E-Learning Capability Maturity Level in Kingdom of Bahrain

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ABSTRACT
Despite the effectiveness of using e-learning, educational institutions are still facing many challenges with the e-learning infrastructure and technical aspects, practices and capabilities, and improvement in learning outcome. Hence, a need for framework to benchmark the e-learning capability maturity level and measure the extent to what it is improving the learning processes and ensure improvements in student learning outcomes is raised. The current research is aim at assessing and identifying the e-learning maturity level of the universities in the Kingdom of Bahrain by adopting the e-learning Maturity Model (e-MM). The current state of e-learning in the Kingdom of Bahrain in terms of the drivers for the using e-learning, the technical challenges faced by the learners and level of satisfaction with the current e-learning systems will be investigated in attempt to consolidate the findings. A self-administrated questionnaire was adopted in which 400 surveys were distributed to the public university (University of Bahrain) and all private universities in Kingdom of Bahrain. The overall eMM figures demonstrate that universities in Kingdom of Bahrain both public and private reached an average level of achievement and performance in e-learning processes and developed reasonable capability maturity level on each dimension of the learning processes.

INTRODUCTION
Recently, e-learning considers as a critical element in the educational system which imposed an innovative shift in the learning environment (Nagarajan and Jiji, 2010). An effective implementation of e-learning can border the educational opportunities and enhance a positive attitude toward the learning process and helps students in developing skills they need for the 21st century (Phillips, et al., 2012). Despite the effectiveness of using e-learning, educational institutions are still facing a challenge with the rising cost of e-learning infrastructure, lack of e-learning practices and capabilities, and level of student achievement and improvement. E-learning should be efficient in utilizing the institute' resources while, effective in adding value to the educational delivering (Marshall and Mitchell, 2002). Thus, e-learning has to be seen as a platform for educating the students and improving the institute productivity and performance. E-learning is a complex system which needs a balance between technical issues like the creation, utilization and support of e-learning facilities and other organizational and pedagogical considerations (Jacobson and Wilensky, 2006). With such complexity assessing the investment of e-learning projects and the extent to what it improved learning outcome is not an easy task. Therefore, there is a need for an overall framework for guiding the adoption of e-learning and improving the learning processes to ensure improvements in student learning outcomes (Marshall and Mitchell, 2002).

E-learning has spread widely among the educational institutions and universities in Kingdom of Bahrain and has become one of the important strategic elements that are used in order to improve students' performance and skills, as well as educational outcomes (Jabli and Qahmash, 2013). Moreover, it has been noticed that most of the universities in Kingdom of Bahrain are adopting blending learning, in which traditional and e-learning are running in parallel; which means extra costs. Therefore, universities in Kingdom of Bahrain need to manage the investment of their e-learning by adopting a framework to assess and evaluate the effectiveness of their e-learning in improving the learning processes and enhancing student learning outcomes. While e-learning have been intensively discussed in the previous research, few studies have tackled the assessment of the capabilities and maturities of e-learning in Kingdom of Bahrain. The purpose of the current research is to assess and identify the e-learning maturity level of the universities in the Kingdom of Bahrain by adopting e-learning Maturity Model (e-MM). In addition, the current state of e-learning in the Kingdom of Bahrain in terms of the drivers for the using e-learning, the technical challenges faced by the learners and level of satisfaction with the current e-learning systems will be investigated in attempt to consolidate the findings. The findings of the research will provide the decision makers and managements at Kingdome of Bahrain and the Arabian Gulf Countries, as they are facing mostly the same situation, with a guideline for assessing their investment in e-learning projects and evaluating their capability maturity level in providing a success learning environment. Knowing the maturity level will helps in understanding the institution's strengths and points of improvement in the different learning

processes starting from that directly impact the pedagogical aspects of e-learning to that associated with the institutional planning and management. In turn, this critical information can be used at the executive level to plan for the next step for improving the e-learning projects and progress to a higher level of maturity to maintain a sustainable e-learning success.
The current paper is articulated into six sections including the introduction. Discussions on the E-learning in Kingdom of Bahrain and the e-MM were presented in Section 2 and Section 3, respectively. Section 4 talks over the research methodology and data collection. Section 5 presents the results of the research. The paper then concludes with Section 6.

E-LEARNING IN THE KINGDOM OF BAHRAIN

The Ministry of Education (MOE) in Kingdom of Bahrain is paying supplementary attention to the investment in learning process and infrastructure. The education system in Kingdom of Bahrain has started in 1919 by opening the first school for boys and in 1928 for girls. Later in 1930 schools in the country became more organized and managed by the government. With the development in the country, three higher education institutions have been opened in Kingdom of Bahrain, University of Bahrain with five colleges in 1986, Arabian Gulf University by Gulf Countries Cooperation Council (GCC) and the College of Health and Science in 1979 which provide specialized programs like general nursing, laboratory studies, radiography, pharmacy, and sport therapy (Shaker, 2000).

Bahraini government has strengthened efforts in the education field, as education minister Dr. Majed bin Ali Al Nuaimi (the minister of the ministry of Education) has mention in the 36th General Conference of (UNESCO) that Bahrain have successfully implement e-learning through the pioneering King Hamad Schools of the Future Project and recently some curricular has been switch to electronic lessons with collaboration (UNESCO). In the same content, the minister states that King Hamad Prize for the Use of Information and Communication Technologies in education has great impact in engaging numbers of researchers and encourage innovation in that field (Rafique, 2011). Kingdom of Bahrain is one of many Arab countries that adopted the online learning access tools in parallel with traditional teaching (Al-Musawi, 2014). With this new learning trend, most of the higher institutions have pursued the e-learning to enhance the learning and teaching outcomes. For instant, University of Bahrain-UOB play major role in shaping the students behavior toward using new techniques for getting knowledge. In such situation, instructors encourage students to use online materials and exchange ideas with their colleague which in turn leads to enhance the learning outcomes. The latest statistics in 2008 shows that 4800 students are using the e-learning in UOB that is include simple interaction through emails to Blackboard tools. ZAIN E-learning Center was open on 2004 to arrange e-learning foundation and boundaries; in associate with the center Wi-Fi access is available to all students and instructors to provide easy access anywhere any time. University of Bahrain always search for new trends in information technology that could improve the level of learning efficiency and effectiveness by using social networks and other collaboration tools to find the best ways through the available resources (Al-Ammary, 2012). On the other hand, Arab Open University (AOU) had a successful experience on adopting hybrid e-learning model (Mirza and Al-Abdulkareem, 2011). Mohammed (2010) has conducted a SOWT analysis over four universities includes: ASU, DELMON, AL-AHLIA and RUW. The study aimed at measuring students' altitude toward adopting e-learning and the ability of the academic staff in term of their technical knowledge and experience. The finding revealed that e-learning has a vital impact on enhancing the students learning and skills, increasing the level of communication and collaboration between peers and instructors, and imposing a positive attitude toward the learning process.

