

Evaluating and Measuring the Impact of E-Learning System Adopted in Saudi Electronic University

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Abstract

This research aims to investigate and quantify the impact that the Blackboard system has as an e-learning system, with the specific context of its use in Saudi Electronic University (SEU) using the IS Impact Measurement model. This study will help to provide rich insights and increased understanding on how the creation of effective and successful adoption of such Learning Management System (LMS) can be achieved. Thus, this research will help to improve the quality of existing learning environment in Saudi Electronic University (SEU) and other similar context. The significance of this research is that it addresses gaps in current knowledge for a special need of SEU to measure and evaluate its use of LMS after about eight years of implementation in order to increase knowledge on how to best apply such LMS on a blended learning environment.

Keywords:

E-learning; Blackboard; Learning Management System

1. Introduction

Information and communication technologies have been experiencing rapid growth, which has in turn led to the emergence of a unique set of opportunities for education, specifically when it comes to e-learning processes. Learning Management Systems (LMSs) have been deployed by several institutes to augment learning. LMS uses contemporary technology to enhance accessibility and availability to learning around the world. According to Paulson^[1] the spread of e-learning is the result of LMS. Virtual Learning Environment (VLEs) allow educational institutions “to

develop electronic learning materials for students, to offer these courses electronically to students, to test and evaluate the students electronically, and to generate electronically student databases in which student results and progress can be charted”^[1, p 2]. Using LMS allows learners to grasp their content easily, while tracking their courses. The instructors are also able to navigate things in a simpler manner because they are able to track and evaluate every student.

Given the value that this system brings to the table, evaluating its success and influence has become more and more important, especially to help augment the quality

of the educational processes at play. Several studies, including Aceto et al. [2], Wang et al. [3], and Alkhalaf [4] look at why such systems are needed.

This research has been developed within the scope of information systems, gauging the impact and success of Blackboard systems being used at SEU. In particular, this work will employ the IS-Impact Measurement Model [5] to evaluate the affect that the system in question has so as to augment the existing learning environment's quality at SEU, which is the sole institute to use such a style of learning at the university level, within Saudi Arabia. Moreover, this research will use a single case study to satisfy its research aim. This case design is suitable in this research for testing a theory, anomaly or a special case [6, pp 38- 40]. According to Walsham [7] and Irani et al. [8] the use of a case design will allow researchers to investigate the phenomena in a better fashion for the purpose of developing a deeper description and understanding. This research extended the previous work [9; 10] that only discussed individual impact and information quality of Blackboard system. This paper further contributes with measuring the impact of "system quality" and "organisational impact" along with the perspectives from both students and teachers. It provides a comprehensive assessment of the impact of Blackboard system on the educational process in SEU. This paper is structured as follows. It begins with a brief background relating to SEU. Next, overview about learning management systems is presented. The paper then

discusses the research methodology and finally concludes by presenting the survey results and outcomes of the study.

2. Saudi Electronic University (SEU)

King Abdullah Bin Abdul-Aziz issued a royal decree on August 10, 2011, so that the university in question could be launched as a governmental educational institute. It is focused on blended learning and is the only one of its kind in the country to allow for both graduate and undergraduate programs. The university has a vision to be one that performs with excellence when it comes to adopting ICTs to build knowledge society. Its mission is to offer "high quality programs for all segments of society through the use of blended learning. It promotes knowledge production and community services to achieve development goals by optimal utilization of technology and engagement in local and global partnerships" [11].

Saudi Electronic University adopts a blended learning pattern as a recent learning method used in world's universities, it uses a combination of e-learning and direct traditional edification. The blended learning method here uses a mixture so that it can provide the optimum advantage from technology to students and teachers, helping each reach their learning goals effectively.

3. Literature review

Universities which have adopted Learning Management System (LMS) normally re-

fer it as a Virtual Learning Environment [12;1]. Learning Management System (LMS) has been given different meanings by different researchers. Ayub et al. [13] explained it as a web-based technology that served the purpose of creating, dissemination and evaluating a given learning process. It is essentially a software that has been created to inform the process of learning, alongside providing resources with which the learner can augment their understanding of a subject or topic. It can also be seen as a set of tools and framework that allow for hassle-free creation of content online, and at the same time guiding learning [12]. Wahlstedt and Honkaranta [14] confirm that it is an advanced form of traditional learning, and contains instructional and evaluation devices, and learning contents. Fairly unique with learning management system is the fact that it can be useful when it comes to playing, disseminating, and managing learning, therefore integrating multiple tasks that were previously handed over to various stakeholders. Management under this system includes delivery, exams, tracking progress, statistical evaluation and virtual lessons [12; 15; 16]. Learning Management System can be defined as “web-based software platforms that provide an interactive online learning environment and automate the administration, organization, delivery, and reporting of educational content and learner outcomes.” [16]. This is the reason it is a crucial tool when it comes to institution management, because it helps combine multiple factors together. This is an essential platform through which

