Nelson, 2013). Therefore, as the stand in this study is to assess the quality of process in VLE implementation, E-learning Maturity Model was found to be relevant and suitable to be chosen and adopted in this study as it is the only maturity model that emphasis on e-learning, focusing on VLE initiation, plan, manage and engagement practice including elements that can be assessed to be improved (Mukendwa, 2015; Marshall S., 2013). As an exploratory study, the research was conducted in Universiti Teknologi MARA, Malaysia before proceeding with more Malaysia Public Universities.

E-LEARNING MATURITY MODEL (EMM)

The e-Learning Maturity Model was established from a combination of Capability Determination Model (CMM) and Software Process Improvement and Capability Determination (SPICE) in 2002 by Marshall and Mitchell (Marshall & Mitchell, 2002; Kohlegger, Maier, & Thalmann, 2009). According to S.W. van Rooij, K. Zirkle, (2016), the model uses self-assessment instrument to collect data on five learning process area such as (a) processes that directly impact on pedagogical aspects of e-learning; (b) processes surrounding the creation and maintenance of e-learning resources; (c) processes surrounding the oversight and management of e-learning; (d) processes surrounding the evaluation and quality control of e-learning throughout its entire lifecycle; and (e) processes associated with institutional planning and management (Marshall S., 2013; Van Rooij & Zirkle, 2016).

Instrument

The research Instrument is using eMM survey as the instrument to assess online learning because the aim of eMM is to assess the quality of the processes in online learning, and not at promoting approaches on teaching and learning. It includes processes of; (1) learning, (2) development, (3) support, (4) evaluation and (5) organization which described in Table 2. By using eMM Capability Assessments (Marshall & Mitchell,2003), each process will be assessed accordingly using five dimensions as shown in figure 1 and table 3 including; (1) delivery, (2) planning, (3) definition, (4) management and (5) optimisation as shown in figure 4. Five Likert scale used are: (5) fully adequate; (4) largely adequate; (3) partially adequate; (2) not adequate; and (1) not assessed.

Table 2: Description of eMM processes.

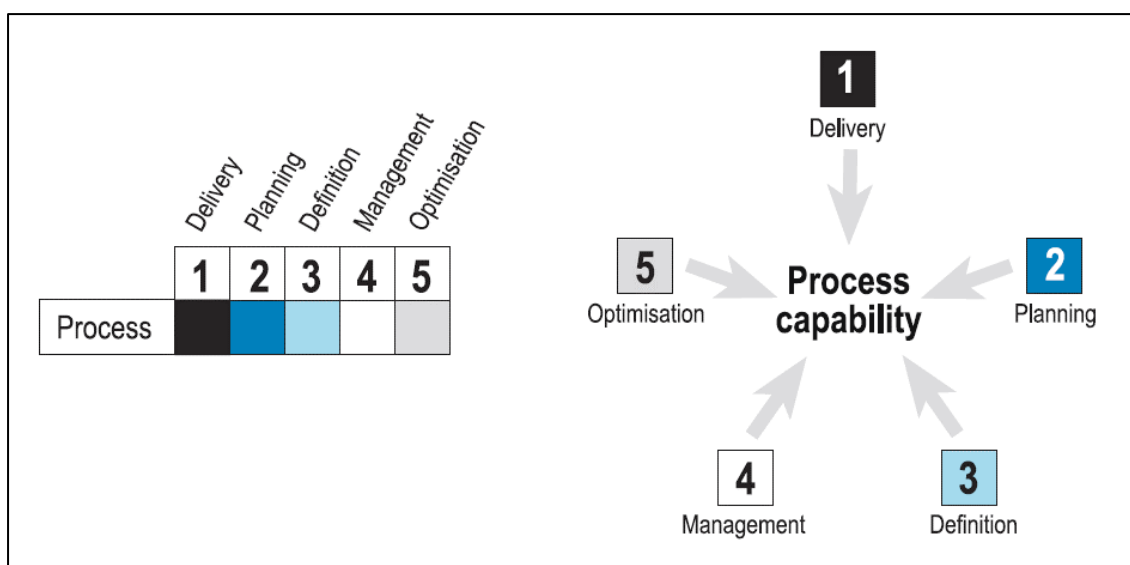| Process category	Brief description
Learning	Processes that directly impact on pedagogical aspects of e-learning
Development	Processes surrounding the creation and maintenance of e-learning resources
Support	Processes surrounding the oversight and management of e-learning
Evaluation	Processes surrounding the evaluation and quality control of e-learning through its entire lifecycle.
Organisation	Processes associated with institutional planning and management

