E-Learning Effectiveness as Inputs for a Learning Management System Framework and Policy

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Abstract –*This study focused on the evaluation of a web-based virtual classroom initially piloted in one state college in the Philippines, with the aim of crafting an institutional framework policy for a Learning Management System for the College. A modified Web-based Learning Environment Instrument (WEBLEI) was used to gather data quantitatively on students' and teachers' observations on effectiveness. It measured the respondent's observations across four (4) scales which include Access, Interaction, Response and Results, using a 5-point Likert scale from students and teachers' responses. A sample of five (5) teachers and 132 students, who participated in the pilot implementation of the web-based virtual classroom during the previous school year comprised the respondents. Results showed that both students and teachers moderately agreed that the web-based virtual classroom was convenient and accessible, interactions were evident. Lessons became more interesting and kept them focused on their lesson. Weak internet connection is one of the issues raised by the respondents on the implementation which hindered the optimal utilization of the system. Documents analyses, as well as inputs from the evaluation, were used to come up with an institutional system framework and policy adapting the E-learning framework of Kahn. The LMS Policy includes the following aspects: (1) Rationale and Objectives, (2) Design and Development, (3) Management and Usage, (4) Guidelines of Use (5) Monitoring and Evaluation and (6) Effectivity. For more effective implementation, blended learning as a teaching-learning strategy should be widely disseminated to all faculty and students. The impact on student's learning may also be planned after two or three years of implementation to measure its significant contribution students' performance.*

Keywords *– Blended Learning, Google classroom. Web-based Virtual Classroom*

INTRODUCTION

The Web has become a powerful global medium for learning. As such, educational institutions are experiencing great changes as they are faced by the rapid pace of technological and economic development, thus the domains of teaching and learning need to adopt to concepts of e-learning. E-learning provides flexibility and convenience on the part of both the teacher and learner as it provides easy access to education since anyone can learn anywhere and anytime without constraints of time and place.

The use of technological gadgets while integrating with world wide web has created a big impact in the teaching-learning environment taking the benefits of internet services and online tools available in the cloud. Through the advancement of web-based technology, a software system such as the Learning Management System (LMS) is used to enhance learning in various conditions. LMS is based on the principle of e-learning platform ultimately aimed to effectively accomplish the instruction which could be optimized for supporting important instructional activities such as instructional management, interaction, evaluation and information guidance [1]. In other words, LMS is not just a tool that provides users with convenient facilities such as sending email, distributing handouts or keeping an online grade book. Essentially, an LMS provides an automated mechanism for delivering course content and tracking learner program. LMS also allows students to view multimedia lectures, communicate with their teachers and each other in teaching the communities, download course material, take online quizzes and submit homework and assignment [2]. LMS also provides tools for multimedia contents, assignments, and supporting interaction, including discussion groups, chat sessions, and online quizzes and examinations. Due to numerous online learning, e-learning platforms and virtual classrooms, educators and researchers are concerned that there is danger that learning in that medium becomes driven by

Technology without sufficient emphasis on pedagogy [3].

Evaluation is becoming increasingly important, both as a part of the design of online courses and as a mechanism for quality assurance. For blended learning programs to become successful, one of the essential things to consider is constant evaluation, not only at the end of the program, but more importantly during its implementation [4]. Studies on evaluation of the use of a virtual learning environment show that online forums are popular among student and perceived benefits were identified such as flexibility, greater sense of community and enhanced higher learning skills [5].

In 2018, the College of Arts and Sciences pioneered a single LMS available to the college, its faculty and students, known as the Online Classroom. It promotes blended learning, a hybrid teaching methodology which is a combination of online and Face-to-face learning [6]. It utilizes the digital tools from Google seamlessly integrated in education and classroom practices to an extent in which this online learning management system supports or substitutes other learning and teaching approaches such as linear learning, collaborative learning, flipped classroom, or using synchronous or asynchronous learning. Relative to ISO-Quality Management Systems (QMS) compliance, the tool helps to support formulating balanced scorecard in the quality assurance practices of teachers as part of the output for the quality management assisting the department to assess the performances of students, teachers, and their academic disciplines according to their areas of excellence.

Relative to the institutionalization of the system, an evaluation of the initial implementation was conducted as to its effectiveness and continuous improvement. The results of this evaluation was used to review and revise the implementation process for the use of all the other colleges of the institution. A framework with its attached policy resulted from this evaluation.

OBJECTIVES OF THE STUDY

This study focused on the evaluation of a web-based virtual classroom for a state college with the end goal of crafting an institutional policy for an E-learning System for the College. Specifically, this study evaluated effectiveness of the web-based virtual classroom from the students' and teachers' perspectives and established an Institutional framework and policy for a Learning Management System.

