

<b>Title:</b>	The eLearning Maturity Model (eMM): A framework to enhance the systematic implementation of eLearning policies?
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## Abstract

The Polytechnic of Namibia (PoN) is transforming into a University of Science and Technology. This transformation has brought the spotlight back on the integration and implementation of technology in all the institutions key activities. eLearning is one such vital core activity. This is a trend witnessed globally as a majority of higher education institutions (HEI's) are at some stage of eLearning implementation albeit for varying reasons. The debate has shifted from whether HEI's should implement eLearning to how far along are HEI's in their implementation of eLearning. As the PoN and various institutions around the world aim to make technology, specifically eLearning a seamless part of their operations, it's important to determine if and how they are progressing in this regard. Various authors suggest the use of maturity models to determine this. This study shows how one such maturity model was applied within the context of the PoN. In so doing explored ways in which maturity models assist in improving standards and the quality of eLearning activities at the PoN.

**Key words:** eLearning implementation, Maturity model, Capability, Quality

## 1. Introduction

The Polytechnic of Namibia (PoN) is transforming into a University of Science and Technology. In the advent of this transformation one of the institutions' aims is to further drive, promote and facilitate technology development, innovation and technology transfer. An area of concern is the integration and implementation of technology into all its core activities. eLearning is one such vital core activity. eLearning at the Polytechnic is currently one of four learning modes, the others being full time, part time, distance: print. Until 2010, distance education was offered predominantly via distance: print. This is by no means unusual as in her paper, Guri-Rosenblit (2005, p.469) wrote that "...most distance education on the university level all over the world is still provided through the more 'traditional' media of print and broadcasting, in spite of the many advantages e-learning provides for distance teaching purposes."

Global trends, advantages of eLearning and the subsequent transformation into a university of science and technology has necessitated the need to shift the focus from offering courses at the institution from distance: print to eLearning. This trend is witnessed globally with a majority of higher education institutions at some stage of eLearning implementation albeit for varying reasons. The debate has thus shifted from; should HEI's implement eLearning, to, how far along are HEI's in their implementation of

eLearning. As the PoN and various institutions around the world aim to make technology, specifically eLearning a seamless part of their operations, it's important to determine if and how their progressing in this regard. Several authors (Marshall & Mitchell, 2002; Neuhauser, 2004; Petch et al, 2007; Mettler, Rohner & Winter, 2010; Clarke, Stoodley & Nelson, 2013) argue for the use of maturity models to determine this. But just what are maturity models?

The concepts maturity, maturity models, capability and maturity capability models have been explored and defined by various authors. Mettler, Rohner, and Winter (2010, p.334) defines maturity as '*... an evolutionary progress in the demonstration of a specific ability or in the accomplishment of a target from an initial to a desired or normally occurring end stage*'. Added to this, Kohlegger, Maier & Thalmann (2009, p.1) define maturity models as '*...instruments used ... to rate capabilities of maturing elements and select appropriate actions to take the elements to a higher level of maturity*'. Capability on the other hand is described by Clarke, Stoodley and Nelson (2013, p.3) as '*... an indication of how well a process used by an organisation does what it is designed to do*'. Lastly Clarke et al (2013, p.1) define the concept capability maturity model as an instrument that enables the assessment of an institutions capability to '*... initiate, plan, manage and evaluate institutional student engagement practices*'.

Using components from these definitions, maturity models for the purpose and context of this study will be viewed as instruments that rate and determine the evolutionary progression of an institutions capability to design, plan, initiate, manage and evaluate eLearning activities with the sole aim of being used as a framework to guide improvement in all spheres of eLearning. This study aimed to apply one such model within the context of the PoN. In so doing explored the ways through which maturity models assist in improving standards and the quality of our eLearning activities and above all, how these can be utilised to enhance the systematic implementation of eLearning policies.

## 2. The eLearning Maturity Model (eMM)

Kohlegger, Maier & Thalmann (2009, p.54) in their study to explore and analyse existing maturity models determined, at the time, that there were more than 70 maturity models which they classified in the following categories:

- maturing of persons (8 models found)
- maturing of objects (22 models found)
- maturing of social systems (46 models found)

Marshall and Mitchell's (2002) eLearning Maturity Model (eMM) classified under Kohlegger's et al (2009) maturing of objects subcategory was the only maturity model that had primary emphasis on eLearning maturity. It is for this reason the eMM was the only maturity model considered for such a study. A brief overview of the eMM will now be discussed.

