Assessing Information Quality of Blackboard System

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Abstract

This paper reports on how a positivist research paradigm was conducted with the aim to assess the information quality of the Blackboard system. It outlines the application of the IS-Impact Measurement Model for the purpose of testing the variables for the construct of "Information Quality." The investigation in this paper is a part of a research project aiming to measure the success of the Blackboard system adopted in a higher education institute. Data for this investigation are gathered from students in Saudi Electronic University in the Kingdom of Saudi Arabia. This paper explores the factors related to information quality affecting the success of the use of the Blackboard system. It concludes by confirming that information quality positively affects the use of the Blackboard system.

Keywords: Information Quality; Blackboard; IS-Impact Model.

1. Introduction

Educational institutions are increasingly using Learning Management Systems (LMS) to facilitate e-learning and make learning available and accessible anywhere in the world and at any time. The Blackboard system is a learning management system whereby learners can engage actively with materials and interact with each one. It aims to develop completely online courses with few or no face-to-face meetings and to add online elements to courses that are delivered conventionally face to face. The Blackboard system contains a platform for sharing content and allows both instructors and students to communicate efficiently [1]. Due to the value of such systems, the quality of information generated by the Blackboard system is becoming important to successfully and effectively adopt the system.

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While the need for high-quality information cannot be overstated, the concept of quality remains ambiguous and controversial because it is not only premised on the perception of the information user and the utility value it proffers to the user but also on the multidimensional nature of the concept itself. Therefore, the evaluation of the information quality of any new information system is always faced with the challenge of defining the face that the quality of information held therein should assume. Regardless of the complexity of the quality aspect of information, it has become widely accepted that information quality must at least meet the thresholds of relevance, accuracy, timeliness, completeness, format, accessibility, compatibility, security, and validity, although some of these dimensions can be overemphasized depending on the utility of the information in the system. Ultimately, the question of information quality needs to be resolved with any new information system to guarantee its universal acceptance and adaptation, particularly in sectors where information systems are already in existence. In fact, the advent of artificial intelligence and its increasing application in information systems in a bid to enhance their utility has made information quality even more important in the contemporary technology environment. This study adopts the IS Impact Measurement Model [2] to assess the information quality of the Blackboard system. This paper is structured as follows. It begins with a brief background related to information quality in information systems. The paper then discusses the research model, hypothesis, sampling method, and survey questionnaire. Finally, the paper concludes by presenting and discussing the results.

2. Information Quality

The aspects of information systems and the quality of information therein have been widely researched and published in the literature. However, the increasing ubiquity of information technology applications and concerns regarding the rising budgets dedicated to information systems have invigorated the search for avenues through which returns on investments can be derived [3]. In the evaluation of the performance of information systems, researchers have focused on different aspects such as the quality of system performance and the quality of information [4]. Based on this premise, information quality as a factor of information system success has gained increasing attention from organizations, information system developers, and customers as well as researchers. However, information quality remains a loosely and ambiguously defined concept that is highly subjective depending on the use of the system and the perceptions of the users. After much research, the aspects that determine the quality of information in an information system have been agreed to be relevance, accuracy, timeliness, completeness, format, accessibility, compatibility, security, and validity, although the focus on some of these components may be overemphasized in some studies. However, it must be realized that overemphasis on one of these components or domains of information quality often compromises another. For instance, heightened focus on the security of information may compromise its accessibility. The overall benefits accrued from an information system are dependent on the perception of the end user of the system and are often manifested as increased profits, increased efficiency of processes, improved decision-making, or any other desirable outcome articulated by the immediate beneficiary of the system. Information quality has been identified as one of the metrics that determines the success of an information system in addition to system quality and service quality [5]. Indeed, DeLone and McLean established an information system success model that has formed the basis for evaluating the performance of information systems. This model identified information quality and system quality as a pertinent component in the evaluation of the success of an

information system.

However, due to the multidimensional and interdependent nature of information system success, this model has undergone much improvement aimed at creating a comprehensive framework that can allow comparability of success across different information systems or different uses of one information system [6]. With this development, information quality remains a pivotal variable in the determination of the success of any information system. From this perspective, the success of the Blackboard system needs to be evaluated based on its utility, which can be measured by the quality of the information that the system yields. Therefore, the proposed study will investigate whether information quality positively affects the use of the Blackboard system. The aspects of information quality to be tested include its availability, usability, ease of understanding, conciseness, timeliness, clarity, readability, and exclusivity, as suggested by Gable, Sedera and Chan [2].

