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Performance Measurement of Learning Management System in AOU-Bahrain Branch

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ABSTRACT

Websites have become a mission critical component of the organizations as more and more businesses have come to rely on it. In this paper, we define a framework that can be used to evaluate and to measure the performance of the blended learning system in Arab Open University. The Learning Management System will abbreviate it by LMS which represents the blended-learning web site of Arab Open University in Bahrain. This research work comprises three on-line analysis Questionnaires (staff and student oriented), SWOT analysis of LMS, utilization of available resources and the overall performance evaluation. This survey is part of research conducted in AOU-Bahrain Branch to improve services & performance of Blended-Learning system. LMS functions deal with the comprehensive management of a collection of applications, so we proposed a performance management policy and also we suggested a guideline to manage and address deficiencies of actual online functions; some important issues have been answered and evaluated.

Keywords: blended-learning, web site quality, performance, management and monitoring.

1. METHODOLOGY

In support of the framework, we have developed a systematic methodology that uses a series of analysis questionnaires oriented to staff and students to drive and support the analysis. **Table 1** contains a comparative study between traditional learning and blended learning [1][10]. The conducted questionnaires are used clearly to identify and monitor performance management components, processes, and tools that are the focus of the various system activities of blended learning web-site. Outcome of SWOT analysis has been conducted to measure system performance & effectiveness given in **Table 2.**

Table (1) Comparison Study Between Traditional Learning and Blended Learning

	Traditional Learning	**Blended Learning**
Classroom	• Physical – Limited scale. • Time and location dependent.	• Mixed between limited and unlimited. • Anytime, anywhere. • Face-to-face meeting.
Contents	• PowerPoint slides. • Textbook.	• ACES resources. Simple text, audio, WebEx video simulation.
Collaboration	• Perishable, decay with time.	• Re-useable due to ICT development.
Learning Center	• Instructor paced	• Student, Self Paced.

Table (2) Questionnaire for SWOT Analysis of Blended-learning System in AOU

	Question	***YES***	***NO***	***Possibly/ Don't Know***	**SWOT**
1.	Do you think that blended-learning reinforces and enhances courses in your university, so you will learn more?	46.72%	17.63%	35.65%	**STRENGTHS**
2.	Do you think that blended-learning will enable /excellent communication between students & staff?	51.78%	23.05%	25.17%	

3.	Do you think it is good to implement blended-learning. i.e. to come to face-to-face meeting plus online lectures, which provide students with satisfactorily integrated resources, software, notes and lectures to be utilized together?	49.00%	21.03%	29.97%	
4.	Do you think blended-learning is a more flexible way of delivering classes especially considering shift patterns workers?	42.33%	15.95%	41.72%	
5.	Do you think staff involved in delivering blended-learning have a lot of experience in the field.	43.23%	16.05%	40.72%	
1	Is Professional Development of IT tools, facilities & training satisfactory as per the concept of blended-learning in your university?	42.41%	20.56%	37.03%	**WEAKNESSES**
2.	Is blended-learning used by all member of staff , is it developed with close cooperation between all partners Computing centers, Services, faculty, register and students?	37.58%	20.71%	41.70%	
3.	Does blended-learning works only for self motivated students?	42.98%	22.98%	34.04%	
4.	Do you think the technical infrastructure to be suitable for the purpose of blended learning implemented in AOU?	35.18%	29.88%	34.94%	
5.	Do you think there is lack of quality in blended-learning materials?	43.05%	20.10%	36.85%	
1.	Is blended-learning better to upload student's works, lectures delivered by web cams and live messaging?	45.51%	19.64%	34.85%	**OPPORTUNITIES**
.2	Is the concept open to adaptation of mixed traditional & blended-learning to improve learning outcomes?	44.36%	17.36%	38.28%	
3	Is it more connivance to provide web space for lecturers to enable them to upload notes & develop more courses than included in traditional learning?	42.13%	18.16%	39.71%	
4.	Do you think that AOU as a non-profit organization is regarded as a leader to develop the national learning management system in GCC, Arab countries and Internationally?	38.36%	21.36%	40.27%	
5.	Do you think blended-learning may increase the volume of materials covered per course?	35.67%	23.66%	40.66%	
1	Do you think blended-learning will reduce admission rates, resulting in reducing university income?	31.01%	31.96%	37.03%	**THREATS**
2	Does blended-learning have lack of accuracies, interaction and feedback in online materials? Lack of opportunity to ask lecturers questions?	37.02%	25.70%	37.28%	
3.	Do you think blended-learning will cause job losses,	32.21%	31.97%	35.81%	
4.	Do you think blended-learning is not cost effective?	28.65%	32.16%	39.19%	
5.	Do you think blended-learning as better than the traditional delivery system?	41.03%	24.64%	34.33%	