The eLearning Maturity Model (eMM) was initially developed in 2002 using the underlying concepts from the Capability Maturity Model (CMM) and the Software Process Improvement and Capability Determination (SPICE) (Marshall & Mitchell, 2002; Kohlegger et al, 2009). Derived from the Software Engineering field, the current eMM version 2.3 2007 is quite

comprehensive dividing capability index in institutions ability to sustain and deliver eLearning into 5 major process areas (Marshall & Mitchell, 2002). Each process in the eMM is assessed using the capability assessments of 5 dimensions. Petch, Calverley, Dexter, and Campelli (2007) recommend that thorough understanding of the processes and dimensions ensure successful implementation of the eMM within an institution. The three major elements of the eMM; processes, dimensions and capability assessments are thus briefly described below.

## 2.1 eMM Processes

Figure 1 depicts the 5 major process area categories in the eMM. Each process area is further broken into specific detailed processes which are assessed using capability assessments (Marshall & Mitchell, 2006). Each process under a specific process area is indicated with the first letter of the process area and the corresponding digit as seen in Figure 2. Assessing all process areas enables an institution to determine how well it is performing in each of the key eLearning components. Each process area is assessed individually, but it is the overall result that determines the ability of the institution to perform well (Marshall, 2007). Some of the process areas are linked and thus the assessment of one process could potentially affect the other. The focus of these processes is on their contribution to eLearning effectiveness and sustainability (Marshall & Mitchell, 2007).

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 processes categories (Marshall, 2007 p. 6)

<b>Learning: Processes that directly impact on pedagogical aspects of e-learning</b>	
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
<b>Development: Processes surrounding the creation and maintenance of e-learning resources</b>	
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
<b>Support: Processes surrounding the support and operational management of e-learning</b>	
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
<b>Evaluation: Processes surrounding the evaluation and quality control of e-learning through its entire lifecycle</b>	
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
<b>Organisation: Processes associated with institutional planning and management</b>	
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

Figure 2: eMM process categories and processes (Marshall, 2007 p. 7)

## 2.2 Dimensions and Practices

The eMM consists of 5 dimensions; *delivery*, *planning*, *definition*, *management* and *optimisation* (Figure 3) with each dimension broken down further into practices (Figure 4). The dimensions determine capability of practices from a lower (delivery) dimension to higher (optimisation) dimension. These dimensions should however not be mistaken as a

rankings because an institution that has developed capability at Higher dimensions but is not supported by capability at the lower dimensions will not deliver the desired outcomes and vice versa (Marshall & Mitchell, 2007). The practices indicated in bold i.e. Dimension 1: *Delivery course documentation includes clear statement of objectives* and *Learning objectives are linked explicitly throughout learning and assessment activities using consistent language* as seen in Figure 4 are deemed essential for the process to be successfully achieved. The practices that are not indicated in bold although useful are supportive in nature to that particular dimension.

<b>Dimension</b>	<b>Description</b>
<b>Dimension 1 (Delivery)</b>	is 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. It is important to emphasise that institutions can have extremely effective processes operating within this dimension, but in the absence of capability in other dimensions there is risk of failure or unsustainable delivery and wasting resources through needless duplication.
<b>Dimension 2 (Planning)</b>	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.
<b>Dimension 3 (Definition)</b>	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.
<b>Dimension 4 (Management)</b>	is 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 practices of the process are performed by the staff of the institution.
<b>Dimension 5 (Optimisation)</b>	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.