METHODS

This study used the survey method to evaluate the effectiveness of Learning Management Systems (LMS) of students and teachers to online learning or the LMS. After the pilot implementation of the LMS for one semester, teachers who used the system and their students became part of the research sample that were given the questionnaires on effectiveness.

Participants

The Web-based Learning Environment Instrument (WEBLEI), an instrument for evaluating effectiveness of online learning was administered to five (5) teachers from one specific college and 132 students from different colleges. They were the teachers who adapted the online classroom as a teaching strategy and their respective students.

Instrument

This research determined the effectiveness of the LMS through the use of the Web-based Learning Environment Instrument WEBLEI, which was initially designed by Chang and Fisher [7]. The instrument consists of four (4) scales – Access, Interaction, Response and Results, with eight (8) statements each. The Cronbach alpha reliability coefficients of the WEBLEI ranged from 0.65 to 0.88.

In the WEBLEI instrument, the Access scale determines the extent to which conditions associated with accessing this methodology meet students' expectations. The Interaction scale investigated the extent to which the opportunity of interacting productively with peers and teachers is achieved, from students' point of view once the students have logged in successfully. The Response scale gives an indication of how they felt about using a web-based medium and the Results scale gives an idea of whether they accomplished any of the learning objectives by using the learning resources accessed through this medium.

This was further modified by Chandra and Fisher [8] and used in a high school in Australia. In the present study, the latter version was found to be more appropriate to evaluate the effectiveness of the College's e-learning Classroom where only a few courses were offered online, as an initial activity before implementing it school-wide.

E-learning Framework. In 2010, Badrul H. Kahn designed the Global E-learning Framework to provide a "flexible learning environment" for learners worldwide. It has eight (8) dimensions- institutional, management, technological, pedagogical, ethical, interface design, resource support and evaluation. [9]

The *institutional dimension* is concerned with issues of administrative affairs, academic affairs and student services related to e-learning. The *management* of e-learning refers to the maintenance of learning environment and distribution of information. The *technological* dimension of e-learning examines issues of technology infrastructure in e-learning environments. This includes infrastructure planning, hardware and software. The *pedagogical* dimension of e-learning refers to teaching and learning. This dimension addresses issues concerning content analysis, audience analysis, goal analysis, medium analysis, design approach, organization, and learning strategies. The *ethical* considerations of e-learning relate to social and political influence, cultural diversity, bias, geographical diversity, learner diversity, digital divide, etiquette, and the legal issues. The *interface design* refers to the overall look and feel of e-learning programs. Interface design dimension encompasses page and site design, content design, navigation, accessibility and usability testing. The *resource support* dimension of the e-learning examines the online support and resources required to foster meaningful learning. The *evaluation* for e-learning includes both assessment of learners and evaluation of the instruction and learning environment.

Data Analysis

Data analysis was conducted and became the basis for the framework and policy on the learning management system for the College. Statistical treatment such as weighted mean was utilized to establish the observed effectiveness. Suggestions and recommendations were also solicited for the improvement of the system.

Data from the survey were coded and entered as 5 (4.51-5.00: Strongly Agree), 4(3.51-4.50: Agree), 3 (2.51-3.50: Moderately Agree), 2(1.51-2.50: Disagree) and 1(1.00-1.50; Strongly Disagree). Average means were also computed for every scale for comparison.

RESULTS AND DISCUSSION

Table 1. Weighted means for the four scales of the WEBLEI

WEBLEI Scales	Mean	Descriptive Rating
Access	3.54	Agree
Interaction	3.30	Moderately Agree
Response	3.27	Moderately Agree
Results	3.56	Agree
Overall Mean	3.42	Moderately Agree

The overall mean obtained for all the four scales was 3.42 as shown in Table 1. For the specific scales, the Access and Results scale obtained descriptive ratings of Agree (3.54 and 3.56), the Response and Interaction scales obtained descriptive ratings of moderately agree (3.30 and 3.27).