E-LEARNING MATURITY MODEL EMM

In most educational institutions, many decision makers and strategic planners are facing problems in evaluating and assessing the quality of e-learning projects. Evaluating such projects is not an easy task as it necessitates a balance between technical and learning process consideration (Marshall, 2010). E-learning is a strategic project that is adopted to impact the organization performance, improving the educational outcomes and enhance the students and users skills (Iskander and Daflous, 2013) not to operate just as an enabler for such impact. Therefore, education institutes need to adopt frameworks encompasses all aspect of e-learning or benchmarking process to be able to identify their projects' strengths and points of improvement (Petch et al 2007, Iskander and Daflous, 2013). Consequently, the need for a capability maturity model for e-learning has been raised. Using such model will increase the effectiveness of e-leaning and guarantee the desired learning outcomes [15]. Moreover, Marshall and Mitchell and Mitchell (2004) states that the lack of maturity framework for e-learning makes the comparison between educational institutions harder for planner. When such framework adopted, institutions will be able to compare and improve their learning processes (Penicina, 2011). The assessing e-learning using such framework provide guidelines for improving learning usability, reducing number of failure projects, and maintaining workflows process to assessment quality issues (Penicina, 2011). Petch et al. (2007) state that with well design framework numbers of educational issues can be declare and examined.

Previous literatures revealed that different models are available to measure the capability maturity model such as Capability Maturity Model (CMM). CMM proposed by the software engineering institution (SEI, 2004) is concerned on the problems that are related to the capacity of organizations to manage software development processes. The CMM for software characterizes a mature and capable software process. This model is currently applied to a number of industry sectors (Griffiths, 2005). This model consists of five stages for judging the maturity of software development processes of the institution (Marshall and Mitchell, 2002)b. Another model adopted to assess the capability level is the SPICE (Software Process Improvement and Capability Determination) which is a joint effort by the international standard for software process assessment, adds the approach for organizing the e-learning provision practices and processes into process areas (Griffiths, 2005). The main aim of these models is to provide the organization with a continuous development and improvement plan (Paulk et al., 1993). However, CMM and SPICE are not suitable for assessing the educational capability to engage in high quality processes that are able to re-create, extend and sustain with the development of the institute. Such assessment is essential for measuring the effectiveness of the institute in any particular area of works (Kaur, 2014). Therefore, the eMM (e-learning Maturity Model) was created by Stephen Marshall in 2004 by combining both CMM and SPICE (Petch et al. 2006). Combing CMM and SPICE as a basis for eMM provides the educational institute with a method or technique for improving process capability and assess their ability to perform their key learning process (Mitchell and Mitchell, 2004). This model targets the capability of institute to make sure that the design and implementation of the e-learning meet the stakeholder's vision and the overall desired outcomes. eMM measures the process maturity from multiple facets and assessing capability within each aspect (Marshall and Mitchell, 2004; Petch et al. 2006). eMM is distinguished by providing an identification of five categories of learning processes that is strongly connected to e-learning (Marshall and Mitchell, 2002)a. In step to further analysis of the concept Marshall take less resource to establish a primly set of practice for easer benchmarking (Marshall and Mitchell, 2002)b.

Within the eMM model the capability of institution is divided into five major categories or learning areas which replace the customer/supplier areas used in software engineering in SPICE model see Table (1). The learning areas are further divided into a set of thirty-five learning processes. These learning processes targets and affects the characteristic and the design of e-learning, as well as the execution of the delivered courses. Each process is selected on the basis of its necessity in the development and maintenance of capability in e-learning (Petch et al, 2007) which give the power to control the platforms and improve it in high standard and ensure the proper use of technology in the content of these courses (Zhou, 2012). The learning areas are used to measure the maturity of the e-learning.

Table 1.E-learning Maturity Model processes categories/Areas: source:Marshall and Mitchal (2002)a

E-learning Maturity Model: learning areas	
Process Category/area	**Brief Description**
Learning	Processes that directly impact on pedagogical aspects of e-learning
Development	Processes surrounding the creation and maintenance of e-learning resources
Coordination	Processes surrounding the oversight and management of e-learning
Evaluation	Processes surrounding the evaluation and quality control of e-learning through its entire lifecycle
Organization	Processes associated with institutional planning and management

It has been noticed that most of the maturity models are based on measuring the progressive levels which implies a hierarchical model. With such structured model the capability is assessed and builds in a layered way (Marshall and Mitchell, 2002)a. Instead, eMM describes the capability of the processes from "synergistic perspectives". As such the institutes will be measured based on the extent to what it develop capability on each dimensions of the learning processes. As such, the institute will not deliver the desired outcomes, if the capability at the higher dimensions is not supported by capability at the lower dimensions.

Table 2.E-learning Maturity Dimensions: source: (Marshall and Mitchal, 2002)a

E-learning Maturity Model: Dimensions	
Dimension	**Focus**
5: Optimization	Continual improvement in all aspects of the e-learning processes
4: Managing	Ensuring the quality of both the e-learning resources and student learning outcomes
3: Definition	Defined process for development and support of e-learning
2: Planning	Clear and measurable objectives for e-learning projects
1: Delivery	Ad-hoc processes

Conversely, the institute will be ad-hoc, unsustainable and unresponsive to the institution changes and learner needs if the capability at the lower dimensions is not supported by the capability at the higher dimensions. The dimensions of the learning process are starting by the delivery at the lower level to optimization at the higher level as shown in Table (1). The first dimension (delivery) measures the formulation of the process feedback and the definition of the level to which the operation is known and realize across institution (Paulk, 1993). The second dimension of maturity is the planning, in which there is a link between well-defined goals and objectives and the validation of the learning process. Such association makes managing the process more effective and efficient and reproduced if successful (Kwak, 2002). The third dimension is the definition, in which predefined standers, polices and producers are used as well as a well-defined and structured process that should be work to produce desire outcome (Reitzig, 2003). The fourth dimension (managing) concerned about the overall control and management of the process implementation and the guarantees of the quality of the outcomes (Grottke, 2001). The last dimension is the optimization which is concerned about the extent to what capability measurement within other dimensions of the learning process is improved by using formal and systematical approach (Paulk, 1993).

RESEARCH METHODOLOGY AND DATA COLLECTION

The data sample of the current research is consisted of the users of e-learning systems (instructors) from all universities in Kingdom of Bahrain both private and public universities. Therefore, a stratified sampling was used in which two groups were identified public and private universities. In Kingdom of Bahrain there is only one main public university which UOB, while there are around ten private universities. Therefore, the first group consists of UOB only, while private universities consist of Arab Open University (AOU), Royal University for Women (RUW), Ahlia University (AU), The Kingdom University (KU), Applied Sciences University (ASU), Arabia Gulf University (AGU), Bahrain Polytechnic (BPT) and Royal College of Surgeons in Ireland (RCSI). The total population for instructors in each university has identified. Further, random samples were selected from each strata of the population as shown in Table (3).