Figure 3: eMM dimensions

<b>Dimension 1: Delivery</b>
Course documentation includes a clear statement of learning objectives.
Learning objectives are linked explicitly throughout learning and assessment activities using consistent language.
Learning objectives are linked explicitly to wider programme or institutional objectives.
Learning objectives support student outcomes beyond the recall of information.
Course workload expectations and assessment tasks are consistent with course learning objectives.
<b>Dimension 2: Planning</b>
Course documentation templates require the clear statement of learning objectives.
Learning objectives guide e-learning design and (re)development decisions regarding content and activities.
Learning objectives guide e-learning design and (re)development decisions regarding technology and pedagogy.
Institutional reviews monitor the linkages between course learning objectives and wider programme or institutional objectives.
Institutional reviews are guided by course learning objectives when assessing course structure, learning design and content.
E-Learning design and (re)development is guided by a researched evidence base of effective learning objectives and associated e-learning activities.
E-learning design and (re)development plans formally link learning objectives to institutional strategic and operational plans.
Staffs are provided with assistance when engaged in e-learning design and (re)development.
<b>Dimension 3: Definition</b>
Institutional policies require that a formal statement of learning objectives is part of all course documentation provided to students.
Teaching staff are provided with support resources (including training, guidelines and examples) on developing learning objectives that address the full range of cognitive outcomes appropriate to the discipline, pedagogical approach and students.
Teaching staff are provided with support resources (including training, guidelines and examples) on using learning objectives to guide e-learning design and (re)development.
Teaching staff are provided with support resources (including training, guidelines and examples) on assessing student achievement of learning objectives.
Institutional e-learning policies are guided by institutional learning objectives for all students.
Staffs are provided with a researched evidence base of effective learning objectives and associated e-learning activities.
<b>Dimension 4: Management</b>
Compliance with policies, standards and guidelines governing the incorporation of learning objectives in e-learning design and development activities is regularly monitored.
A variety of qualitative and quantitative metrics are used to assess student achievement of course learning objectives.
Course learning objectives are regularly monitored to ensure that they address the full range of cognitive outcomes.
Course learning objectives are regularly monitored to ensure that they are effective.
E-learning design and (re)development activities are subject to formal quality assurance reviews at key milestones.
Financial costs and benefits of delivering course learning objectives are regularly monitored.
Feedback collected regularly from students regarding the effectiveness of e-learning activities.
Feedback collected regularly from staff regarding the effectiveness of e-learning activities.
<b>Dimension 5: Optimisation</b>
Information on student achievement of learning objectives guides e-learning design and (re)development.
Institutional learning objectives are guided by learning and teaching strategic plans.

Figure 4: eMM dimensions and practices

### 2.3 Capability Assessment

Lastly, the eMM consists of 4 capability assessments (Figure 5). The capability assessments rate each practice from not being adequate to being fully adequate; where *not adequate* implies that that practice is not being exercised at the institution to *fully adequate* which indicates that the practice is clearly and sustainably addressed (Marshall & Mitchell, 2007). The eMM capability assessments assess each practice in a dimension on the basis of the evidence collected from the institution (Marshall & Mitchell, 2007). The capability assessments determine whether or not the practice is performed; how well it appears to be functioning and how prevalent it appears not to be (Marshall & Mitchell, 2007).





	Fully adequate	This rating indicates that the process outcomes are currently being clearly and sustainably addressed
	Largely adequate	This rating indicates that the practice outcomes are evident
	Partially adequate	This rating indicates that major shortcomings or limitations in practice outcomes are evident
	Not adequate	This rating indicates that there is currently no evidence of the practice occurring in the institutional context

Figure 5: eMM capability assessments

Figure 6 shows an example of a completed assessment for Process L1 and Dimension 1 (Delivery) using capability assessments. From this example it can be concluded that the institution under assessment would be largely adequate in this process in this dimension although the two practices with lower assessments indicate where additional attention could usefully be focused (Marshall & Mitchell, 2007).






<b>L1 Learning objectives guide the design and implementation of courses</b>		
	<b>Assessment</b>	<b>Delivery</b>
	Fully	<b>Course documentation includes a clear statement of learning objectives.</b>
	Largely	<b>Learning objectives are linked explicitly throughout learning and assessment activities using consistent language.</b>
	Largely	Learning objectives are linked explicitly to wider programme or institutional objectives.
	Partially	Learning objectives support student outcomes beyond the recall of information.
	Partially	Course workload expectations and assessment tasks are consistent with course learning objectives.

Figure 6: Example of a completed learning process capability assessment

The Learning process area can be further summarised as indicated in Figure 7. In so doing giving the overall performance of the institution in the process areas and dimensions indicated.

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

Figure 7: Example of a completed capability assessment

In assessing the processes and practices using the capability assessment, the eLearning Maturity Model provides a means by which institutions can assess and compare their capability to sustainably develop, deploy and support eLearning (Marshall & Mitchell, 2007).

