

Case Study

EVALUATING THE USE OF E-LEARNING SYSTEM AS A SUPPLEMENTARY TOOL AT AN ACADEMIC INSTITUTION

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ABSTRACT

This paper evaluate the use of e-learning system tools to supplement the traditional way of teaching at an academic institution in Oman. The results revealed that students believed that the most useful aspects of the e-learning system were downloading course materials, online quizzes and the email tool. The results also disclosed that system characteristics were cited higher than information characteristics as the technical determinants of the students' usage of the e-learning system. Also, there were non-technical determinants; the most cited ones were related to the students (such as students' computer skills and availability) and the instructors (such as instructors' support and online availability). The results also revealed several benefits of utilizing the e-learning systems to supplement the classes; the most identified benefits were improved computer skills, improved connectivity with others and quick access to course materials.

Key Words: E-Learning, e-learning benefits, e-learning success factors, e-learning tools.

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INTRODUCTION

As the world is moving toward a knowledge-based economy, the use of the information technology (IT) tools including e-learning systems has become a main imperative. Several international reports from the World Bank and the World Summit on the information society emphasized that the use of information communication technology (ICT), to build human resources is a vital prerequisite for the development of knowledge-based economy especially for developing country. Recently, the adoption of e-learning systems has been growing in the academic world. In 2004, the e-learning market was worth more than US \$18 billion worldwide¹. In the Middle East, e-learning projects are expected to exceed a compound average growth rate of 32% by 2008, based on the Madar research group¹.

In Oman, several institutions (such as Petroleum Development of Oman Company, National Bank etc) are utilizing e-learning systems to train their employees. Academic institutions, such as Sultan Qaboos University (SQU), are also utilizing the e-learning systems to supplement their traditional way of teaching. The utilization of e-learning system in SQU is just starting; the University is utilizing WebCT and Moodle Systems to support the delivery of the traditional courses at the university. Faculty members are encouraged to design e-learning templates to support their teaching. Several faculty members, for instance, are utilizing several tools in Moodle

system to support the delivery of their classes. Also, centers (such as language center, Center for Educational Technology, etc) at SQU are utilizing the Moodle system to support training and academic classes. Based on 2005 endorsed strategic plan, the main strategic objectives of e-learning at SQU are:

1. To develop a range of purely online course that students are required to take as part of their academic undergraduate program.
2. To deliver online courses for distance learning programs for graduate and for outreach into the community.
3. To utilize e-learning system for faculty/staff professional development.
4. To initiate a proposal for a virtual consortium with high quality universities in Oman and Gulf Cooperation Countries (GCC).

To be able to succeed on the deployment of e-learning systems and reach the organization's long-term strategic objective, it is very essential for organizations (such as SQU) to understand the determinants of this technology's acceptance. The technology's acceptance can be assessed from different perspectives such as the acceptance of governments, organizations, instructors or manager. This study aimed to investigate this phenomenon from the students' perspective. Students are the ultimate end users

of e-learning system and their utilization determines the success and failure of such systems.

This study qualitatively investigated the technical and non-technical determinants and benefits of the students' use of the e-learning system. It also examined the specific tools of e-learning system that have been utilized to support the delivery of classes and their degree of usefulness.

The next section provides a literature review of e-learning tools and benefits and the determinants of e-learning system use. The literature section is followed by sections on study framework, study methodology, data analysis and discussion and conclusions.

LITERATURE REVIEW

A. E-Learning Tools and Benefits

E-learning is defined as "instruction delivered through purely digital technology using the Internet or private networks"². It is the use of a web-based communication, collaboration, learning, knowledge transfer and training to add values to the learners and the businesses³. Some academic and technical training institutions adopt the e-learning system to support distance learning, while others adopt this technology as a supplementary tool to their traditional way of teaching. For distance learning, E-learning can be used to build a virtual classroom where all coursework is done purely online⁴. What's more, e-learning management system supports the development of virtual universities, where students take classes from home (or off-site location) via the Internet. Examples of these universities are University of Phoenix (www.phoenix.edu) and California Virtual Campus (www.cvc.edu).