Table 3.Sample size and sample distribution

	Public University	Private Universities									
	UOB	AOU	RUW	AU	KU	ASU	AGU	RCSI	BPT	AMA	Total Private
Population	880	25	32	120	28	65	58	39	86	62	515
Sample size	252	7	9	34	8	19	17	11	25	18	148

A total of four hundred (252 + 148) questionnaires were distributed to the instructors based on the sampling structure using both face-to-face and online survey. Only two hundred and fifty completed questionnaires were returned. The survey instrument provides a response rate of 62.5% which can be considered as high rate bearing in mind that many instructors, either from public or private universities, refused to answer the questionnaire either because they were very busy or they were not interested. Moreover, private universities like ASU and RCSI refused to distribute the questionnaires due to some regulation and policies. The survey instruments were developed by adopting the measurement proposed by Marshall and Mitchell [3]. As such measurements for capability of the university over 35 processes grouped into five major categories or process areas were developed, each process is dived in each dimension into practices as shown in Figure (1). Then each practice is assessed for each process for performance from (Not practiced/not adequate) to (fully adequate) as shown in Figure (1).

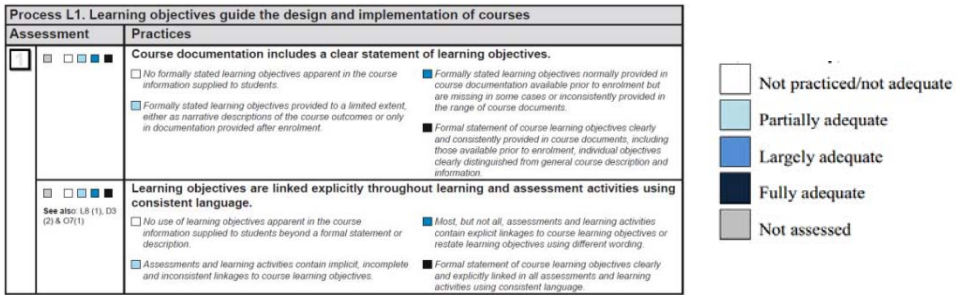


Figure 1.method for analyzing the E-learning Maturity Model, source: Marshall and Mitchell, 2004

DATA ANALYSIS AND RESULTS

THE CURRENT SITUATION REGARDING THE E-LEARNING IN THE HIGHER EDUCATIONAL INSTITUTIONS IN KINGDOM OF BAHRAIN

The following section presents results on the current situation regarding the e-learning in the universities in Kingdom of Bahrain. The current situation on e-learning was investigated from the usage, drivers, challenges and users' satisfaction of the e-learning. Table 4 presents results on the e-learning systems adopted by the universities in Kingdom of Bahrain. The results demonstrate that Moodle is the most LMS (Learning Management Systems) adopted by the universities. Moreover, it can be noticed from the results that most of the universities – both public and private are adopting different LMSs. For instance, most of the academic staff in UOB is using Blackboard (72%) and Moodle (55%). However, RUW and AGU are adopting WebCT, Moodle and Blackboard as e-learning systems in the university.

Table 4.E-learning systems adopted by universities in Kingdom of Bahrain

LMS used for e-learning	WebCT	Moodle	Blackboard	Others LMS
AGU	2%	**11%**	8%	0%
AMA	0%	**10%**	2%	0%
AOU	3%	1%	0%	2%
AU	0%	**19%**	7%	9%
KU	0%	2%	4%	0%
BPT	0%	9%	7%	1%
RUW	4%	**20%**	6%	2%
UOB	15%	**55%**	**72%**	14%

Table 5 presents results on the drivers for adopting e-learning by the universities. The results demonstrate that, providing independent location and time for learning and ubiquity of end-user-computing are the main drivers for adopting e-learning in UOB (91% and 86% respectively). However, no common driver for adopting e-learning in the private universities can be identified from the results. As such, different drivers were identified for each university such as improving collaboration and interactivity and higher retention of content through personalization learning. Results on the technical challenges (software, hardware, network or skills) that are facing users with e-learning in the universities are presented in Table 6. It can be observed that most of the universities are facing many technical problems with their e-learning systems. In average, rapid change in the technology, inconsistency in the platforms, tools and software, and network access/usage problems are the main technical challenges faced by the universities (84%, 75% and 74% respectively).

Table 5.Drivers for adopting e-leraning

Technical challenges facing users with e-learning	UOB	AGU	AMA	AOU	AU	KU	Polytechnic	KUW	Average
Network Access/usage problems	91%	67%	92%	0%	92%	67%	83%	100%	74%
System errors and bugs	85%	67%	75%	0%	75%	83%	91%	100%	72%
Network/software crashes during classes	84%	83%	83%	0%	83%	67%	87%	86%	72%
Instructors need to be updated with the new technology	82%	75%	100%	75%	79%	67%	96%	100%	84%
Inconsistent of the platforms, tools, and software	72%	92%	92%	0%	92%	83%	100%	71%	75%
lack of technology knowledge	56%	83%	75%	0%	75%	67%	87%	71%	64%
lack of confidence to use technology in teaching	70%	83%	75%	0%	83%	67%	57%	71%	63%
lack of knowledge to design courses with technology	65%	83%	83%	25%	83%	67%	96%	71%	72%

Table 6.Tehnical challenges facing e-learning users

Driver for e-learning	UOB	AGU	AMA	AOU	AU	KU	Polytechnic	KUW	Average
Reduced cost	39%	83%	92%	100%	88%	83%	91%	71%	81%
Higher retention of content through personalized learning	48%	75%	100%	0%	100%	67%	70%	100%	70%
Improved collaboration and interactivity	73%	83%	100%	0%	92%	100%	91%	57%	75%
Borderless education	66%	67%	100%	0%	83%	83%	100%	100%	75%
Location and time independence	91%	92%	100%	0%	88%	100%	96%	100%	83%
Ubiquity of end-user computing	86%	83%	83%	0%	88%	83%	96%	57%	72%
Convenience and lifestyle	74%	83%	100%	75%	96%	100%	78%	71%	85%
It is a vehicle for community outreach	76%	75%	92%	75%	79%	100%	91%	71%	82%

Finally, Table 7 present results on the extent to what academic staffs are satisfy with the e-learning. The results reveal that although more than 60% of UOB staffs feels that the e-learning is useful and ease of use (67% and 65%), most of them are not satisfied with the e-learning.. However, private universities show a high level of satisfaction. In general, the average of users' satisfaction in all universities is low.