## 2.4 Application of the eMM

Over 80 different institutions have assessed their eLearning capability using the eLearning Maturity Model (Marshall, 2013). The eMM has been applied in both tertiary and non-tertiary in several countries around the world including: New Zealand, Australia, the USA and the UK (Marshall, 2010, 2012). Figure 8 shows a sample of the results of eMM capabilities at various universities in the fore mentioned countries. As seen in Figure 8 eMM capability assessment enables comparative capability visualisations. This is however but one use of the model. Results gathered using the eMM can be analysed for a specific institutional or sector capabilities (Beames, Mitchell & Marshall, 2009). This information would be essential for all persons involved with eLearning implementation at middle to top management level in understanding the entirety of their institution's eLearning capability (Beames, Mitchell & Marshall, 2009, p.2). Having this broad perspective allows strategic investment of resources in areas of concern and priority. According to Beames, Mitchell and Marshall (2009) data collected from tools such as the eMM will assist in guiding and focusing continuous improvement and attainment of goals. Marshall (2012) concludes that since the eMM allows for this holistic perspective of organisational systems it will inform, support and capacitate institutional leaders in improving the entire system using systems approach.

	University NZ-A	University NZ-B	University NZ-C	University NZ-D	University NZ-E	University NZ-F	University NZ-G	University UK-A	University UK-B	University USA-A	University AUS-A	University AUS-B
<b>Learning: Processes that directly impact on pedagogical aspects of e-learning</b>												
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 design 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												
<b>Development: Processes surrounding the creation and maintenance of e-learning resources</b>												
D1. Teaching staff are provided with design and development support when engaging in												
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												
<b>Support: Processes surrounding the support and management of e-learning</b>												
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												
S7. E-learning resources are designed and managed to maximise reuse												
<b>Evaluation: Processes surrounding the evaluation and quality control of e-learning through its entire lifecycle</b>												
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												
<b>Organisation: Processes associated with institutional planning and management</b>												
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 strategy 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 pedagogues prior to starting courses												
O8. Students are provided with administrative information prior to starting courses												
O9. E-learning initiatives are guided by institutional strategies and operational plans												

Not practised/not adequate  
 Partially adequate  
 Largely adequate  
 Fully adequate  
 Not assessed

Figure 8: University eMM capabilities (Marshall, 2012, p. 22)

It is important to note that the eMM was conceptualised as a benchmarking framework to guide and support institutions collaborating or working individually on their eLearning capability (Marshall, 2012). Similarly, there is need to clarify that the eMM does this by providing a clear picture of an institutions strengths and weaknesses, combined with a pathway for improving capability. The eMM provides a mechanism for institutions to determine their own priorities while still allowing for sufficient flexibility in the operationalisation of the institutions' eLearning activities (Marshall, 2010). A key aspect of the eMM is that it does not rank institutions, but rather acknowledges the reality that all institutions will have aspects of strength and weakness that can be learnt from and improved (Marshall, 2010).

Marshall (2008) acknowledges the fact that most institutions have existing quality assurance measures in place for all activities including eLearning. The eMM is not meant to replace these but rather complement them. Beames, Mitchell & Marshall (2009) suggest a marrying between current quality assurances systems at an institution with the eMM. The institutions priorities would drive this process. Data gathered using tools such as the eMM informs institutional priority areas thus allowing for a synergetic relationship. Marshall (2013) refers to the eMM as a quality improvement framework. This is attributed to the models inherent design to improve areas of concern while still maintaining identified strengths. The eMM also caters and advocates for collaboration between institutions for the main purpose of sharing best practices from identified strengths through this process. In a nutshell Marshall (2010) concludes that '... the eMM combines key features of benchmarking and capability maturity models with those of observational eLearning quality frameworks in order to create a quality framework for improving eLearning maturity.'

### **3. Methodology**

The methodology for implementing the eLearning Maturity Model at an institution is thoroughly explained in documentation available on the eLearning Maturity Model's website under the Creative Commons Attribution-ShareAlike 2.5 licence. The eMM methodology is comprehensive with detailed documents on process and practice descriptions which include background and research informing the processes and practices (Marshall, 2007). Each of the individual process descriptions includes sources of information providing evidence of capability. This contains lists of questions and potential documents which can be examined when determining institutional capability. Documents that can be analysed include: course outlines, course materials, time figures, assessment task descriptions, evaluation and review documents, course development and project planning documents, development checklists, staff research, staff development and support materials. For the purpose of this study, institutional policies, documents and strategic plans were also consulted.