3. Methodology

3.1. Research model

This study adopted the IS-Impact Measurement Model developed by Gable, Sedera, and Chan in 2008. This model has always been regarded as a comprehensive and valid information system (IS) success measurement model [7]. Gable and his colleagues [2] defined it as "a measure at a point in time, of the stream of net benefits from the IS, to date and anticipated, as perceived by all key-user groups" [4]. This model was designed based on the work of DeLone and McLean [8], and it corrects the drawbacks of their earlier model. The IS-Impact Measurement Model differs from the old DeLone and McLean IS Measurement Model in five ways: 1) it reflects a true measurement model rather than the causal/process model depicted by the D&M model; 2) the use of dimensions has been omitted; 3) the aspect of satisfaction is seen as a measure of success rather than as a dimension of success; 4) the modern IS context has been taken into consideration through the inclusion of new measures; and 5) additional measures have been added to deeply examine organizational dimension [4].
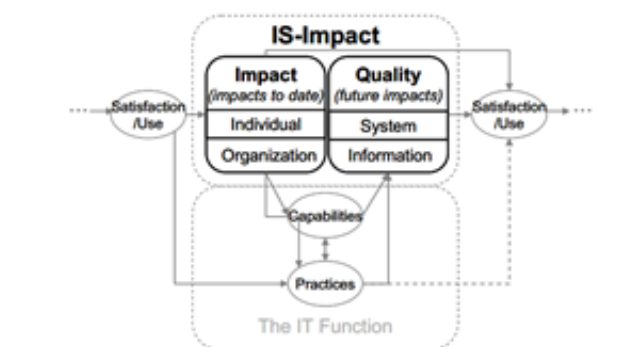

Figure 1: IS-Impact Measurement Model [1].

As illustrated in Figure 1, within the IS-Success/Impact framework, the success and impact of an IS system can be measured in terms of the quality of the information produced (information quality), the performance of the system from a technical perspective (system quality), the impact on individual users (individual impact), and the impact on the relevant organization (organizational impact). According to Rabaa'i [4], this model has been

tested statistically though surveys; it has proven to be valid, and it employs perceptual measures. Despite borrowing heavily from the DeLone and McLean model by adopting its constructs, it has succeeded in employing them for a different purpose [2]. The model and approach employ perpetual measures, aiming to offer a common instrument answerable by all relevant stakeholder groups, thereby enabling a combination or comparison of stakeholder perspectives [7]. 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 the other models by including and reviewing their constructs. This paper will focus on assessing information quality. According to Gable, Sedera, and Chan [2, p.289], "Information Quality is a measure of the quality of (the IS) outputs: namely, the quality of the information the system produces in reports and on-screen." Information quality is concerned with the relevance, timeliness and format of reports, and the accuracy of information generated by the Blackboard. The focus is on the quality of the Blackboard outputs: namely, the quality of the information the system produces in reports and on-screen.

3.2. Research hypothesis

Based on the adaptation of the IS-Impact Measurement Model, the variables for the construct of "Information Quality" are the following:

- Information available from the Blackboard is important
- The Blackboard provides output that seems to be exactly what is needed
- Information needed from the Blackboard is always available
- Information from the Blackboard is in a form that is readily usable
- Information from the Blackboard is easy to understand
- Information from the Blackboard appears readable, clear, and well formatted
- Though data from the Blackboard may be accurate, outputs sometimes are not
- Information from the Blackboard is concise
- Information from the Blackboard is always timely
- Information from the Blackboard is unavailable elsewhere

Accordingly, the hypothesis for the construct of "Information Quality" can be stated as:

"Information Quality positively affects the use of the Blackboard system"

The Blackboard system should provide precisely what is needed at the correct time. Similarly, the Blackboard system must provide information that is relevant to the required course, sufficient for the required purpose of learning, and easy to understand. Moreover, the information provided by the Blackboard must be up-to-date, readable, clear, well formatted, and on time while being suitably concise. Depending on the occurrence of all of these factors, the Blackboard system should work successfully and effectively within the education environment.

3.3. Sampling method

In order to carry out this positivist research a single case design was chosen as it is more suitable for research that aims to test a theory, anomaly, or special case. This research used a single case design to delve more deeply into the phenomena in order to insure that a rich description and understanding is provided.

The selected case for this research was Saudi Electronic University (SEU), which is the only university in Saudi Arabia that has adopted a blended learning style. The adopted blended learning pattern in SEU combines the features of both traditional education and e-learning in an integrated model that obtains the maximum benefit from the technology and the means available to each of them in order to achieve the desired optimal learning objectives. The Blackboard system has been utilized by SEU since 2012 as the main learning management system in the university. A total of 447 students from SEU voluntarily participated in the study.

3.4. Survey Questionnaire

The IS-Impact survey instrument developed by Gable, Sedera & Chan [2] was adopted in this research. However, only those survey questions that measure the information quality were included. Ten variables that are mentioned in the section "research hypothesis" were presented in the questionnaire to test the construct validity. The participants were asked to answer the questions based on a scale of 1 to 5, where 1 represented "Strongly disagree"; 2, "Disagree"; 3, "Neutral"; 4, "Agree"; 5, "Strongly agree."