Table 7.E-learning user satisfaction

User satisfaction with e-learning	UOB	AGU	AMA	AOU	AU	KU	Polytechnic	KUW	Average
The overall usefulness of technology used in classes	65%	75%	75%	100%	75%	83%	74%	86%	79%
The quality of technical support provided	40%	75%	75%	75%	79%	83%	65%	57%	69%
The confidence of the stability and reliability of the online class	40%	58%	67%	75%	58%	67%	83%	71%	65%
The ease of use of technology used in class	67%	50%	58%	75%	46%	67%	96%	71%	66%
The quality of the technology used in class	28%	58%	58%	100%	54%	83%	91%	71%	68%
The necessary ICT infrastructure	33%	75%	83%	100%	83%	100%	78%	71%	78%
Quality of the internet access in the institute	42%	67%	67%	100%	67%	100%	83%	86%	76%

EMM ANALYSIS

The eMM was analyzed based on the method discussed in the methodology. For each response on each practices of each process area, a color was chosen (White=Not practiced\ not adequate Blue= partially adequate Dark Blue=largely adequate Black=fully adequate Grey=Not assessed). Based on this analysis two types of results were presented.

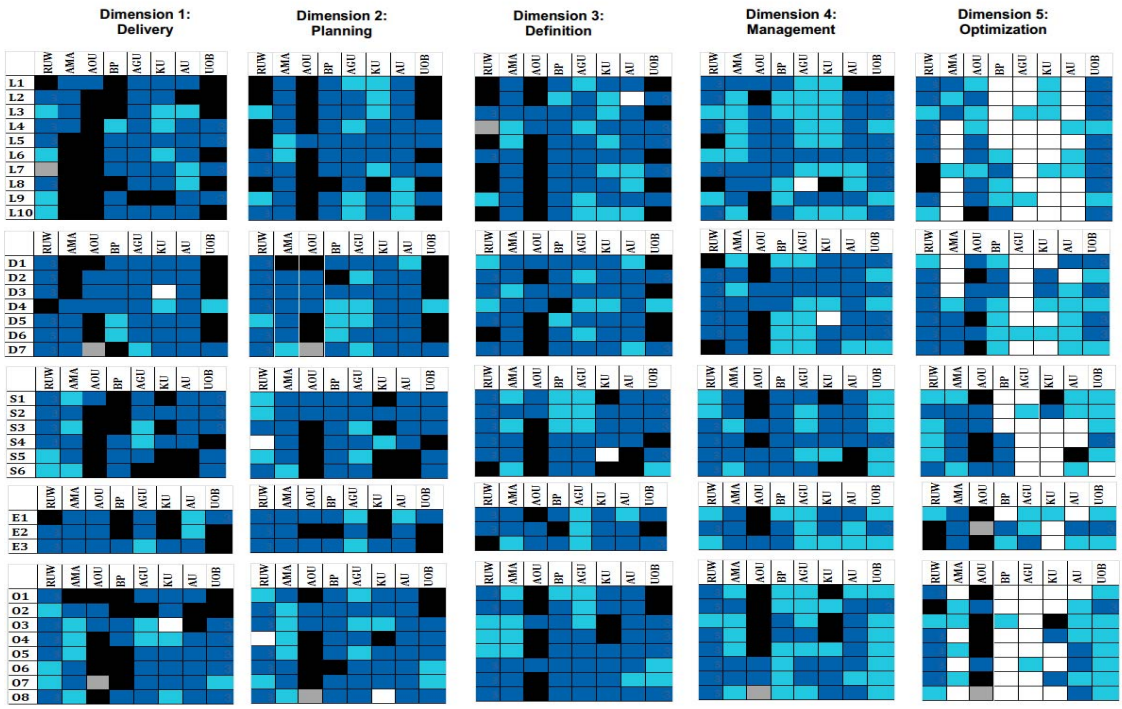


Figure 8: eMM assessment of learning process the universities in Kingdom of Bahrainin arranged by dimension

Table 8: eMM assessment of learning process the universities in Kingdom of Bahrainin arranged by universities

Universities	E-learning Learning Areas				
	Learning	Development	Support	Evaluation	Organization
UOB	D, P, DF, M,O	D, P, DF	D, P, DF	D, P, DF	D, P, DF
AOU	D, P, DF, M	D, P, DF, M, O	D, P, DF, M, O	D, P, DF, M, O	D, P, DF, M, O
RUW	P, D, M, O	D, P, M, O	D, D, M	D, P, O	D, P, DF, M, O
AU	D, P, M	D, P, DF, M	D, P, DF, M	P	D, P, DF, M
KU	D	D, P, DF, M	D, P, DF, M	D, P, DF	D, P, DF, M
AGU	D, P	D	D, P	-	D, P, DF
BP	D, P, DF	D, DF	D, P, M	D, P, DF	D, P, DF
AMA	D, P, DF	D, P	P, M, O	D, P, M, O	-

(Note: D: Delivery, P: Planning, DF, definition, M: Management, O: Organization)

The first type of results present a detail description on the performance of the universities in each process area with each maturity dimensions as shown in Figure 2. On the other hand, results on the overall view of the e-learning performance and maturity level of each university are presented in Table 8. The results illustrate how each university is performing in each learning areas and which dimension of maturity have they achieved in their e-learning. In general the results show that all universities in Kingdom of Bahrain are performing the learning, development and organization processes very well with evidence shown by fully adequate and strong capability of delivery, planning, definition, and management dimensions. However, only AOU, AU, and KU are performing well in support process with evidence shown by fully adequate and strong capability of delivery, planning, definition, and management dimensions. On the other hand, the universities are not doing well in the evaluation processes as some of them shown fully adequate and strong capability just in delivery, planning and management as shown in Figure (2) and Table (8).

DISCUSSION AND CONCLUSION

In the following section the significance of the results will be discussed and synthesized in a final conclusion. To achieve that, the results on current situation on the adoption of the e-learning were discussed and presented to

identify indications on the performance and learners' satisfaction of the e-learning. These results will be used to compare with the results on the eMM assessment of the capability maturity level to get a holistic view on the e-learning performance in the Kingdom of Bahrain.