The assessment workbook as seen in Figure 9 is an excel spreadsheet where all the capability assessments are carried out for each process and practice. The assessment workbook is therefore the mother document that is used to assess an institutions eLearning capability using the eLearning Maturity Model (eMM).

D2 Course development, design and delivery are guided by e-learning procedures and standards		Assessment Notes	Cross-Reference
Assessment	Delivery		
	Teaching staff are provided with e-learning design and (re)development standards.		
<b>Planning</b>			
	Standards and procedures for changing pedagogies guide e-learning design and (re)development.		
	Technical design and development support is formally scheduled during e-learning design and development.		See also D1(2) & S5(2)
	Specialist staff support the use of e-learning design and (re)development procedures.		See also D1(2) & S5(2)
	Formal risk assessments of staff e-learning skills and mitigation planning are required by e-learning design and (re)development.		See also D1(2) & S5(2)
	Formal agreements covering intellectual property ownership are addressed in e-learning design and (re)development procedures.		
<b>Definition</b>			
	Support staff are provided with standards and guidelines covering technical and pedagogical aspects of e-learning design and development.		See also D1(3) & S5(3)
	Teaching staff are provided with support resources (including training, guidelines and examples) for e-learning design and (re)development.		See also D1(3)
	Teaching staff are provided with project tools (including standard contracts and licenses, checklists and quality assurance procedures) for e-learning design and (re)development.		See also D1(3), D3(3), D6(3) & S5(3)
	Teaching staff are provided with support resources (including training, guidelines and examples) on developing e-learning resources that discourage student plagiarism and misuse of intellectual property.		
	Formal allocation of e-learning technical support is addressed in e-learning design and (re)development procedures.		See also D1(3)
	Pedagogical issues are formally addressed in e-learning design and (re)development procedures.		See also D1(3) & S5(3)
	Staff engaged in e-learning design and (re)development are provided with a researched evidence base of e-learning initiatives.		See also L6(3), L7(3), D1(3), D3(3), D7(3), S5(3), S6(3), O1(3), O3(3), O4(3), O5(3) & O9(3)
	Staff technical support requirements are formally addressed in e-learning design and (re)development procedures.		See also D1(3), S5(3) & S6(3)

Figure 9: Assessment workbook

In conducting this study, the assessment workbook was distributed to four (4) individuals directly involved in eLearning activities at the Polytechnic of Namibia. Participants who completed the assessment workbook are referred to as assessors. In addition to the four assessors involved in eLearning activities, assessors from the administrative support and library services were invited to complete the specific section of the workbook that is directly applicable to their line of work. Documentation as listed above was provided to assist assessors in their consideration of the individual practices listed for the process. Completed assessment workbooks were consolidated into one workbook by averaging out assessment capabilities.

Four (4) assessors were asked to complete assessment workbooks for triangulation purposes. Cohen, Manion and Morrison (2007) define triangulation as the use of multiple assessors to independently gather the same data in the hopes of eliminating bias and subjectivity. This was also a mechanism of ensuring validity and reliability of the results. Marshall (2007) further suggests the addition of extensive notes, a feature available on the workbook, to elucidate processes where necessary. For the purpose of this study, this feature was utilised by assessors to add notes on their perception of the usefulness of the model.

#### 4. Limitations

As this study was an exploratory study, not all stakeholders involved in the implementation of eLearning activities at the Polytechnic of Namibia were involved in this study. Findings of this study are thus not reflective of all eLearning activities taking place at the Polytechnic of Namibia. Additionally, not all assessors completed all the sections of the assessment workbook as some sections were beyond their scope.

## 5. Findings

The findings are subdivided according to each process category.

### 5.1 Learning Process

Figure 9 summarises the results yielded for the learning process category. As evident in Figure 9, most of the processes are either fully or largely adequate in the delivery dimension except for L4 and L10. This implies that processes that directly impact pedagogical aspects of eLearning are generally well operationalised at the institution. There is a need for the institution to however examine staff response times to student communication and ensure that the eLearning courses are designed to support diverse learning styles. These processes are currently not being addressed adequately.