teachers and their students can connect and simultaneously exchange and share materials. Therefore, it can be said that internet-based tech solutions are beneficial for both the teachers and the students since they made it possible for the two to engage through useful interactive features such as file sharing platforms, forums and discussion boards [12]. The Learning Management System can be used by the instructors to distribute courses and at the same time aiding in instructor-learner interaction [17]. The management function of Learning management System is particularly of great importance because it requires less effort and it also saves time that could otherwise been wasted by the instructor without changing the entire instructional process. Communication tools, virtual classes, and discussion forums are the key characteristics of Learning Management System [12]. These features make an interactive learning environment possible.

“Learning Management System has tremendous effect on e-learning. According to Paulsen [1], the presence of a Learning Management System will determine how e-learning will succeed. With a Learning Management System in place, an institution can easily develop web content, teach electronically, evaluate learners electronically and generate learners’ databases for which the learners can access their results [1].”

Although it provides much support when it comes to e-learning, there has been a gap noticed in terms of the situation and advanced instructional tools, including

multimedia, which are thought to help augment the level of instruction being handed out^[17]. Multimedia tools, in several cases, are not deployed. And if they are deployed, the instructors are unable to use them to their full potential. For instance, several institutes are using LMS to help augment e-learning, however, teachers place limits on their own selves when they upload course material and do not ever get around to using other features such as forums that can help increase interaction and learning through discussions^[17]. In some cases, users have reported being discouraged because they fail to acquire immediate feedback from tools such as the email^[17]. Even though the features exist within the system, their use is limited because of the actions of the stakeholders. The system can act as a bridge to fix the issues that are present. However, this is only possible if the system is built to be adaptive and customizable^[17]. Creating such a system will make it possible to ensure that teachers and students with varying levels of digital literacy can use it with ease.

The Blackboard is an LMS and VLE. It is one of the famous E-learning systems that use the electronic educational technology in learning and teaching with features for online collaboration and interaction. Colleges and universities use the Blackboard System to deliver online courses and augment on-campus courses. Also allow instructors to create, deliver, and manage web-based components for e-courses. In addition, allow students to download and upload files, attend virtual classrooms,

participate in discussion forums and to submit assessments. Also students are able to view their grades and send e-mails to instructors and classmates within courses, and these services are available for instructors and students anytime and anywhere by using the Internet.

Saudi Electronic University^[11] uses different products of Blackboard system including:

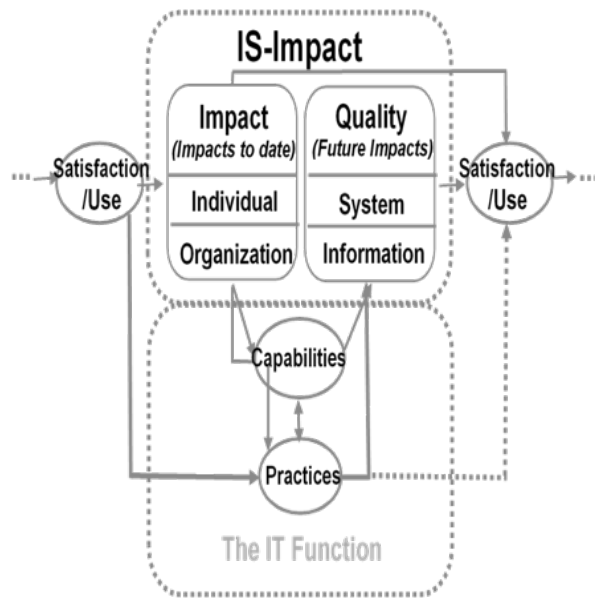
- Blackboard Learn – Provides a learning platform that includes course delivery, community engagement, and content management functionality as well as mobile applications
- Blackboard Collaborate –integrates -in-class web conferencing into the learning environment
- Blackboard Ally - a product that focuses on making digital course content more accessible.
- Analytics for Learn - a comprehensive learning analytics solution.