4. Results

All questionnaire responses were stored in the SPSS (Statistical Package for the Social Science) software, which was used for the analyses. Statistical analysis included the frequency and the percentage of each variable, the chi-square value, and its level of significance. More specifically, the data analysis included the following variables:

- Information available from the Blackboard is important
- The Blackboard provides output that seems to be exactly what is needed
- Information needed from the Blackboard is always available
- Information from the Blackboard is in a form that is readily usable
- Information from the Blackboard is easy to understand
- Information from the Blackboard appears to be readable, clear, and well formatted
- Although data from the Blackboard may be accurate, sometimes the outputs are not
- Information from the Blackboard is concise
- Information from the Blackboard is always timely
- Information from the Blackboard is unavailable elsewhere

As shown in Table 1, the survey results clearly indicate that the most important response among the variables within the information quality was for the item number 1: "Information available from the Blackboard is important". The majority of students have a positive view of the importance of the information available from the Blackboard system, with mean scores between 4.01 and 3.14 out of 10.

Table 1: Relative numerical distribution and basic standards, including the chi-square values of variables related to information quality

Item	Strongly disagree		Disagree		Neutral		Agree		Strongly agree		M	SD	X2	الوزن النسبى	الترتيب
	f	%	f	%	f	%	F	%	F	%					
1	7	1.6	19	4.3	60	13.4	236	52.8	125	28.0	4.01	.852	395.629	4.01	1
2	14	3.1	52	11.6	112	25.1	191	42.7	78	17.4	3.60	1.006	201.870	3.6	3
3	9	2.0	66	14.8	102	22.8	205	45.9	65	14.5	3.56	.977	236.345	3.56	5
4	19	4.3	41	9.2	107	23.9	212	47.4	68	15.2	3.60	.992	258.358	3.6	4
5	20	4.5	46	10.3	110	24.6	219	49.0	52	11.6	3.53	.979	283.213	3.53	6
6	17	3.8	41	9.2	101	22.6	218	48.8	70	15.7	3.63	.979	275.539	3.63	2
7	13	2.9	97	21.7	175	39.1	140	31.3	22	4.9	3.14	.909	227.351	3.14	10
8	14	3.1	48	10.7	130	29.1	231	51.7	24	5.4	3.45	.872	373.324	3.45	8
9	20	4.5	55	12.3	112	25.1	203	45.4	57	12.8	3.50	1.011	228.917	3.5	7
10	12	2.7	45	10.1	211	47.2	145	32.4	34	7.6	3.32	.857	323.369	3.32	9

With regard to item number 1, the results indicate that the majority (80%) of the students believe that the information available from the Blackboard is important, while only 5.3% of the students believe that it is not important and 13% are neutral. The results also show that 59% of the respondents believe that the Blackboard provides output that seems to be exactly what is needed while 14% of the respondents believe that the Blackboard provides output that does not seem to be exactly what is needed; 25% remain neutral. With regard to item number 3, most the students (60%) confirm that information needed from Blackboard is always available, 17% say that the information needed from the Blackboard is not always available, and 22% remain neutral on the subject. As evidenced from the data analysis, only 13% of the students perceive that information from the Blackboard is in a form that is not readily usable, while the majority (62%) agree that it is in a form that is readily usable. Moreover, 60% of the surveyed students perceive that information from the Blackboard is easy to understand while 14% either disagree or strongly disagree that the information is easy to understand. However, 25% of students are neutral on the same question. The results further indicate that the majority of students (64%) confirm that the information from the Blackboard appears to be readable, clear, and well formatted while a low percentage (13%) of the students do not agree. In addition, 36% of the respondents say that although data from the Blackboard may be accurate, outputs sometimes are not; 39% of the respondents are neutral on this subject while 25% either disagree or strongly disagree. With regard to the suitable conciseness of the information from the Blackboard, the highest percentage (57%) of the students either agree or strongly agree that it is concise, 14% feel that it is not concise, and 29% remain neutral on the subject. Furthermore, a low percentage (16%) of the students believe that the information from the Blackboard is not always timely, but most of them (58%) believe that the information is always timely. A quarter (25%) of the students are neutral on this issue. The last survey question relates to information quality concerns with the uniqueness of the information provided by the Blackboard. Thirty-nine percent of the respondents believe that the information from the Blackboard is unavailable elsewhere while 13% that the information is available elsewhere. Nearly half (47%) of the participants remain neutral on the subject. In this case, the number of students that are neutral is relatively large. The results from the research can be generalized to the whole student population in high schools and bachelor degree students since all the answers provided by the respondents had a small standard variation,

implying that the standard error is small and the chi-square statistic is within the significance level.

5. Conclusion

Information quality related to the Blackboard system is concerned with the relevance, timeliness, and format of reports as well as the accuracy of the information generated by Blackboard. This paper assessed the information quality of the Blackboard system using the IS-Impact Measurement Model developed by Gable, Sedera, and Chan in 2008. It highlights the importance of measuring the information quality of the system to achieve a higher level of success. Analysis of the results indicates that information generated by the Blackboard is relevant, timely, accurate, up-to-date, readable, clear, well formatted, and suitably concise. The analysis of the results confirms that information quality positively affects the use of the Blackboard system. Finally, since this paper is limited to the assessment of only the "information quality" of Blackboard system, further research is suggested to test variables for the other constructs stated in the IS-Impact Measurement Model in order to measure the impact for the other aspects of the system.

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