Table 2. Weighted means of student responses to the items in the Access Scale

	Statement	WM	VI
1.	I can access lessons on the Internet at times convenient to me.	3.49	Moderately agree
2.	Lessons on the Internet are available at locations suitable for me.	3.40	Moderately agree
3.	I can access lessons on the Internet on days when I am not in class or absent from school.	3.51	Agree
4.	Lessons on the Internet allow me to work at my own pace to achieve learning objectives.	3.69	Agree
5.	Lessons on the internet enable me to decide how much I want to learn in a given period.	3.52	Agree
6.	Lessons on the Internet enable me to decide when I want to learn.	3.53	Agree
7.	The flexibility of lessons on the Internet allows me to meet my learning goals.	3.58	Agree
8.	The flexibility of the lessons on the Internet allows me to explore my own areas of interest.	3.63	Agree
	Average Mean	**3.54**	**Agree**

Table 2 further shows the weighted means for the Access scale. A weighted mean of 3.54 for the Access scale suggested that a web-based environment enabled them to work at their own pace and gave them greater autonomy in achieving their learning objectives. The respondents moderately agreed that can access lessons on the Internet at times convenient to the students (3.49) and Lessons on the Internet are available at locations suitable for them (3.40). This suggested that students are not fully convinced that their learning environment was convenient and easily accessible at locations suitable to them. Some of the respondents even commented that the internet connection of the College has much to be improved.

Table 3 shows specific weighted means for the Interaction Scale. The Interaction scale produced a weighted mean of 3.30, which is described as moderately agreeable. But interestingly, the statement with the highest rating in the entire questionnaire was from this scale. With a weighted mean of 4.08, students agreed that in this learning environment (web- based), they have to be self-disciplined in order to learn.

Table 3. Weighted means of responses to the items in the Interaction Scale

	Statement	WM	VI
1.	I communicate with my teacher in this subject electronically via email.	2.95	Moderately agree
2.	In this learning environment, I have to be self-disciplined in order to learn.	4.08	Agree
3.	I have the option to ask my teacher what I do not understand by sending an email.	3.09	Moderately agree
4.	I feel comfortable asking my teacher questions via an email.	2.88	Moderately agree
5.	The teacher responds to my emails.	2.96	Moderately agree
6.	I can ask other students what I do not understand during Internet lessons.	3.53	Agree
7.	Other students respond positively to questions in relation to Internet lessons.	3.45	Moderately agree
8.	I was encouraged by the positive attitude of my friends towards the Internet lessons.	3.45	Moderately agree
	Average Mean	3.30	Moderately agree

The statements with the lowest ratings were on the use of emails. Students moderately agreed that they can communicate with their teacher in this subject electronically via email (2.95), that they feel comfortable asking their teacher questions via an email (2.88) and that their teacher responds to their emails (2.96). This result is not unique for this research. In an Australian high school, senior students also expressed low agreement on the teacher's ability to respond to emails [8].

Table 4. Weighted means of responses to the items in the Response Scale

	Statement	WM	VI
1.	This mode of learning enables me to interact with other students and my teacher.	3.34	Moderately agree
2.	I felt a sense of satisfaction and achievement about this learning environment.	3.29	Moderately agree
3.	I enjoy learning in this environment.	3.23	Moderately agree
4.	I could learn more in this environment.	3.29	Moderately agree
5.	I can easily get students to work with me on the Internet.	3.11	Moderately agree
6.	It is easy to work with other students and discuss the content of the lessons.	3.29	Moderately agree
7.	The web-based learning environment held my interest in this subject throughout this term.	3.30	Moderately agree
8.	I felt a sense of boredom in this subject towards end of this term.	3.31	Moderately agree
	Average Mean	**3.27**	Moderately agree

All other items generally demonstrated moderate agreement to the all other items in the scale as shown in Table 4. A mean score of 3.27 was obtained for the Response scale, which is the lowest among the 4 scales. This implied that students moderately agreed that web based learning was satisfying and it enabled them to interact with other students and their teachers. They also enjoyed learning in this environment and they believed that this approach held their interest in the subject for the whole term. While students observed moderately that they can easily get other students to work with them on the Internet (3.11). Consequently, they also moderately agreed that the mode of learning enables students to other students and their teacher (3.34), which was the highest rated statement in the interaction scale. Cakiroğlu [3], found that online learning had limitations in terms of discussion among learners since they find it difficult to follow the topics sometimes.

Table 5. Weighted means of responses to the items in the Results Scale

Statements	WM	VI
25. I can work out exactly what each lesson on the Internet is about.	3.37	Moderately agree
26. The organization of each lesson on the Internet is easy to follow.	3.51	Agree
27. The structure of the lessons on the Internet keeps me focused on what is to be learned .	3.62	Agree
28. Internet lessons helped me better understand the work that was taught in class.	3.62	Agree
29. Lessons on the Internet are well sequenced.	3.48	Agree
30. The subject content is appropriate for delivery on the Internet.	3.59	Agree
31. The presentation of the subject content is clear.	3.72	Agree
32. The assessment test at the end of each lesson on the Internet improves my learning in this subject.	3.55	Agree
Average Mean	**3.56**	**Agree**