4.Methodology

This work will be employing a positivist research paradigm, which looks to verify hypotheses and validate theories for the purpose of evaluating the real world as it is^[5; 19]. This research will analyze and gauge Blackboard use by testing IS-Impact Measurement model developed by Gable et al. [5; Figure 1]. This model was chosen for its ability to take stock of ICTs comprehensively, through use of 37 measures in four significant aspects, i.e., “System Quality,” “Information Quality,” “Individ-

ual Impact,” and “Organisational Impact.”

Fig. 1. IS-Impact Measurement model
(Gable et al. 2008)



Much has been done with regards to research on information system success measurement since its emergence into the academic disciplines in the 1990's. Despite having been researched extensively by use of different approaches, scholars have failed to come up with a unified decision on a common measure of information system success. As a result of these diverse studies, scholars have had differing opinions thus coming up with different models. However, the most discussed IS success model are the DeLone and McLean [20] and the IS-Impact Measurement model by Gable and others [5; 21]. This model emerged upon the review of communications' research done by Shannon and Weaver [22] and the information influence theory work done by Mason [23]. According to Gable et al. [5; 21], it was difficult to use these studies in the IS success measurement owing to the fact that researchers had lumped together

different factors of success thus making it difficult to use [20]. The model was borne of the synthesis and harmonization of these earlier separated measures [24]. This model includes six main IS success constructs and they include: system quality, use, information quality, user satisfaction, single person and organizational impact [24; 25].

The model was then subjected to review by Seddon [26] to give an advanced version of the D&M model. In his review Seddon [26] removed the interpretation process of the D&M model and fragmented the remainder into two different models; the partial behavioral model of IS use and the IS success model [3]. The updated IS model done by Seddon has six dimensional components, as previously discussed [3].

Despite the fact that these three IS models; DeLone & McLean [20], Seddon model and Update DeLone & McLean model have contributed immensely to the IS success measurement research, they have failed to address several issues. One major setback of these models that has not been addressed is failure to address the constructs as either formative or reflective [21]. A good example of such as a confusion was highlighted by Petter et al. [27] and they argue that constructs were under threat of being mis-specified and validated as reflective while close scrutiny could easily reveal that they are formative. In addition to this, the D&M IS success model has widely been criticized for failure to offer a good and clear explanation on its theoretical and epistemological basis [21]. It is for these reasons that the IS-impact model has always

been suggested as the best option to address these weaknesses.

The IS-Impact measurement model is “more comprehensive and valid model for use. According to [24], this model has been tested statistically through surveys and has proven to be valid and it employs the perceptual measures. These tests depicted the validity and reliability of this model. Despite borrowing heavily from the DeLone & McLean model by adopting its constructs, it has succeeded in employing them for a different purpose [21]. The model and approach employs perpetual measures, aiming to offer a common instrument answerable by all relevant stakeholder groups, thereby enabling combining or comparison of stakeholder perspectives [25].”

“Moreover, a study conducted by Alotai bi [28] validated the IS-Impact Model and emphasize on the completeness and validity of IS-Impact Model as a Hierarchical Multi-dimensional Formative Measurement Model in the Saudi Arabian context. Accordingly, this model has been adopted in this research owing to its strengths in comparison to other models. It is quite clear that this model has eliminated all the weaknesses of other models by including and reviewing their constructs. Furthermore, since a single case design is more suitable for such research aims to test a theory, anomaly or a special case [6], this research will use a single case design to delve more deeply into the phenomena in order to insure that a rich description and understanding be provided.” It will use a

case study to help achieve the aim of this research which is to evaluate and measure the impact of Blackboard system adopted in Saudi Electronic University for the purpose of improving the quality of existing learning environment. As mentioned by Benbasat et al. [29; p 370], “A case study examines a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities (people, groups, or organizations).”

As can be observed in Figure 1, within the scope of the framework in question, the impact and success of a system can be gauged through:

- quality of information produced (information quality),
- impact on individual users (individual impact),
- performance of system from a technical perspective (system quality),
- impact on relevant organisation (organisational impact).

More specifically, a questionnaire is used to collect data for this study. It is a decent method through which data can be acquired from a significantly large group. It also helps bring together the answers to the research questions under study, and also acts as an efficient method to look into people's opinions and attitudes, in specific regarding the issue under study. The questionnaire will include 37 measures in the context of four aspects mentioned earlier in the IS-Impact Measurement Model. The questionnaire will contain two sections.

One of the sections will look at demographic information, while the other will focus on the 37 measures, previously discussed, alongside other dependent variables that can help look at validity. A Likert scale has been used to help rank the participants' responses.