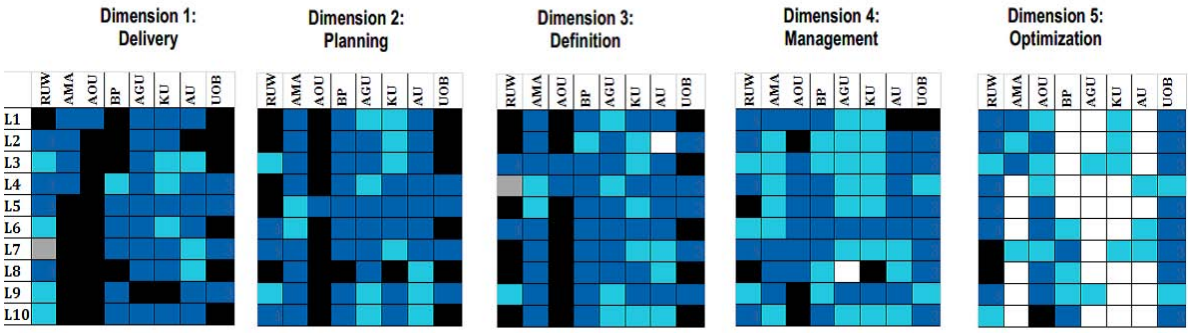
The results have identified several significant and interest findings on the current situation regarding the adoption of e-learning by the universities at Kingdom of the Bahrain. The result indicates that e-learning is essential tools for teaching in the universities. This can be revealed from the different systems that are adopted for the e-learning. The results demonstrate that most of the universities are adopting Blackboard, while the other is adopting WebCT and Moodle. Universities such as UOB, AMA, AU, KU, PB and RUW are adopting Blackboard, WebCT or Moodle, however, AOU are adopting Moodle only. In addition, some private universities are using their own system. For instance, Ahlia University is using the ADREG system and self-service system was adopted by ROW. Adopting more than one system for e-learning indicate that universities are paying high priorities for e-learning and try to encourage both students and instructors to use the e-learning by offering them different systems to satisfy their experience and knowledge. Unfortunately, the results show that the main purpose for using e-learning in most universities are uploading and downloading which considered as the basic services provided by most of the e-learning platforms. While using e-learning for the communication with instructors or students identified as minor purpose for adopting e-learning. The results can be attributed to many reasons. Students may prefer to use informal communication media like social media (WhatsApp, Facebook or Instagram) which is more ease to access and use. Moreover, monitoring students' performance is difficult in the blended learning environment. In such universities, students are assessed in the classes using the traditional assessment techniques as the available online monitoring and assessment techniques are perceived less secured.
Moreover, the results has identified a significant figures on the opinion of the academic staff on the drivers, challenges of the e-learning systems adopted in their universities as well as their satisfaction. Three main drivers for adopting e-learning were identifying which includes "convenience and lifestyle", "location and time independence", and "e-learning is a vehicle for community outreach". Regarding the challenge faced by the users of e-learning, it has been notice that most of the universities are facing challenges with their systems specially UOB, AGU and AU. The top challenges for instructors are relating to the network and technology infrastructures stability and reliability include the network Access/usage problems, system errors and bugs and network/software crashes during classes. The results indicate that academic staffs are ready in term of knowledge and skills to participate in e-learning. However, they are not provided with the robust and reliable tools and platforms. This confirmed the results that most of the respondents were agreed on that they are facing a challenge with the "Inconsistent of the platforms, tools, and software". These findings provide the decision makers and planners with some points of improvement for their e-learning system and environment. Finally, the results show that an average of 70% of the e-learning users from the different universities is satisfied with their e-learning systems. However, just 50% of the e-learning users at UOB are satisfied. This dissatisfaction rose mostly from the quality of the Internet access and technology used in classes as well as the quality of the ICT infrastructure in UOB. On the other hand, users in RUW, KU and BP showed a high satisfaction with their e-learning especially in term of the quality of technology used and Internet access. The results reflect what has been observed during distributing questionnaires, the classes were provided with advance technology like smart boards and others educational technology adopted to support the e-learning. Universities include AU, AOU and AGU have shown a moderate satisfaction regarding their e-learning systems. The aforementioned findings revealed that the e-learning in the universities in Kingdom of Bahrain are suffering from several problems. The drivers for adopting e-learning are not strategic and not aligned with the university objectives. Besides, there are many technical problems and challenges with their systems starting with e-learning infrastructure to Internet access. Furthermore, there is a degree of dissatisfaction with e-learning systems. The following findings can be used to predict the eMM level for the universities as it reflects the e-learning performance and the effectiveness of these universities.

The following paragraphs discusses the assessment of e-learning capability undertaking in the universities at Kingdom of Bahrain using the eMM (Marshall, 2007) in order to exemplify how the assessment are envisage and how this data can be used to assess the strengths and points of improvement of each university. Based on Figure (8) and Table (8) which summarizes the outcome of the assessments of learning category; the following analyses were adopted. For each learning category a detail discussion will be presented as follow:

Learning area: Learning
Delivery dimension: Some universities such as: AMA, AOU and UOB were assessed as having strong ability in the learning category showing fully adequate ability in most processes. Thus, AMA and AOU have the possibility to students to get views on their performance, providing their students with a support for the research development, as well as the possibility of students to determine timetables and delivery time. Moreover, courses in these universities are designed to support diverse learning styles and learner capabilities. UOB on the other

hand, has clear learning objectives and providing their students with mechanisms for interaction with instructors. RUW, KU, AGU and AU are not performing the learning process well (largely to partially adequate rating for delivery dimension) with no assessment on the learning designs and activities actively to engage students.

Universities	UOB	AOU	RUW	AU	KU	AGU	BP	AMA
Learning	D, P, DF, M,O	D, P, DF, M	P, D, M, O	D, P, M	D	D, P	D, P, DF	D, P, DF



Planning dimension: AMA, AOU and UOB are mostly performing the learning process very well with evidence shown by the fully adequate rating of the planning dimension. The objectives of the learning have the ability to guide the design and the implementation of the courses. In addition, the students are provided with mechanisms in order to interact with colleagues or with the academic stuff. BP is performing all planning processes well (largely adequate rating) except L8 that performing this process very well (fully adequate rating). AGU, KU and AU are not performing the learning process well with evidence shown of the partially adequate of the planning dimension.

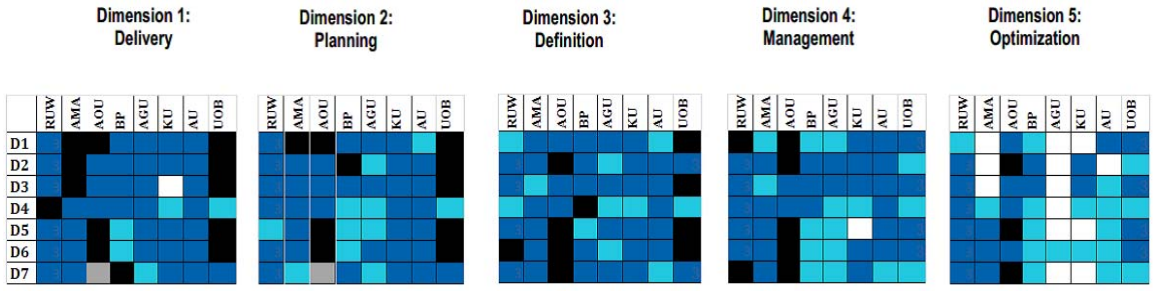
Definition dimension: RUW, AOU and to some extent UOB are performing the learning process very well than other universities (largely to fully adequate rating of the definition dimension). RUW perform less in providing the students with expected staff response time. AMA and PB and AGU are mostly performing the learning process well with evidence shown by the largely adequate of the definition dimension.

Management dimension: AOU, BP, AU and UOB are performing the learning process well with evidence shown by the largely adequate of the management dimension. AMA, KU and AGU universities are significantly less capable in learning process with evidences shown by the partially adequate of the management dimension, with the absence of design assessment to build student qualification and competences (L8) in AGU.

Optimization dimension: RUW and to some extent UOB are more able in the learning process in optimization dimension than other universities with evidence shown by the partially adequate rating of the optimization dimension. AMA, AGU, KU, BP and AU are showed absence in most learning process of the optimization dimension.