Generally, it was found that only 3 processes were either fully or largely adequate in the planning dimension. A majority of the processes were only partially adequate indicating major shortcomings in the planning of learning processes at the institution. Four processes were found to be largely adequate in the definition dimension implying that only these processes are currently well defined with adequate documented standards, guidelines, templates and policies. The other processes within the definition dimension were only partially adequate in this area indicating a need to develop the mentioned documents. The management and optimisation of processes in the learning process area generally requires attention at the institution as most of the processes were either not or partially adequate in these dimensions except for L3 and L5. These were the only processes that had formal approaches in place to improve their capability.

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

Figure 9: Summary of results for Learning Process category

### 5.2 Development Process

Figure 10 outlines the results received for the Development Process category. As clearly visible in Figure 10, it appears as though the institution is doing fairly well in providing its teaching staff with design, development and support when engaging in eLearning as well

as in using guided eLearning procedures and standards when designing, developing and delivery eLearning courses. These processes however are not being adequately managed or optimised. The institution largely has adequate plans in place for linking eLearning technology, pedagogy and content to be used in all courses, but that's pretty much all they have as these plans are not being adequately delivered, defined, managed or optimised. It is commendable that the institution has put into place fully all the required eLearning infrastructure for reliable, robust and efficient use, but once again, not much else is being done to ensure that this process is accomplished in all other dimensions. The results show that there is a great concern in regards to the integration of eLearning infrastructure using defined standards as well as with the designing and managing of eLearning resources for maximum reuse. These processes are currently just not being addressed by the institution at all.

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

Figure 10: Summary of results for Development Process category

### 5.3 Support Process

Figure 11 summarises the results obtained for the Support Process category. It is obvious that the institution is doing fairly well as far as the delivery of processes surrounding the support and operational management of eLearning. Similarly, most processes are also largely adequate in their planning except in the case of S1 and S2. This implies that the institution requires interventions in providing technical assistance and personal and learning support services when students are engaging in eLearning. With the exception of the provision of library facilities and student enquiries, the results show that most processes do not have well-defined and documented standards and guides which are also not managed or optimised adequately.

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

Figure 11: Summary of results for Support Process category

#### 5.4 Organisation Process

Overall, it is quite evident by looking at Figure 12, that most processes in the Organisation process area are either not or partially adequate in all dimensions at the PoN except for processes O6, O7, O8 and O9 where there are some identified pockets of excellence. The institution seems to be doing well in regards to providing students with administration information before courses commence but the management of this process requires attention. Students are also largely provided with information on eLearning pedagogies prior to commencement of courses but once again the management and optimisation of these processes needs improvement. The results also indicated that eLearning initiatives at the institution are largely guided by institutional strategies and plans, but the planning and management of this process is neglected. Overall however, the institution is not fairing too well in most processes associated with institutional planning and management as evident in the majority of the processes in Figure 10 being either partially or not adequate in all the dimensions.

		Delivery	Planning	Definition	Management	Optimisation
<b>Organisation: Processes associated with institutional planning and management</b>						
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					

Figure 12: Summary of results for Organisation Process category

#### 5.4 Evaluation Process

It is evident from Figure 13 that the processes under the evaluation process category are generally partially or not adequately executed at the PoN with the exception in the delivery of E1 and planning of E2. The institution is doing well in providing students with the opportunity to provide regular feedback on the quality and effectiveness of their learning experience. However, once this feedback is collected, it is not taken any further as the results indicate partial to no follow up in the planning, definition, management or optimisation of the feedback collected. Similarly, it appears as though planning is conducted in ensuring that teachers are able to provide regular feedback on quality and effectiveness of their eLearning experience but this process is not being well executed in its delivery. Furthermore, this process does not have well defined and documented standards and is not properly managed or optimised either. The institution needs to provide regular reviews of the eLearning aspects as this process is only partially addressed and there are hardly any formal approaches in place in improving their capability.