5. Student questionnaire

Based on the tables containing the results of survey on: a) impacts of the Blackboard on the students individuals; b) Blackboard System information quality; c) Blackboard system quality; d) Students' satisfaction on the use of the blackboard.

Table 1. Demographics of the students survey participants

Qualifications	Frequency	Percent	Valid Percent	Cumulative Percent
High school	398	89.0	89.4	89.4
Bachelor degree	47	10.5	10.6	100.0
Total	447	100.0		

5.1. Impacts of the Blackboard on the students individuals

In this section we were able to assess on how the blackboard role on the individual performance. The respondents were expected to reflect on how the black board has helped them to improve on the "ability to interpret information accurately, un-

derstand the information and work related activities in their university, the decision making effectiveness and the overall productivity. The students answered the questions on a scale of 1-5 where 1 represents strongly disagree, 2- disagree, 3-Neutral, 4- agree, 5- strongly agree."

Table 2. Impacts of the Blackboard on the students individuals

N	Items	Strong disagree		Disagree		Neutral		Agree		Strongly agree	
		F	%	f	%	f	%	F	%	f	%
1	Blackboard impact on learning	10	2.2	32	7.2	78	17.4	237	53.0	90	20.1
2	Blackboard enhances awareness and job related information	8	1.8	36	8.1	74	16.6	246	55.0	83	18.6
3	Blackboard enhances effectiveness in the educational process.	11	2.5	46	10.3	92	20.6	217	48.5	81	18.1
4	Blackboard increases productivity	15	3.4	55	12.3	125	28.0	185	41.4	67	15.0

From the table 1, it is clear that from the 398 high school students and 47 bachelor degree students; table 2 shows that around two percent said they strongly agreed that the Blackboard augmented their learning, while 7.2% disagreed. Around 17% of the sample was neutral. Around 53% of the

sample said that the board helped them, while 20% strongly agreed that it augmented their learning. The data showed that 73% of those queried were of the view that the blackboard augmented their learning, while 9.2% said that it did not; 17% stuck to neutrality. "9.1% of the students

say that Blackboard has not enhanced their awareness and recall of relative information, 73% agree that the Blackboard has enhanced their awareness and recall of relative information while 16 % are neutral on the same question. 12% of the respondents say that the blackboard has not enhanced their effectiveness in the educational process, 66% say that the blackboard has enhanced their effectiveness in their educational process while 20% of the students that responded remained neutral on this matter. On the last question on this section 15% of the students disagree that the Blackboard has increased their produc-

tivity 28% of the students neither agree nor disagree while a total of 56% of the students believe that the black board has increases their productivity.”

The data can be generalized to the students in the university. The standard deviations that were recorded were not particularly large, while the chi-square was noted to be significant. Therefore we conclude that the Blackboard has helped the students’ ability to interpret information accurately and their overall productivity^[30].

5.2. Blackboard system information quality

Table 3. Blackboard Information Quality

N	Items	Strong disagree		Disagree		Neutral		Agree		Strong Agree	
		F	%	f	%	f	%	F	%	f	%
5	Information available from Blackboard is important	7	1.6	19	4.3	60	13.4	236	52.8	125	28.0
6	Blackboard provides output that seems to be exactly what is needed	14	3.1	52	11.6	112	25.1	191	42.7	78	17.4
7	Information needed from Blackboard is always available	9	2.0	66	14.8	102	22.8	205	45.9	65	14.5
8	Information from Blackboard is in a form that is readily usable	19	4.3	41	9.2	107	23.9	212	47.4	68	15.2
9	Information from Blackboard is easy to understand	20	4.5	46	10.3	110	24.6	219	49.0	52	11.6
10	Information from Blackboard appears readable, clear and well formatted	17	3.8	41	9.2	101	22.6	218	48.8	70	15.7
11	Though data from Blackboard may be accurate, outputs sometimes are not	13	2.9	97	21.7	175	39.1	140	31.3	22	4.9
12	Information from Blackboard is concise	14	3.1	48	10.7	130	29.1	231	51.7	24	5.4
13	Information from Blackboard is always timely	20	4.5	55	12.3	112	25.1	203	45.4	57	12.8
14	Information from Blackboard is unavailable elsewhere	12	2.7	45	10.1	211	47.2	145	32.4	34	7.6

Under this category, the researcher is concerned with the timeliness, relevant and the accuracy of the information generated by the blackboard. Therefore, as well seen in table 3, we seek the answers of the ten questions all wish are intended to give us the insight to this matter.