Learning area: Development
Delivery dimension: RUW showed fully adequate only in (D4) in which courses are designed to support disabled students. AMA, AOU and UOB are mostly perform development process with evident shown fully adequate for AMA in (D1 to D3), AOU in (D1), (D5) and (D6) and UOB in (D1), (D2), (D3) and (D5), (D6). UOB IS performing the development, creation and maintenance of e-learning resources very well. That is reflecting high level of development and maintenance of e-learning resources. Nevertheless, BP, AGU and KU and AU universities are shown largely adequate in most of the development process.

Universities	UOB	AOU	RUW	AU	KU	AGU	BP	AMA
Development	D, P, DF	D, P, DF, M, O	D, P, M, O	D, P, DF, M	D, P, DF, M	D	D, DF	D, P



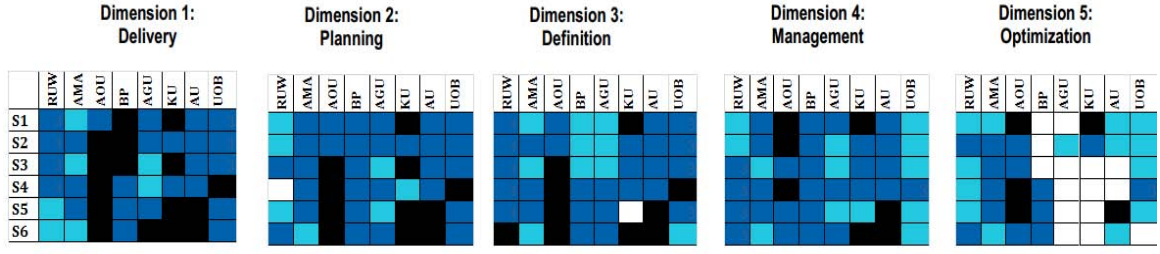
Planning dimension: UOB are mostly performing the development process well with evidence shown by the fully adequate of the planning dimension except in designing courses to support the disable students and the management of e-learning resources to maximize reuse. RUW, AMA, KU, and AU universities are performing the development process very well (partially to largely adequate rating of planning dimension). AOU on the other hand, showed fully adequate in providing reliable, robust, and integrate e-learning infrastructure in addition to support the teaching staff engage in e-learning. However, BP and AGU universities are mostly not performing the development process well with evidence shown by the partially adequate of some of planning dimension.
Definition dimension: the results show that AOU and UOB universities are the most universities performed well in in this dimension. As such AOU shown fully adequate in (D3), (D4), (D5) and (D6) while UOB shown fully adequate in (D2), (D5), (D6) and (D7). Both universities are significantly doing well in providing a reliable, robust and integrated infrastructure. Other universities such as MA, BP, AGU, KU and AU are performing the definition process well with evidences shown by the largely adequate in most of the variables in development dimension.

Management dimension: RUW and AOU are performing development process well as evidences shown by largely to fully adequate in management level. Other universities such as AMA, KU, AU, and UOB are performing the development process to certain extent as evidences shown by the partially to largely adequate of the management dimension. However, BP and AGU are not performing the development well with evidence shown by partially adequate in most processes of the management dimension.

Optimization dimension: AOU and RUW are the only universities that are mostly performing the development process very well with evidence shown by the fully and largely adequate rating of the development dimension. Other universities include AMA, BP, KU, AU, UOB, and especially AGU showed absence in performing the development process with evidences showed not adequate to partially rating for optimization.

Learning area: support
Delivery dimension: AOU and KU are mostly performing the support process very well with evidence shown by the fully adequate rating of the delivery dimension. RUW, AU and UOB are mostly performing the support process well with evidence shown by the largely adequate of the delivery dimension. AMA university was assessed as having largely to partially adequate capability in the support category in most processes, while BP University was assessed as having largely to fully adequate capability in the learning category in most processes. AGU is performing very well the support process with evidence of fully adequate rating for the delivery dimension as the teaching staff are provided with technical supports and performing the support process well (partially to largely adequate rating of the rest delivery dimension processes).

Universities	UOB	AOU	RUW	AU	KU	AGU	BP	AMA
Support	D, P, DF	D, P, DF, M, O	D, D, M	D, P, DF, M	D, P, DF, M	D, P	D, P, M	P, M, O



Planning dimension: AOU, KU and to some extent AU are mostly performing the support process very well with evidence shown by the fully adequate rating of the planning dimension. PB, AMA and UOB are performing the support process well with evidence shown by the largely adequate of the planning dimension. KUW and AGU were assessed as having partially to largely adequate ability in the support category in most processes with the observation that KUW is showed absence in providing the students with learning supports services (S4).

Definition dimension: KU, AOU and AU are mostly performing the support process very well with evidence shown by largely to fully adequate rating of the definition dimension. However, KU University is suffering from the absence of providing the academic stuff with E-learning pedagogical support (S5). RUW and UOB are performing the support process well with evidence shown by the largely adequate of the definition dimension. AMA, BP and AGU are not performing the support process well (partially to largely adequate rating of the definition dimension processes).

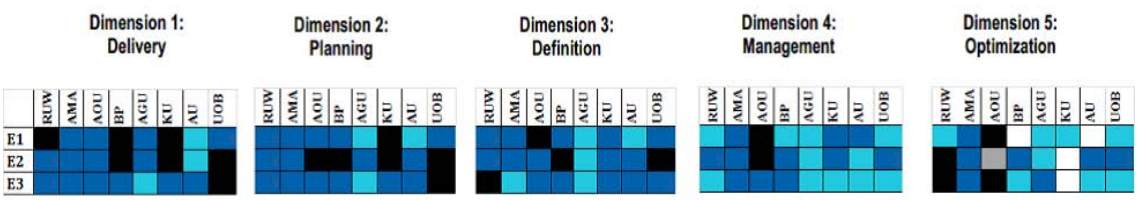
Management dimension: AU, AOU and KU are performing the support process very well than other universities for the management dimension. PB is performing all the support process well with evidence shown by the largely adequate of the management dimension. AGU and RUW was assessed as having partially to largely adequate capability in the support category in most processes, while the UOB is not performing the support process well (partially adequate rating for management dimension).

Optimization dimension: AOU and AMA are more able in support process in this dimension (optimization) than other universities with evidence shown by fully to largely adequate rating for AOU and partially to largely adequate rating for AMA thus the support process is mostly performed well. RUW and UOB are not performing the support process well (largely to largely adequate rating of the optimization dimension processes), as the (UOB) does not providing the academic stuff with technical supports while using the digital information. BP universities are significantly less able in the support process with evidence shown by the partially adequate rating for (S4, S5 and S6) and absence in the other optimization dimension processes. KU and AGU shows absence in the support process (not adequate rating for the optimization dimension) in most support processes.