SWOT analysis has been conducted as shown in **Table -2** based on actual feedbacks from staff and students using online voting system (for courses T175A, T175B, T209A, M363 and T490). The outcomes shown in Figure-1 will measure the effectiveness of blended-learning system by being able to trace the students' preferences, and to find new opportunities to enhance the learning environment in AOU, which will associate or affiliate more people in the community to join blended learning in AOU.

The SWOT's (20) questions are equally weighted on Strengths, Weakness, Opportunities and Threats illustrated in **Table 2.**

Surveys were disseminated through on line ACES to students and staff in AOU, (47%) of respondents agree with blended-learning Strengths, holding that will help them to learn better, improve their technology skills and help them to communicate better, while (40%) of respondents agree with blended-learning Weakness, were reflected by those who concluded that 'using blended-learning is difficult due to lack of infrastructure and cooperation between all partners. Whereas (41%) of respondents agree that using blended-learning was also linked to finding new room for improvement and good opportunities. While (34%) of respondents stated that there are threats of job loss and lack of accuracy. SWOT Analysis reflects the students' satisfaction, conversion rate (switching from traditional learning to blended-Learning. This will Increase Revenue & Decrease Expenses (cost).

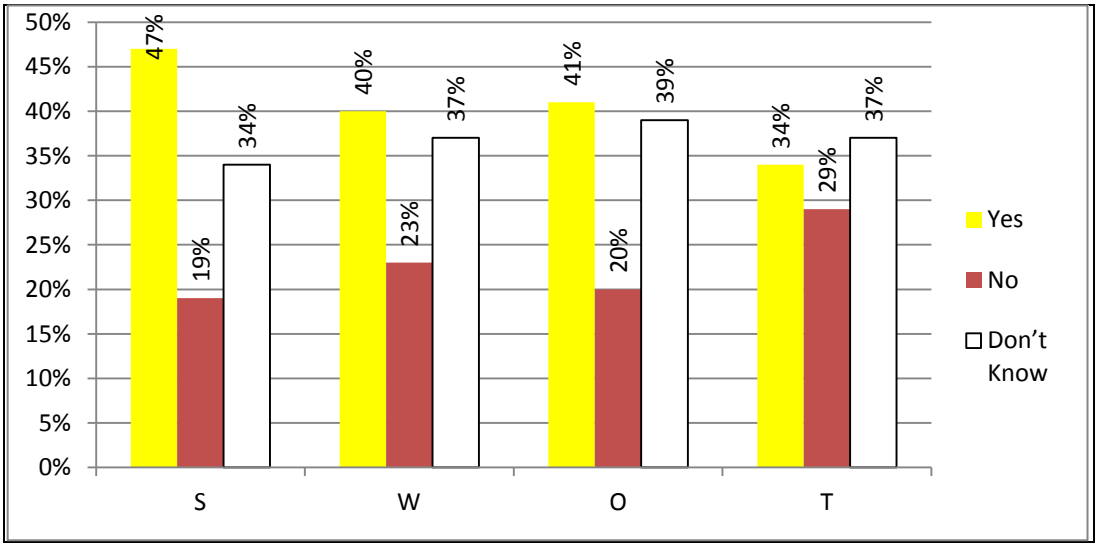

Figure (1) SWOT Analysis outcomes of Blended-learning system in AOU

2. THE BUSINESS & MANAGEMENT ISSUE

The applications as business components are grouped and taken as a whole, views are used to visually manage the business systems, and business system monitoring is more inclusive than regular monitors are. For example, a business system monitor could have a monitor called all business system interfaces. **Table 3** contains an index which illustrates the utilization of LMS tools and other resources. Voting system and the suggested feedback forms were added to web sites to measure level of staff and student satisfaction in order to improve system performance. Figure 2 illustrates a low percentage utilization of the resources as one deficiency in LMS. Daily overall average utilization of mentioned resources is 20%.