The results show that 80% of the students were of the view that the information acquired through the blackboard is of importance. Around 5.3% thought it was not important, while 13% gave a neutral response. Over 59% thought the output being produced by the blackboard was precisely what was required, while 14% negated this notion, and 25 remained neutral.

Over 16% of the respondents reported that

the system was not always timely, while 57% responded the opposite. Around 25% of the sample responded with neutrality. From the sample, 12% believed that the data found in the system was available elsewhere, 39.6% thought that it was not available anywhere else, and 47% chose to remain neutral. Despite the large number of neutral responses, the results can be generalized to the entire school since the answers present only a small standard variation, and the chi-square statistic was also within range. We can, therefore, conclude that the data is relevant, accurate and timely.

5.3. Blackboard system quality

Table 4. Blackboard system quality

N	Items	Strong disagree		Disagree		Neutral		Agree		Strong agree	
		f	%	f	%	f	%	f	%	f	%
15	Data from Blackboard often needs correction	23	5.1	179	40.0	142	31.8	73	16.3	30	6.7
16	Data from Blackboard is current enough	26	5.8	135	30.2	113	25.3	155	34.7	18	4.0
17	Blackboard is missing key data	12	2.7	131	29.3	167	37.4	105	23.5	32	7.2
18	Blackboard is easy to use	15	3.4	49	11.0	89	19.9	210	47.0	84	18.8
19	Blackboard is easy to learn	12	2.7	38	8.5	81	18.1	236	52.8	80	17.9
20	It is often difficult to get access to information that is in the Blackboard system	29	6.5	176	39.4	127	28.4	85	19.0	30	6.7
21	Blackboard meets university requirements	21	4.7	46	10.3	87	19.5	222	49.7	71	15.9
22	Blackboard includes necessary features and functions	8	1.8	24	5.4	76	17.0	256	57.3	83	18.6
23	Blackboard always does what it should	10	2.2	54	12.1	141	31.5	205	45.9	37	8.3
24	The Blackboard user interface can be easily adapted to one's personal approach	13	2.9	59	13.2	154	34.5	181	40.5	40	8.9
25	The Blackboard system is always up-and-running as necessary	44	9.8	126	28.2	83	18.6	150	33.6	44	9.8
26	The Blackboard system responds quickly enough	20	4.5	82	18.3	93	20.8	203	45.4	49	11.0

N	Items	Strong disagree		Disagree		Neutral		Agree		Strong agree	
		f	%	f	%	f	%	f	%	f	%
27	Blackboard requires only the minimum number of fields and screens to achieve a task	11	2.5	56	12.5	171	38.3	181	40.5	28	6.3
28	All data within Blackboard is fully integrated and consistent	12	2.7	48	10.7	148	33.1	208	46.5	31	6.9
29	Blackboard can be easily modified, corrected or improved.	13	2.9	60	13.4	193	43.2	152	34.0	29	6.5

From the data collected from the respondents represented in table 4, it is clear that 45% of the students believe that the Data from Blackboard often need not to be corrected, while 22.7% of the students believe that the Data from Blackboard often needs to be corrected and 315 of the students remain neutral. This clearly indicates that most of the students are satisfied with the accuracy of the data from the blackboard. However, believe that Data from Blackboard is current not enough 35% and 38% believe that Data from Blackboard is current enough. Note that these percentages are almost equal and therefore reflect that the blackboard needs to be improved in such aware that it includes more data.

On the other hand a substantial number of students feel that the Blackboard is easy to use, easy to learn and it is not difficult to get access to information that is in the Blackboard system since from the table C, the data indicates that most of the students

believe so as compared to the smaller number of the students with a contrary opinion. 64% of the students believe that Blackboard meets university requirements while 14% of the students believe that the Blackboard does not meets university requirements. Blackboard can be easily modified, corrected or improved since with the standard deviation of 0.873 and a chi-square statistic of 279.65 clearly indicate that 44% of the students believe that the blackboard has made it easy to correct and modify the data available from the blackboard.

Therefore, we can conclude that the Blackboard system is a multifaceted system designed to capture the system performance. The Blackboard system is considered to be of high quality, consistent and easy to maintain since the standard deviation of the answers of the questions is small while the chi-square statistic is significant ^[31].