Figure 1: eMM Process Dimension (Marshal, 2014)

Table 3: Dimensions of eMM

DIMENSION	DESCRIPTION
DELIVERY	concerned with the creation and delivery of process outcomes. Assessments of this dimension are aimed at determining the extent to which the process is seen to operate within the institution.
PLANNING	assesses the use of predefined objectives and plans in conducting the work of the process. The use of predefined plans potentially makes process outcomes more able to be managed effectively and reproduced if successful.
DEFINITION	covers the use of institutionally defined and documented standards, guidelines, templates, and policies during the process implementation. An institution operating effectively within this dimension has clearly defined how a given process should be performed. This does not mean that the staff of the institution follows this guidance.
MANAGEMENT	concerned with how the institution manages the process implementation and ensures the quality of the outcomes. Capability within this dimension reflects the extent of measurement and control of the outcomes and the way in which the staff of the institution performs the practices of the process.
OPTIMISATION	captures the extent an institution is using formal approaches to improve capability measured within the other dimensions of this process. Capability of this dimension reflects a culture of continuous improvement.

POPULATION AND SAMPLING

In this paper only one population are considered because this population have the required knowledge and experience in the VLE processes (Turban, 1993). 135 questionnaire set were distributed to selected lecturers/instructors as these are the subjects that actively involved in the utilization of i-Learn and its processes.

DATA ANALYSIS AND FINDINGS

The data collected were analysed using eMM Workbook. From 135 questionnaire sets distributed only 133 were answered. Results from each section were represented using colours as indicated in the eMM guide as shown in figure 2. Process capability of VLE in UiTM were determine using the scale to identify processes which inadequately practiced and require improvisation.

Figure 2: Likert scale represented by colours

■ (black)	Fully Adequate
■ (blue)	Largely Adequate
■ (light blue)	Partially Adequate
□ (white)	Not Practiced/Not Adequate
■ (grey)	Not Assessed

LEARNING - PROCESSES THAT DIRECTLY IMPACT ON PEDAGOGICAL ASPECTS OF E-LEARNING

Table 4 evident the results on the Learning Process capability of VLE in UiTM. It summarizes that, majority of the processes are largely adequate except 3 processes which partially adequate for **L2, L3** and **L4**. Yet, none were assessed with fully adequate. It seems that management and optimisation of interaction mechanisms and e-learning skill development including planning for staff response time to students' communication not being addressed adequately.

Table 4: Result on Learning Process

Learning: Processes that directly impact on pedagogical aspects of e-learning		Delivery	Planning	Definition	Management	Optimization
L1	Learning objectives guide the design and implementation of courses	■	■	■	■	■
L2	Students are provided with mechanisms for interaction with teaching staff and other students	■	■	■	▦	▦
L3	Students are provided with e-learning skill development	■	■	■	▦	▦
L4	Students are provided with expected staff response times to student communications	■	▦	■	■	■
L5	Students receive feedback on their performance within courses	■	■	■	■	■
L6	Students are provided with support in developing research and information literacy skills	■	■	■	■	■
L7	Learning designs and activities actively engage students	■	■	■	■	■
L8	Assessment is designed to progressively build student competence	■	■	■	■	■
L9	Student work is subject to specified timetables and deadlines	■	■	■	■	■
L10	Courses are designed to support diverse learning styles and learner capabilities	■	■	■	■	■

DEVELOPMENT - PROCESSES SURROUNDING THE CREATION AND MAINTENANCE OF E-LEARNING RESOURCES

Table 5 shows summary on the Development Process assessment which indicate none of the processes and dimensions were assessed as fully adequate. It is shown that **D4, D5** and **D6** were evaluated as only partially adequate for all dimensions. It implies that that current VLE practice in the institutions is partially adequate

in terms of (1) supporting disabled students; (2) elements in physical e-learning infrastructure which should be reliable and (3) integrated using defined standards