There are several learning management systems in the market such of these systems are WebCT, Blackboard and Moodle. These systems include several tools that can be utilized to support distance learning or to supplement the traditional teaching.

For example, Moodle system offers instructors several tools that allow them to develop some course activities such as assignments, surveys, choices, discussion forums chats, resources (files, websites), quizzes, survey, journals, glossaries, workshops⁵. WebCT(from WebCT Inc), another online learning management systems, also provides instructors different tools to design for online course; such tools are as quizzes, syllabus, calendar, assignments, content module, audio and video clips, forums, glossaries, students homepages, electronic mail, chat sessions, interactive whiteboards, grades tracking and records and others.

There are several individual and organizational benefits resulted from the deployment of online learning management system. Students can access course materials online at any time, it also give students some flexibility

in terms of place, time and own pace⁴. Other benefits are cost-effectiveness, consistency, timely content, flexible accessibility and customer value^{6,3}. E-learning system also allows students to interact with others and see the results of the action, control their own learn, develop deep thinking skills and develop a sense of community with other learners (SQU, 2008). However, e-learning may cost a lot to develop, requires new skills on content producers and requires more responsibility and self-discipline from the learners⁶; thus students might be intimidated to use the e-learning systems.

E-learning management system is not only a promising technology for schools. In corporate training environment, e-learning management system offers several benefits such as flexibility, accessibility and convenience. It allows managers to develop customized online training modules and allows field employees to access those modules 24 hours per day, seven day per week⁷.

B. Determinants of E-learning System Use

User acceptance is a multidimensional attitude affected by various technical and social factors^{8,9}. Various frameworks in the Information systems literature examined the technology acceptance of users from technical or/and social perspective. Examples of those frameworks are those⁸⁻¹². Benbya and colleagues also indicated that there are several challenges to the acceptance of an information system¹³. These challenges are related to technical challenges (e.g. system design, effective information and usability), management challenges (leadership, rewards policy, strategy and cost.) and social challenges (e.g., organizational culture, trust, commitment and satisfaction)

From cognitive perspective, Oblinger indicated that to understand the determinants of "virtual or brick-and-mortar learning environment", cognitive determinants of environmental preference suggested by Kaplan and Kaplan should be considered¹⁴. These determinants are related to Coherence (the ease with which a setting can be organized cognitively), Complexity (the perceived capacity of the setting to occupy interest and stimulate activity), Legibility (perceived ease of use) and Mystery (the perception that entering the setting would lead to increased learning, interaction, or interest).

Thus, understanding the determinants of the learners' acceptance of the e-learning systems is vital to the promotion and exploitation of these systems. Limited studies investigated the e-learning acceptance from instructors' perspective such as those^{15,16}. For instance, Roca and colleagues found that Information quality, ease of use, perceived usefulness, information quality, service quality and system quality determine the students' satisfaction and consequently their e-learning continuous intention¹⁷. Gotthardt and colleagues indicated the success of e-learning strategy depends on content quality, system and content flexibility, system ease of use and others¹⁸. Nevertheless, these two studies evaluated the individuals' acceptance of the entire e-learning system.

STUDY FRAMEWORK

The main objective of this study is to evaluate the use of e-learning management system as a supplementary tool at an academic institution such as Sultan Qaboos University. First, this study examined the specific tools of e-learning system that have been utilized to support the delivery of classes and their degree of usefulness. Second, the study qualitatively investigated the technical and non-technical determinants and benefits of the students' use of learning management system. To conduct this investigation, two sets of questions were developed. First set is related to the tools of learning management system and their degree of usefulness:

1. Which tools have you used for your classes?
2. Which tools do you believe are useful to be utilized for your major classes?
3. Which tools do you believe are not useful to be utilized for your major classes?