		Delivery	Planning	Definition	Management	Optimisation
<b>Evaluation: Processes surrounding the evaluation and quality control of e-learning through its entire lifecycle</b>						
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					

Figure 13: Summary of results for Evaluation Process category

## 6. Discussion and Conclusion

Marshall & Mitchell (2007) postulated that the eLearning Maturity Model had the ability to provide means by which institutions can assess and compare their capability to sustainably develop, deploy and support eLearning. Findings from this study certainly support this claim. The eLearning Maturity Model was a useful tool in determining areas of strength and areas of weakness in the institution's eLearning activities. In providing a clear picture of the institutions strengths and weaknesses, conclusions can be used as a pathway to improve eLearning capability (Marshall, 2010). A brief summary of the strengths and weaknesses as discovered using the eMM will shared and ways in which they can be used to improve eLearning capability briefly outlined.

The eMM enabled the identification of the following strength's at the PoN:

- delivery of processes that directly impact pedagogical aspects of eLearning
- delivery of eLearning skill development for students
- the delivery of student feedback on their performance within courses
- provision of teaching staff with design, development and support when engaging in eLearning
- using guided eLearning procedures and standards when designing, developing and delivery eLearning courses
- plans in place for linking eLearning technology, pedagogy and content to be used in all courses
- eLearning infrastructure that is reliable is in place
- delivery of processes surrounding the support and operational management of eLearning.
- providing students with administration information before courses start
- provided students with information on eLearning pedagogies prior to commencement of courses
- eLearning initiatives at the institution are guided by institutional strategies
- students are given the opportunity to provide regular feedback on the quality and effectiveness of their learning experience.

With the very few exceptions, the PoN's strengths were marred by the general lack of systems in place to further manage and optimise these processes. The strengths mainly resided in the delivery and planning dimensions of the eMM. This reflects a general lack of maturity in the performance, control and continuous improvement of these processes at the Polytechnic of Namibia.

In addition, the eMM allowed for the identification of the following weaknesses at the institution:

- staff response times to student communication
- eLearning courses are not designed to support diverse learning styles
- the integration of eLearning infrastructure using defined standards
- the design and management of eLearning resources for maximum reuse
- providing technical assistance and personal and learning support services when students are engaging in eLearning.
- eLearning institutional planning and management
- eLearning evaluation processes
- regular reviews of the eLearning aspects

Strengths reflect sustainable practices at an institution. Identifying these is vital if the institution wants to maintain that standard but also share best practices with other institutions whether regionally and internationally. Although the lists above are not exhausted, they do give a glimpse of what is transpiring as far as eLearning activities are concerned at the PoN. In identifying these, the institutions capability to design, plan, initiate, manage and evaluate eLearning activities is being gauged. Looking at Figure 8, it's evident to see that the results obtained are comparable to the results obtained at other higher education institutions around the world where the eMM was applied. The clear and general trend is that most processes are largely adequate in the first three domains; delivery, planning and definition and generally not adequate in the management and optimisation of these processes.

This similarity by no means excuses weaknesses observed, but highlights the crucial areas all higher education institutions should strategically invest their resources in if they are to ensure that eLearning implementation at their institution is maturing. Working in collaboration with institutions performing well in the latter is one way in ensuring continued maturity of eLearning at the institution. The aim of this paper was to explore ways through which maturity models can assist in improving standards and the quality of our eLearning activities and subsequently be utilised to enhance the systematic implementation of eLearning policies. In analysing the findings, I can comfortably support the eMM's capability in achieving this. The findings of this paper allude to the models usefulness. With the eLearning policy revision looming, results obtained from the application of this model is essential in informing that process.

## 7. Recommendations

Although the eLearning Maturity Model was helpful in determining crucial areas of priority as far as eLearning implementation is concerned, there were issues of concern in its usability of which recommendations will be made here. To ensure validity and reliability, 4 assessors were asked to complete separate eMM workbooks. Consolidating results into one consolidated workbook proved challenging as the various workbooks could not be merged into one. This implied having to manually calculate the averages. A rather time consuming process and nearly impossible if more assessors are to be included. A recommendation in this regard would be to develop software with the ability to merge various assessors' workbooks together with formulas that give the average rating for each process.

In hindsight, a simpler alternative would have been to organise a workshop session where all assessors are invited to jointly complete the same workbook after consensus has been reached for the rating of each process.

This was an exploratory study and thus simply piloted the application of the eMM. A follow up study would be valuable in further cementing advocacy for using the eMM in institutions. It is however recommended that this follow up research be a collaborative effort amongst institution to explore the benchmarking aspect of the eMM.

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