Table 3: Utilization of LMS tools and other resources
How many times do you use the following tools in arabcampus.org (LMS)?

ACES Tools	Daily	Weekly	Biweekly	Monthly	Never
LMS Email	32%	17%	15%	18%	18%
LMS Forum	26%	26%	11%	16%	21%
Chat	6%	7%	12%	18%	57%
Translator	14%	14%	10%	15%	47%
E-Library	15%	13%	11%	12%	48%
Other ( )	25%	27%	15%	10%	24%

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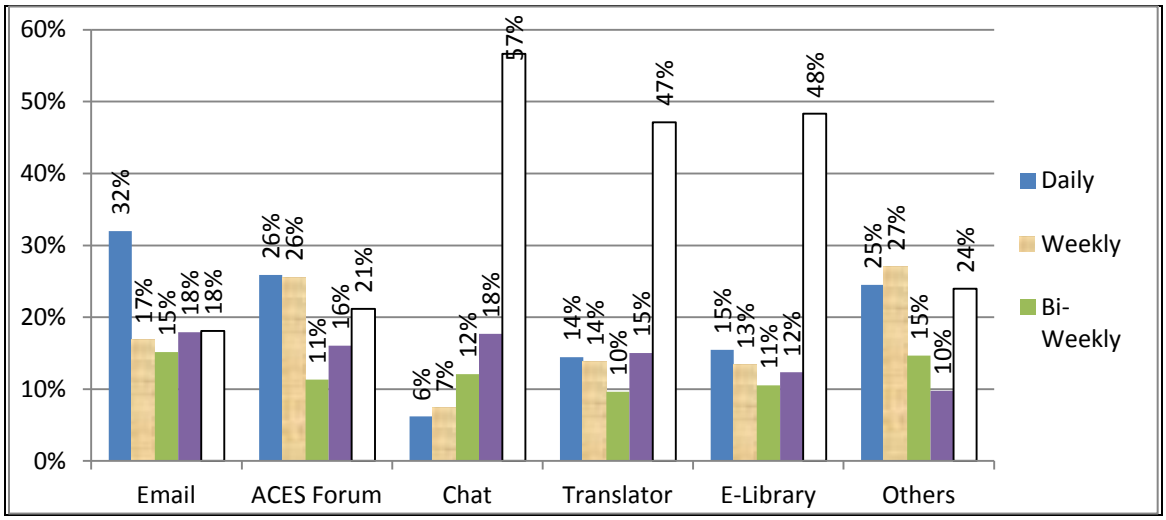

Figure (2) Utilization of LMS tools and other resources

Management is a process whose goal is to provide defect-free implementation of changes to the system environment [3]. This process includes planning and documentation of the change, real time management of the change, verification of completion or, in the case of failure, verification of restoration back to the original state, and follow-up analysis and reporting [4]. From a system-monitoring viewpoint, we see the following three important issues:-

- How to reactivate the monitoring system following a change activity to verify that all systems and services are functioning normally.
- How to convert problem management activities into change activities
- How to be prepared to change tools, and processes implemented to handle the Web site better.

Problem management is the successful awareness and response to all monitoring tool alerts and other manually reported or detected problems and the resolution of any events [5], conditions, failures, etc indicated by this information. The entire set of activities is focused on ensuring that the site is available and functioning in the manner in which it was designed. The 7x24 nature of blended-learning web sites and the number of systems used in the typical web site indicate that in order to scale the problem management system and control costs some degree of automation is required. Automation can insure a rapid response to simple problems regardless of when they occur. Performance management is focused on the measurement and reporting of system resources by the application and its users. Performance management can be used to report problems in real time but is generally used to determine performance trends and to plan for necessary resources upgrades or modifications [8].