Learning area: evaluation
Delivery dimension: AOU, KU and UOB are mostly performing the support process very well with evidence shown by the fully adequate rating of the delivery dimension. RUW, AMA and AOU are mostly performing the support process well with evidence shown by the largely adequate of the delivery dimension. In AMA university was assessed as having largely to partially adequate capability in the evaluation category in most processes, while BP University was assessed as having largely to fully adequate capability in the learning category in most processes. AGU is performing very well the support process with evidence of fully adequate rating for the delivery dimension as the teaching staff are provided with technical supports and performing the support process well (partially to largely adequate rating of the rest delivery dimension processes).

Planning dimension: UOB, KU, AOU and BP are mostly performing the evaluation process very well with evidence shown by the largely to fully adequate rating of the planning dimension. AMA and RUW are performing the evaluation process well with evidence shown by the largely adequate of the planning dimension. AU and AGU were assessed as having partially to largely adequate ability in the evaluation category in most processes with the observation that AGU is showed absence in providing the students with learning supports services (E1 and E3).

Universities	UOB	AOU	RUW	AU	KU	AGU	BP	AMA
Evaluation	D, P, DF	D, P, DF, M, O	D, P, O	P	D, P, DF	-	D, P, DF	D, P, M, O



Definition dimension: RUW, AOU, BP, UOB and KU are mostly performing the evaluation process very well with evidence shown by the Largely to fully adequate rating of the definition dimension except KU with evidence shown all largely rating in all definition process. AU and AMA universities are not performing the

support process well (partially to largely adequate rating of the definition dimension processes). AGU on the other hand is not performing evaluation process well (partially adequate rating of the definition dimension processes).

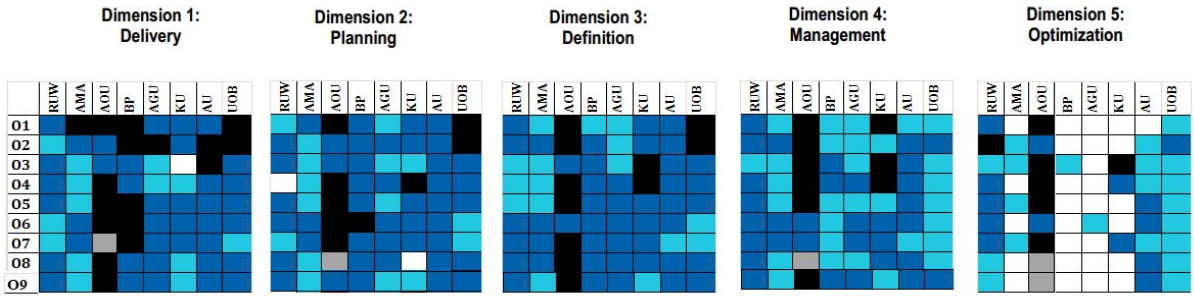
Management dimension: among the participated universities, only AU, and AMA are performing the evaluation process very for the management dimension with evidences shown by largely to fully adequate rating in AU and all largely rating in AMA for management dimension. Other universities were assessed as having partially to largely adequate capability in the evaluation category in most processes, while the AGU is not performing the evaluation process well (partially adequate rating for management dimension).

Optimization dimension: RUW, AOU and AMA are more capable in this learning process the dimension of optimization than other universities with evidences shown by largely to fully adequate for RUW and AOU and all largely adequate in AMA. However, in AOU the ability of the teaching staff to provide feedback on quality and effectiveness of their learning experience was not assessed. AGU and UOB not performing the evaluation process well (partially to largely adequate rating of the optimization dimension). However, BP and AU and BP universities are significantly less able in the evaluation process with evidence shown by the partially adequate rating in many of the process. In addition, BP and AU show an absence in E1 (students are not able to provide feedback on the quality and effectiveness of their e-learning experience). However, in KU evidences shown an absence of assessments for E2 and E3.

Learning area: Optimization
Delivery dimension: AOU and BP are mostly performing in organization process with evidence shown largely to fully adequate in the delivery dimension. However, process O7 is not assessed in AOU. AGU, AU and UOB have less perform organizing process with evident shown largely adequate of the organization processes. RUW, AMA, and KU move from largely to partially in most organization process. However, the results shown that there is not explicit plan to guide e-learning technology decisions (O3) in KU.

Planning dimension: AOU, UOB and BP are mostly perform in development process with evidence shown largely adequate to fully adequate. As such it is fully adequate for AOU in (O1), (O4) to (O9), UOB only in O1 and O2 while in BP just in O6. AU on the other hand is performing very well with evidence shown all largely adequate in all organization process for the planning dimension. RUW, AMA, and KU have less preformed with evidence shown partially to largely adequate, with absent of processes O4 in RUW and O8 in AMA.

Universities	UOB	AOU	RUW	AU	KU	AGU	BP	AMA
Optimization	D, P, DF	D, P, DF, M, O	D, P, DF, M, O	D, P, DF, M	D, P, DF, M	D, P, DF	D, P, DF	-



Definition dimension: AOU is performing very well in the organization process with evidence show mostly fully adequate in the definition dimension. KU and UOB have just two process which shown fully adequate with the rest are ranging between partially and largely adequate. BP, AU, AGU, AMA and RUW have performed less in the organization process with results shown partially to largely adequate in most processes with AMA getting mostly partially in the organization processes for the definition dimension.

Management dimension: AOU, KU, RUW and AU are performing well in the organization process comparing with the other universities. The evidence have shown that these university perform mostly largely to fully adequate in most of the processes. However, other university such as AMA, BP, AGU, and UOB are performing less in the organization process as the results shown that most of them are partially adequate in most of the processes which lead to less management in organization process.

Optimization dimension: AOU and RUW are the only universities that are performing well in this process with evidence show largely to fully adequate. However, process O8 and O9 are not assessed in AOU. AU and UOB are performing significantly less in the organization process with evidence shown partially adequate in most process in the optimization dimension. On the other hand, AMA, BP, AGU and KU have revealed absent in performing the organization process with evidence show not adequate in most process.

As a conclusion on the above discussion, it can be noticed that the overall eMM figures demonstrate that universities in Kingdom of Bahrain have reached an average level of achievement and performance in the e-learning processes and developed reasonable capability maturity on each dimension of the learning processes. As such the results revealed that AOU has the highest capability maturity level among the universities with evidence shown fully adequate in most of their learning processes. It can be noticed that in AOU the capability in the higher dimensions (evaluation and Optimization) are supported by capability at the lower dimensions (delivery, planning and definition). So they are sustainable and responsive to institutional and learner needs as well as are capable to deliver the desired outcome. However, UOB – the only public university- are not fully performed in most of their learning process. UOB is performed very well only in the learning area with evidences shown a full adequate in all dimensions of this process. However, in the other learning areas such as development, support, evaluation and organization, they are providing an ad hoc, unsustainable and unresponsive capability to the learner needs as their capabilities at lower dimensions are not supported by that at the higher dimensions. Other private universities such as AGU, BP and AMA are performing less in most of the learning areas with lower capability maturity level. In most of the dimensions of the learning areas, these universities are not well established and adequate. For instant, KU is not performing the learning process, while AU is not performing the evaluation process. Finally, AGU, BP, and AM, have the lowest e-learning maturity level as they are not performing well in most of the learning categories.