Table 5: Result on Development Process

Development: Processes surrounding the creation and maintenance of e-learning resources						
		Delivery	Planning	Definition	Management	Optimization
D1	Teaching staff are provided with design and development support when engaging in e-learning	█	█	█	█	█
D2	Course development, design and delivery are guided by e-learning procedures and standards	█	█	█	█	█
D3	An explicit plan links e-learning technology, pedagogy and content used in courses	█	█	█	█	█
D4	Courses are designed to support disabled students	░	░	░	░	░
D5	All elements of the physical e-learning infrastructure are reliable, robust and sufficient	░	░	░	░	░
D6	All elements of the physical e-learning infrastructure are integrated using defined standards	░	░	░	░	░
D7	E-learning resources are designed and managed to maximise reuse	█	█	█	█	█

SUPPORT - PROCESSES SURROUNDING THE SUPPORT AND OPERATIONAL MANAGEMENT OF E-LEARNING

Summary in table 6 emphasize on support process practiced towards operational management of e-learning. It was found that library facilities are largely adequate for the students to engaged in current VLE. Moreover, e-learning pedagogical support and professional development which are provided to teaching staff were largely adequate except for optimisation dimension. On the other hand, other processes were partially adequate.

Table 6: Result on Support Process

Support: Processes surrounding the support and operational management of e-learning						
		Delivery	Planning	Definition	Management	Optimization
S1	Students are provided with technical assistance when engaging in e-learning	░	░	░	░	░
S2	Students are provided with library facilities when engaging in e-learning	█	█	█	█	█
S3	Student enquiries, questions and complaints are collected and managed formally	░	░	░	░	░
S4	Students are provided with personal and learning support services when engaging in e-learning	░	░	░	░	░
S5	Teaching staff are provided with e-learning pedagogical support and professional development	█	█	█	█	░
S6	Teaching staff are provided with technical support in using digital information created by students	░	░	░	░	░

EVALUATION - PROCESSES SURROUNDING THE EVALUATION AND QUALITY CONTROL OF E-LEARNING THROUGH ITS ENTIRE LIFECYCLE

Evaluation processes summarized in table 7 highlighted on quality control of VLE towards its implementation through its entire lifecycle. Delivery of regular feedback on quality and effectiveness of teaching staff e-learning experience, was the only dimension assessed with largely adequate while the other processes and dimensions were partially adequate.

Table 7: Result on Evaluation Process

Evaluation: Processes surrounding the evaluation and quality control of e-learning through its entire lifecycle						
		Delivery	Planning	Definition	Management	Optimization
E1	Students are able to provide regular feedback on the quality and effectiveness of their e-learning experience	□	□	□	□	□
E2	Teaching staff are able to provide regular feedback on quality and effectiveness of their e-learning experience	■	□	□	□	□
E3	Regular reviews of the e-learning aspects of courses are conducted	□	□	□	□	□

ORGANIZATION - PROCESSES ASSOCIATED WITH INSTITUTIONAL PLANNING AND MANAGEMENT

Results on organization process in table 8 shows largely adequacy on majority of the processes and dimensions except for **O1, O2, O7** and **O8.** Majority of the processes and dimensions were assessed as largely adequate but none was fully adequate. Management of formal criteria to guide the allocation of resources for e-learning design, development, and delivery; and optimisation of the former and explicit plan that should guide E-learning technology decisions were assessed as partially adequate. On the other hands, provision of e-learning pedagogies and administration information for students were partially adequate for every dimension.

Table 8: Result on Organization Process

Organization: Processes associated with institutional planning and management						
		Delivery	Planning	Definition	Management	Optimization
O1	Formal criteria guide the allocation of resources for e-learning design, development and delivery	■	■	■	□	□
O2	Institutional learning and teaching policy and strategy explicitly address e-learning	■	□	■	■	■
O3	E-learning technology decisions are guided by an explicit plan	■	■	■	■	□
O4	Digital information use is guided by an institutional information integrity plan	■	■	■	■	■
O5	E-learning initiatives are guided by explicit development plans	■	■	■	■	■
O6	Students are provided with information on e-learning technologies prior to starting courses	■	■	■	■	■
O7	Students are provided with information on e-learning pedagogies prior to starting courses	□	□	□	□	□
O8	Students are provided with administration information prior to starting courses	□	□	□	□	□
O9	E-learning initiatives are guided by institutional strategies and operational plans	■	■	■	■	■