Table 4 is an example of a completed performance evaluation table which contains four parts, team, tools, process and overall evaluation.

Table 4: Performance Evaluation Table

Parts	Part details	Evaluation
1.Team	Who are the team members?	Performance team is in place with one member
	What skills, experience, training does the team posses?	Performance team is experienced and well trained with performance tools
	What coverage is provided by the team? Is this adequate?	Team works normal business hours. Most performance management is done after the fact -- most tools are not real-time
	Are there any performance measurements that can be used to	Few measurements exist at this time. Team consults with Web administrators and shares performance information

	evaluate the effectiveness of the team? If so, what data?	
	What are the strengths and weaknesses of the team?	**S**: Self-motivated, creative, good, communication skills, well-practiced, ability to team up with other departments. Team understands tools and does a good job in its consulting role. **W**: Lack of team members, variations in skills are needed, not 24/7 support. Team is not equipped to deal with "emergency" performance problems.
	What other teams are key to the success of this team? Are there any issues?	Performance team works with Web administrators and teams working on problems.
	Based on the above evaluation, what are the primary issues? What is the action plan to resolve?	Action items include -- • Recommendation: performance team needs a methodology to work on emergency performance problems.
2.Tools	What is the primary tool for investigating performance problems?	Team uses utilities that are part of OS and records statistics to log files, and issues tracker.
	What are the strengths and weaknesses of this tool?	S: Easy problem entering to follow-up with the IT partner. W: Issues should be closed by the IT partner. Tools are well-known and easy to use and interpret. Tools require systems administration level skills.
	What other tools are used to manage performance?	Just scripts and basic reporting tools like SAS used in LMS.
	What specific performance metrics are collected	CPU utilization, page space, memory, and disk utilization
	What is the time frame for the collection of performance data	Data is stored for the past 6 months
	Evaluate and develop action plan to address deficiencies.	Action plan will be implemented to improve resource utilization • Recommendation: Real-time tool is needed to support emergency performance problems
3. Process	Is there a document, which defines the organization's performance management policies and procedures?	No, performance management is not a core discipline
	Is this consistent with actual practice, if not, where are the gaps	Team just provides consulting-level assistance
	Evaluate and develop action plan to address deficiencies	Action items include -- • Recommendation: It is unclear if performance-management focus need to be more formal as performance of the site is handled carefully by the administration and performance community
4. Overall	What reports are available to review site performance? Are they adequate?	Real reports, just ad-hoc reporting
	What is the leading cause of performance problems? What is being done to address this?	Should be tracked

2. CONCLUSIONS

This paper described a framework that supports and evaluates the performance management tools and methods for online service of blended-learning LMS web site in Bahrain branch. Three perspectives are the basis of the framework system and support. Methodology is used for proactive planning which involves three steps: preplanning, analysis, and review. **Tables**

2, 3, 4 were used to support the analysis associated with the methodology. The developed systematic methodology as a whole uses a series of Tables to drive and support the analysis. These Tables are used to clearly identify the monitoring and management components and focus on the used tools of the system activities. SWOT analysis has been conducted in **Table 2** to measure system effectiveness which is acceptable. **Table 3** indicates a low utilization percentage of the resources. **Table 4** is based on perspectives that incorporate tools, processes, organizational structure, and staff skills to evaluate system performance. The developed methodology as a whole focused on improvement of availability, performance, consistency, and reliability of blended-learning system. It is expected that the overall outcomes of fulfillment the questionnaire point out that the implemented blended-learning system in AOU has the following characteristics:

Strengths:

- The blended-learning system is clear and concise
- The system has built-in incentives to motivate compliance, where compliance is verifiable and enforceable.
- There is a regular backup of all critical data.
- There is a disaster recovery and business continuity plan.

Weaknesses:

- Due to low percentage of recourse utilization, tutors should encourage the students to utilize the recourses.
- One of the weakness issues in SWOT analysis was the low cooperation between all partners.
- One of the threat issues in SWOT is the low interaction between students and tutors, so tutors urged to interact more efficiently and effectively with students using the ACES tools.

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