5.4. Students' satisfaction on the use of Blackboard system

Table 5. Satisfaction on the use of Blackboard system

N	Items	Strong disagree		Disagree		Neutral		Agree		Strong agree	
		F	%	f	%	f	%	F	%	f	%
30	Overall, the Blackboard System Quality is satisfactory	9	2.0	47	10.5	102	22.8	242	54.1	47	10.5
31	Overall, the Blackboard Information Quality is satisfactory	12	2.7	47	10.5	101	22.6	238	53.2	49	11.0
32	Blackboard is enjoyable to use	26	5.8	75	16.8	116	26.0	168	37.6	62	13.9
33	Overall, Blackboard is satisfactory	11	2.5	34	7.6	96	21.5	257	57.5	49	11.0
34	Overall, Blackboard system related knowledge has been managed satisfactorily.	33	7.4	57	12.8	107	23.9	215	48.1	35	7.8
OVERALL											
35	The impact of Blackboard on the teaching has been positive.	13	2.9	40	8.9	78	17.4	220	49.2	96	21.5
36	The impact of Blackboard on me has been positive.	14	3.1	37	8.3	82	18.3	226	50.6	88	19.7

Under this category, the researcher is concerned with the satisfaction level of the students on the use of the blackboard by evaluating the various consequences of the blackboard. Table 5 clearly demonstrates the following facts: For example, 64% of all students are satisfied with the Overall quality Blackboard System Quality while only 12% are not satisfied with the Overall quality Blackboard System Quality. 64 % of the students are satisfied with the overall quality of the information available from the Blackboard while 21% of the students are not satisfied with the overall quality of the information available from the Blackboard. 68% of the students believe that Blackboard is enjoyable to use. 56% of

the students believe that the blackboard is satisfactory overall and finally 69% of the students believe that the overall system of the Blackboard system related to knowledge has been managed satisfactorily. From the data it is clear that the blackboard system is satisfactory.

6. Teachers questionnaire

The questions for teachers on the use of blackboard were grouped within the following categories for ease of understanding: A) Impacts of the Blackboard on teachers' individuals; B) Blackboard System Information Quality; C) Blackboard System Quality; D) Teachers Satisfaction on the use of Blackboard System.

Table 6. Demographics of the survey participants

Qualifications	Frequency	Percent	Valid Percent	Cumulative Percent
Bachelor	1	1.9	1.9	1.9
Master	28	53.8	53.8	55.8
PhD	23	44.2	44.2	100.0
Total	52	100.0	100.0	

6.1. Impacts of the Blackboard on the teachers' individuals

Here we assessed the impact of the blackboard on the individual performance. The respondents were expected to reflect on how the black board has helped them to improve on the ability to interpret information accurately, understand the information

and work related activities at their university, the decision-making effectiveness and the overall productivity. The teachers answered the questions on a scale of 1-5 where 1 represents strongly disagree, 2-disagree, 3-Neutral, 4- agree, 5- strongly agree.

Table 7. Impacts of the Blackboard on the teacher individuals

N	Items	Strong agree		Agree		Neutral		Disagree		Strong disagree	
		f	%	f	%	f	%	f	%	f	%
1	Blackboard impact on learning	19	35.8	26	49.1	8	15.1	0	0	0	0
2	Blackboard enhances awareness and job related information	13	24.5	27	50.9	12	22.6	0	0	1	1.9
3	Blackboard enhances effectiveness in the educational process.	20	37.7	28	52.8	3	5.7	2	3.8	0	0
4	Blackboard increases productivity	20	37.7	25	47.2	7	13.2	1	1.9	0	0

As represented in table 6, researcher surveyed 52 higher education faculties teaching different higher education levels. While table 7 demonstrates survey results as follows:

Whether the blackboard helped “teachers learn much, 0% responded that they strongly disagree that the use of the blackboard has helped them to learn much, as well 0% disagreed on the same, while 15.1% remained neutral. On the other hand, 49.1% of the respondents agreed that the presence of the black board has helped

them to learn much and 35.8% of the respondents strongly agree that the presence of the blackboard has helped them to learn much. It is evident from the data collected that 84.9% of the respondents say that the presence of the blackboard has helped them to learn much, 0% say that the presence of the blackboard has not helped them to learn much while 15.1% remain neutral on the same.”

Regarding enhancement of the teachers cognizance and memory of job information, 1.9% of the teachers say that Black-

board did not augment either, 75.4% reported that it did, and 22.6% remained neutral. But what concerns the role of Blackboard on effectiveness in the educational process we can see that 3.8% of the respondents were of the view that it did not augment their efficiency in terms of the educational process, 90.5% say that it did, while 5.7% remained neutral. For the last question, on whether the Blackboard has increased their productivity, 1.9% disagree that it increased their productivity, 13.3% remained neutral, while a total of 84.8% of

the teachers believe that their productivity saw a rise because of it.