In this research, the mean score of 3.56 for the Results scale is the highest among the four scales. This suggested that students agreed they could establish the purpose of web-based lessons and they are aware that web-based learning can meet the objectives of the lesson. Specifically, they agreed that the lessons were also clear (3.72), kept students focused on what is to be learned (3.62) and helped students better understand the lesson. But they only moderately agreed that students can work out what each of the lesson on the internet is about (3.37). Chandra V & Fisher, D (2006)

[8] presented also a high rating for the Response scale indicating that the online learning presents lessons in an organized manner which enables the objectives of the lesson to be met. Though, this study had different results in terms of which scale had the highest and lowest ratings.

Written comments from the student questionnaires and responses from informal interviews to teachers were analyzed by looking for commonalities, differences and relationships between student responses with regards to the perceived effectiveness of the online classroom. Almost all comments were on the "weak/ poor internet connection", or "no access to internet". These are also related to comments of "inability to access their accounts". Two students say that there are not enough units (computers) to be used by students" for this purpose.

LMS Policy

Policies are extremely important as part of good management. It sets and clarifies expectations, facilitates consistency and creates a structure for authority[10]. For the successful implementation of any LMS, a policy should outline the appropriate usage, roles, responsibilities and authority for the learning platform.

After analyzing the results of the effectiveness survey, including suggestions and recommendations from the teachers, an e-learning framework following Kahn's e-learning framework was constructed for the school. An LMS policy was also established with inputs from other universities' LMS policies [11]-[14].

The LMS Policy includes the following aspects: (1) Rationale and Objectives, (2) Design and Development, (3) Management and Usage, (4) Guidelines of Use (5) Monitoring and Evaluation and (6) Effectivity.

Rationale and Objectives. This policy governs the development, management, use and administration of the LMS. The LMS is used in all courses and units of study as a means of supporting and enhancing student learning and facilitating access to learning materials.

Design and Development. The LMS is designed to provide a high quality learning platform based on sound pedagogical principles.

Management and Usage. Responsibilities and roles of the following are identified: Academic Resources Committee, Colleges, and Users (teachers and students).

Guidelines of Use. The basic requirement for the use of the online classroom shall be: (a) Student, faculty, and staff will access their LMS account using their college email (*Astean* Account), (b) All current faculty members receive an LMS account, which will house on-line forums for each class they are teaching. Staff members, whose jobs require them to use the LMS for faculty support reasons, are entitled to the creation of an LMS account. And (c). The school will populate an LMS course with enrolled students for each course and section scheduled by the college.

Monitoring and Evaluation. Regular monitoring of course content being uploaded and feedback shall be done by the respective colleges. Evaluation of student performance and perceived effectiveness will be conducted to further improve the system.

Effectivity. The policy shall be deemed effective and implementable once approved by the Board of Trustees.

CONCLUSION AND RECOMMENDATION

Success in an e-learning system involves a systematic process of planning, designing, evaluating, and implementing online learning environments where learning is actively fostered and supported. Results from the effectiveness instrument suggested that the student and teachers had positive perceptions of their online classroom experience. The obtained ratings suggested that a web-based environment enabled students to work at their own pace and gave them greater autonomy in achieving their learning objectives, as manifested by the Access and Results scales. Online classroom as a learning environment also promotes self discipline among students, but the results also showed that use of emails as a vehicle for electronic interaction were not preferred by both teachers and students, which resulted in a low rating for the interaction scale. Students' and teachers' qualitative responses shed light behind the low ratings in the response scale. They criticize the "slow internet connection" and "lack of computer units" for use in the online classroom.

The findings of the effectiveness evaluation were important inputs for the LMS Policy, as well the e-learning framework. The policy also focused on the recommendations of the teachers and students to reinforce and improve the internet connection within the College.

The successful implementation of the LMS policy requires its widest dissemination to all teachers and

students. Training for teachers on the use of the online classroom should be conducted as well as an orientation among students on its procedures for use. Blended learning, as a teaching-learning strategy may also be included in all syllabi, to be utilized in all courses.

An evaluation as to impact on student's learning may also be planned after two or three years of implementation. It should be able to measure whether the learning management system has significantly improved the performance of the students inside the classroom in terms of the amount of learning and their grades.

Due to technology advances, the use of the internet as an instructional media is inevitable worldwide. Learning institutions in the Philippines should be able to keep pace with this innovation if we aspire to be globally competitive in the area of education. This research sets a precedent for other schools, colleges and universities in the country that are moving towards the adaption of online learning, or electronic classrooms.

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