(■ = dark-shaded cell; □ = light-shaded cell)

DISCUSSION & RECOMMENDATION

Utilization of eMM to assess learning capability has been used by more than 80 different institutions (Marshall S. , 2013). It helps institutions to visualize the capabilities of an institutions specifically and comparatively (Beames, Mitchell, & Marshall, 2009). In fact, based on the dimensions, performance of each processes can be compared identically based on its dimensions. The result successfully supports the study goal which is to identify process of VLE practice which require critical improvement. Surprisingly, none of the processes and dimensions reached fully adequate practice in the institution which indicates the administrators of VLE should put up more efforts in ensuring adequate practice of processes based on each dimension. Few areas which found require critical improvement are shown in table 9:

Table 9: Process requires critical improvement

Process	Elements
Development	Courses are designed to support disabled students
	All elements of the physical e-learning infrastructure are reliable, robust and sufficient
	All elements of the physical e-learning infrastructure are integrated using defined standards
Support	Students are provided with technical assistance when engaging in e-learning
	Student enquiries, questions and complaints are collected and managed formally
	Students are provided with personal and learning support services when engaging in e-learning
	Teaching staff are provided with technical support in using digital information created by students
Evaluation	Students are able to provide regular feedback on the quality and effectiveness of their e-learning experience
	Teaching staff are able to provide regular feedback on quality and effectiveness of their e-learning experience
	Regular reviews of the e-learning aspects of courses are conducted
Organization	Students are provided with information on e-learning pedagogies prior to starting courses
	Students are provided with administration information prior to starting courses

These areas or processes identified as require critical improvement as it were assessed lower than largely adequate and having more than two dimensions to be improved. However, even though the remaining areas are largely adequate for the VLE operation, efforts are still required to achieve fully adequate practice.

Results on the development process implies that that current VLE practice in the institutions is partially adequate in terms of (1) supporting disabled students; (2) elements in physical e-learning infrastructure which should be reliable and (3) integrated using defined standards. It is assumed that the current VLE infrastructure is not yet undergoing any assessment on Information System Success Model (DeLone & McLean, 2003), E-learning's Critical Success Factors (Bhuasiri, Xaymoungkhoun, Zo, Rho, & Ciganek, 2012), Technology Acceptance Model (Bagozzi, Davis, & Warshaw, 1992). A serious assessment using such model and critical improvement and optimisation is required as current practices are affecting most of the dimensions of VLE.

Students' technical assistance, formal complaint management, and personal learning support seems insufficiently attended based on the assessment. In fact, these support services are crucial in providing perfect learning engagement. It could be worsening if teaching staff support in using digital information

created by students were assessed lower than partially adequate as this could harm most of the entire VLE learning experience. Moreover, quality control of VLE on current practices are considered poor as this process is important to determine a continuous improvement of VLE in ensuring an effective learning environment. Current circumstances could affect learning as provision of e-learning pedagogies and administration information neglected even though it facilitates the overall operation of VLE in institutions. Moreover, management and optimisation of resources allocation guide and technology decision should be transparent to the users who engaged in VLE.

CONCLUSION

Findings and discussion of the research can be used to be adapted in Malaysia Online Learning provider. Improvements of learning process, development process, support process, evaluation process and organization process can be initiated by looking back into the drawbacks of our current situation of VLEs resulted from eMM assessment. Practically, the departments of public universities who involved in online learning courses could analyse the whole process of having online learning environment by benchmarking it with the results of eMM assessment. This implies that, there are many processes and dimensions that need to be enhanced because this process directly impacts pedagogical aspects of VLE and it determines whether the learning process is well operationalized or not at the institution (Mukendwa, 2015). Administrators could modify the process of VLE implementation based on five specific dimensions that currently used for VLEs, which is crucial to the success of the offered program. Other than that, usability of e-learning resources is highly demanded to provide ample and convenient learning environment. It can be guaranteed using the second process assessment of eMM, development process. Processes surrounding the oversight and management of e-learning; processes surrounding the evaluation and quality control of e-learning throughout its entire lifecycle; and processes associated with institutional planning and management is something that could bring any online program to sustain its existence. Involvement of administrators, librarians, and students as the assessor of the VLE practice to accommodate more specific results are recommended for future study.

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