The data can be generalized since teachers both in higher education degree levels since the standard deviations are insignificant, whereas chi-square statistic are substantial. Therefore, we conclude that the Blackboard has helped the teachers' ability to interpret information accurately, and their overall productivity.

6.2. Blackboard system information quality

Table 7. Impacts of the Blackboard on the teacher individuals

N	Items	Strong agree		Agree		Neutral		Disagree		Strong disagree	
		f	%	f	%	f	%	f	%	f	%
5	Information available from Blackboard is important	16	30.2	32	60.4	5	9.4	0	0	0	0
6	Blackboard provides output that seems to be exactly what is needed	9	17.0	29	54.7	13	24.5	2	3.8	0	0
7	Information needed from Blackboard is always available	10	18.9	26	49.1	14	26.4	2	3.8	1	1.9
8	Information from Blackboard is in a form that is readily usable	9	17.0	27	50.9	15	28.3	1	1.9	1	1.9
9	Information from Blackboard is easy to understand	14	26.4	26	49.1	10	18.9	3	5.7	0	0
10	Information from Blackboard appears readable, clear and well formatted	16	30.2	25	47.2	10	18.9	1	1.9	1	1
11	Though data from Blackboard may be accurate, outputs sometimes are not	4	7.5	4	7.5	21	39.6	5	9.4	0	0
12	Information from Blackboard is concise	5	9.4	36	67.9	10	18.9	2	3.8	0	0
13	Information from Blackboard is always timely	27	27	27	50.9	10	18.9	4	7.5	0	0
14	Information from Blackboard is unavailable elsewhere	5	9.4	14	14	19	35.8	15	28.3	0	0

Under this category, Table 8 demonstrate the survey results of the researcher's concern with the timeliness, relevant "and the

accuracy of the information generated by the blackboard. Therefore, we seek the answers for the ten questions all wish are in-

tended to give us the insight to this matter. 90.6% of the teachers believe that the information available from the blackboard is important, 0% of the teachers believe that the information available from the blackboard is not important while 9.4% are neutral. 71.7% of the respondents believe that the Blackboard provides output that seems to be exactly what is needed while 3.8% of the respondents believe that the Blackboard provides output that does not seem to be exactly what is needed while 24.5 remain neutral. 7.5% of the teachers believe that the Information from Blackboard not always timely, while 77.9% of the students believe that the Information from Blackboard always timely, while 18.9% of the students are neutral on the same.”

Around 28.3% believed that the information can be found elsewhere, 23.4% believed otherwise, while 35.8 % were neutral. Although in this case, the teachers that felt that they should remain neutral presented in much larger numbers. The outcome of our study can be generalized to the population of teachers in universities at different educational levels, given that all the responses that we have gathered only showed a small standard variation. This shows that the standard error will be insignificant and the chi-square statistic is within range. Hence, we can conclude that the blackboard's information is accurate, timely and relevant.

6.3. Blackboard system quality

Table 9. Blackboard system quality

N	Items	Strong agree		Agree		Neutral		Disagree		Strong disagree	
		f	%	f	%	f	%	f	%	f	%
15	Data from Blackboard often needs correction	3	3	15	28.3	17	32.1	17	32.1	1	1.9
16	Data from Blackboard is current enough	7	13.2	29	54.7	11	20.8	5	9.4	1	1.9
17	Blackboard is missing key data	2	3.8	8	15.1	27	50.9	16	30.2	0	0
18	Blackboard is easy to use	19	35.8	26	49.1	6	11.3	2	3.8	0	0
19	Blackboard is easy to learn	22	41.5	29	54.7	1	1.9	0	0	1	1.9
20	It is often hard to acquire access to information within the system	2	3.8	11	20.8	17	32.1	22	41.5	1	1.9
21	Blackboard meets university requirements	11	20.8	30	56.6	10	18.9	1	1.9	1	1.9
22	Blackboard includes necessary features and functions	11	20.8	31	58.5	8	15.1	3	5.7	0	0
23	Blackboard always does what it should	6	11.3	27	50.9	14	26.4	5	9.4	1	1.9

N	Items	Strong agree		Agree		Neutral		Disagree		Strong disagree	
		f	%	f	%	f	%	f	%	f	%
24	The Blackboard user interface can be easily adapted to one's personal approach	8	15.1	24	45.3	15	28.3	6	11.3	0	0
25	The Blackboard system is always up-and-running as necessary	5	9.4	28	52.8	12	22.6	7	13.2	1	1.9
26	The Blackboard system responds quickly enough	8	15.1	27	50.9	9	17.0	9	17.0	0	0
27	Blackboard requires only the minimum number of fields and screens to achieve a task	4	7.5	31	58.5	15	28.3	3	5.7	0	0
28	All data within Blackboard is fully intertwined and reliable	6	11.3	26	49.1	16	30.2	5	9.4	0	0
29	Blackboard can be easily altered, fixed or augmented.	2	3.8	8	15.1	27	50.9	16	30.2	0	0