In general, the current maturity level of e-learning in Kingdom of Bahrain shown to be gone through definition stage to management stage in addition to some characteristics of optimization in few universities. Public universities such as UOB and most of the private universities have done noticeable efforts toward developing more reliable and effective e-learning systems and more sustainable e-learning services and environment. Universities at Kingdom of Bahrain are well performing the learning processes that are mostly related to the pedagogical aspects of e-learning, to that surrounding the creation and maintenance of e-learning resources and ending to that associated with institutional planning and management. In each of these learning areas, some universities already have exceeded the ad-hoc process to more advanced and well defined process for development and support of e-learning. Moreover, AOU, have reached a level in which it providing a continual improvement in all aspects of the e-learning processes. Nevertheless, UOB, AGU, BP, and AMA have problems with the consistency between the lower and higher dimensions of the learning areas. In general, they are paying less attention to the importance of the feedback on the quality and effectiveness of their learning experience and the regular review of the e-learning different aspects of students and teaching staff. Moreover, e-learning initiatives in such universities are not guided by the institutional strategies and operational plans as well as the institutional policies and strategies of learning and teaching are not address in the e-learning. Thus, e-learning are misaligned with the overall institutional strategies, goals and objectives. This result is aligned with the current situation of the adopted e-learning in theses universities. The drivers for adopting e-learning are not to achieve the institute goal or productivity and the infrastructure is not well established and suffers from a major technical problems which in turn, results in a high level of dissatisfaction among the users of e-learning. Investing in e-learning as any IT projects needs to be evaluated and assessed periodically and benchmark with model or standards. The benchmarking will helps in understanding the institution's strengths and points of improvement of the different learning processes; starting from that directly impact the pedagogical aspects of e-learning to that associated with the institutional planning and management. In addition, it can be considered as a road map for e-learning planners and educational institutions to improve their e-learning capability maturity level and performance by fill up the missing point toward more accountable progress.

REFERENCES

AlAmmary, J (2012). "Educational Technology: A way to enhance student achievement at the University of Bahrain", in proceeding of International Conference on New Horizons in Education Inte2012 Social and Behavioral Sciences , 55, 248 – 257.

Al-Musawi, N. (2014), "Development and Validation of a Scale to Measure Student Attitudes Towards E-learning", Journal of Teaching and Teacher Education, 2(1), 1-12.

Griffiths, A. (2005), "Capability model mature–or is it?, IT Now", Oxford Journals, http://itnow.oxfordjournals.org/cgi/content/abstract/47/5/18 last accessed 11.5.2006

Iskander, G. and Daflous, G. (2013), "Exploration of Qualitative Evidence: Towards Construction of Maturity

Model for E-learning", in proceeding of the 2nd e-learning Regional Conference, Kuwait.
Jabli, N. and Qahmash, A. (2013), "The Benefits and Barriers of E-learning in Higher Education in Saudi Arabia", Journal of Emerging Trends in Computing and Information Sciences, 4(1), 877-880.
Jacobson, M. and Wilensky, U. (2006), "Complex systems in education: scientific and educational importance and implications for learning services", the Journal of Learning Science, 15(1), 11-34
Marshal, S. (2010) "A quality framework for continuous improvement of e-learning: The e-learning Maturity Model", Journal Distance Education, 24(1), 143-168
Marshall, S. and Mitchell, G. (2002), "An e-learning maturity model?", Proceedings of ASCILITE 2002, Auckland, New Zealand.
Marshall, S. and Mitchell, G. (2002),"e-Learning: The e-Learning Maturity Model", Journal Of Distance Education, 24(1), 143-166.
Marshall, S. and Mitchell, G. (2004), "Applying SPICE to e-Learning: An e-Learning Maturity Model?", Sixth Australasian Computing Education Conference, Australia, 2004.
Mirza, A. and Al-Abdulkareem, M. (2011), "models of e-learning in the middle east" Applied computing and Informatics, 9(1), 83-93.
Mohammed.S. (2010), "SWOT Analysis of E-learning system in Bahraini universities", in proceeding of International conference on e-Education, e-Business, e-Management and e-learning, IEEE Computer society, Bahrain.
Nagarajan, P. and Jiji, W. (2010), "Online Educational System (e- learning)", International Journal of u- and e-Service, Science and Technology, 3(4), 37-48.
Penicina, L (2011), "Towards E-Learning Capability Maturity Model", Scientific Journal of Riga Technical University, 43, 88-91.
Petch, J. and Calverley, G. and Dexter, H. and Cappelli, T. (2007), "Piloting a Process Maturity Model as an e-Learning Benchmarking Method", The Electronic Journal of e-Learning, 5(1), 49 – 58.
Phillips, V. (2002), "Why does corporate e-learning fail? Virtual University Gazette, June
Rafique, M. (2011), Bahrain successfully implement e-learning, [online] . Available in: http://www.twentyfoursevennews.com/bahrain-news/bahrain-successfully-implements-e-learning/, last access 2/12/2014.
SEI (2004), Process Maturity Profile: Software CMM 2004 Mid-Year Update, Software Engineering Institute, Carnegie Mellon University, Pittsburgh, USA. http://www.sei.cmu.edu/sema/pdf/SWCMM/2004aug.pdf.
Shaker, H. Rashed (2000), "Distance Education in Bahrain: Situation and needs", Open Learning: The Journal of Open, Distance and e-Learning, 15(1), 57-70.
[20] Paulk, M., Curtis, B., Chrissis, M. and Weber, C. (1993), "Capability Maturity Model for Software", Version 1.1, Technical Report, Software Engineering Institute.
[21] Kaur, J. (2014), "Comparative Study of Capability Maturity Model", International Journal of Advanced Research in Computer Science & Technology, 2(1), 47-49.
[22] Petch J. , Calverley G. , Dexter H. , and Cappelli T. , (2006), "Piloting a Process Maturity Model as an e-Learning Benchmarking Method," In Proceedings of the 5th European Conference on e-Learning (ECEL2006). Academic Conferences Limited.
[23] Zhou, Y. (2012), "Towards Capability Maturity Model of e-Learning Process", Intelligent Information Management, 4, 95-98.
[24] Kwak, Y. and Ibbs, C. (2002), "Project Management Process Maturity .PM.2 Model", Journal of Management in Engineering, 18(3), 150-155.
[25] Reitzig, R. and Miller, J. and West, D. and Kile, R. (2003), "Achieving Capability Maturity Model Integration (CMMI) Maturity Level 2 Using IBM Rational Software's", Solutions, Rational Software Corporation.
[26] Grottke, M. (2001), Software Reliability Model Study, Deliverable A.2 of project PETS (Prediction of software Error rates based on Test and Software maturity results), IST-1999-55017, 2001