From table 9 containing the data collected from the respondents, it is clear that 34% of the teachers believe that the Data from Blackboard often need not to be corrected, while 31.3% of the teachers believe that the Data from Blackboard often needs to be corrected and 32.1 of the teachers remain neutral. Note that these percentages are almost equal and therefore reflect that the accuracy of the data from the blackboard needs to be improved. However, believe that Data from Blackboard is current not enough 1.3% and 67.9% believe that Data from Blackboard is current enough. This clearly indicates that most of the teachers are satisfied with the blackboard currency. On the other hand a substantial number of teachers feel that the Blackboard is offer ease of use and learning, and does not pose difficulty when it comes to accessing data and information within the system, since results indicate that most of the teachers

believe so as compared to the smaller number of the teachers with a contrary opinion. 77.4% of the teachers believe that Blackboard meets university requirements while 3.8% of the teachers believe that the Blackboard does not meets university requirements. Blackboard can be corrected, altered, or augmented with easy given that the standard deviation of 0.911 and a chi-square statistic of 41.62 clearly indicate that 18.9% of the teachers believe that the blackboard has made it easy to correct and modify the data available from the blackboard.

6.4. Teachers' satisfaction on the use of Blackboard system.

Table 10. Satisfaction on the use of Blackboard system

N	Items	Strong agree		Agree		Neutral		Disagree		Strong disagree	
		f	%	f	%	f	%	f	%	f	%
30	Overall, the Blackboard System Quality is satisfactory	7	13.2	33	62.3	12	22.6	1	1.9	0	0
31	Overall, the Blackboard Information Quality is satisfactory	9	17.0	35	66.0	7	13.2	1	1.9	1	1.9
32	Blackboard is enjoyable to use	14	26.4	29	54.7	7	13.2	3	5.7	0	0
33	Overall, Blackboard is satisfactory	10	18.9	34	64.2	8	15.1	1	1.9	0	0
34	Overall, Blackboard system related knowledge has been managed satisfactorily.	8	15.1	35	66.0	8	15.1	2	3.8	0	0
OVERALL											
35the impact of Blackboard on the teaching has been positive.	14	26.4	32	60.4	6	11.3	1	1.9	0	0
36the impact of Blackboard on me has been positive.	19	35.8	29	54.7	5	9.4	0	0	0	0

Under this category, table 10 shows the survey's results of researcher's concern with the satisfaction level of the teachers on the use of the blackboard by evaluating the various consequences of the blackboard. For example, 75.5% of all surveyed reported that they found the overall quality of the blackboard system to be satisfactory, while only 1.9% reported the opposite. Around 84 % of the students reported they were satisfied with the overall information quality, while 3.8% reported the opposite. 81.1% of the teachers believe that Blackboard is enjoyable to use. 83.1% of the teachers believe that the blackboard is satisfactory overall and finally 81.1% of the teachers believe that the overall system of the Blackboard system related to knowledge has been managed satisfactorily. From the data, it is clear that the blackboard system is satisfactory.

7. Conclusion

This paper outlined and discussed the results of an evaluation for the impact of Blackboard system adopted in SEU in order to improve the quality of existing learning environment and other similar context. Importantly, results supported a number of findings reported in the related literatures. The paper indicates that impact of Blackboard system positively affects the teaching and learning process for both students and teachers.

The analysis of the results points out that the Blackboard has equally helped the students and teachers' ability to interpret information accurately and their overall productivity; the information produced by the Blackboard is timely, accurate and relevant; and from the data, it is clear that the blackboard system is satisfactory. Further, it can be noted that the Blackboard system

is a multifaceted system developed so that the performance of the system can be captured. In addition, it is considered to be of high quality, consistent and easy to maintain since the standard deviation of the answers of the questions is small while the chi-square statistic is significant.

While this research has evaluated the use of Blackboard system in SEU, further research is recommended to evaluate the implementation of Blackboard in other universities so that results can be compared and generalized.

Acknowledgements

The author would like to thank the Dean-ship of Scientific Research at Saudi Electronic University for funding this research under the number (7643-HS-2019-1-1-S).

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