Second set of questions are related to the determinants and benefits of e-learning:

1. What are the technical factors that affect your use of e-learning system for your classes?
2. What are the non-technical factors that affect your use of e-learning system for your classes?
3. What are the individual benefits of using the e-learning system for your classes?

STUDY METHODOLOGY

A. Investigated System and Sample

The study questionnaire was distributed to students in Sultan Qaboos University, the largest public academic institution in Oman. The medium of instruction is English in all science fields including commerce where the sample was selected. The university is currently deploying Moodle and WebCT e-learning systems. Instructors may voluntarily use these systems and incorporate them in their teaching. The e-learning systems are used as supplementary tool to support the traditional learning system enrich the learning experience.

The questionnaire was completed by 101 undergraduate students. Most of the students are business students; about 95% of the students are from the college of Commerce and Economics. The sample included about 39% male students and 61% female students. About 57% of student described their English level as average and 39% of them above that. About 44% of the students described their computer skills as average, and 36% of them described as above average. All participants had experience with the e-learning system. About 8% of students had one semester of e-learning experience, 38% had two semesters experience, 23% had three semesters experience and 32% had at least four semesters experience. About 66% of the students had used only WebCT e-learning system

and 11% of them used only Moodle e-learning system and 23% used both WebCT and Moodle.

B. Data Collection

Data was collected by a questionnaire. The questionnaire included some demographic questions along with the three open-ended questions. The open-ended "What" questions were applied to identify the technical determinants of the e-learning system use, the non-technical determinants of e-learning system use and the individual benefits that might be achieved through this usage. To trigger the students' answers, the questionnaire cited lists of possible factors are given to answer these questions. These lists were developed based on the cited literature above. Participants may select from these lists or put their own.

DATA ANALYSIS AND RESULTS

A. Analysis Methodology

The results were deducted based on the analysis of 101 completed questionnaire filled by undergraduate students in SQU. The qualitative open-ended questions were developed and analyzed based^{19,20}. The analysis was conducted separately question-by-question. As per¹⁴, frequency tables were developed to help draw inferences from the qualitative data²⁰.

B. E-Learning System Tools and Usefulness.

The results of this study showed that the participants of this study had different utilization level of e-learning tools. Figure 2 indicates that the most utilized tool in the e-learning system is the email tool. About 68% of participants had utilized the email service, while only 12% of participants had utilized instant messaging. About 50% of the participants had used the system to access and download the course materials. About 38% of users had used the system to do online quizzes and 34% of the participants had used the system to check their online grades. About 32% of participants had used discussion forum tool of the system for their classes, while 21% had used chatting sessions. About 29% of participants had used the system to upload assignments, and 26% to check for the course calendar. The results indicated that the usage of survey, journal, group collaboration and workshop tools represents 20%, 16%, 14% and 6% respectively.

Regarding the usefulness of these tools, the results indicated the most useful aspects of the e-learning system utilization to supplement the traditional classes are downloading course materials (cited by 47% of participants), online quiz (46%), and email (45%). Group collaboration tool was believed to be useful by 38% of participants, online grading by 33%, workshop by 31%, discussion forums by 30%, survey by 30% and uploading assignments by 29%; Whereas only 18% of participants believed that journal tool is useful to supplement the traditional classes, 14% believed that calendar is useful tool and 12% believed that instant messaging is a useful tool.

About 62% of participants believed that chatting was no a useful tool.

Technical Determinants of E-learning System Use.

Table 1 shows that several technical factors determine the students' use of the e-learning to support the traditional classes. The most cited factors are related to the system's characteristics compared to the information's characteristics. System's speed was the most cited characteristics (cited by almost 55% of students), followed by availability (31%), ease-of-use (30%), security (28%), reliability (19%) and accessibility (18%). Information sufficiency is the most cited information characteristics (cited by 24%), followed by accuracy (18%), relevancy (17%), timeliness (16%), and understandability (14%).

There are several non-technical determinants of the students' use of the e-learning system use. Table 2 illustrates these factors. Table 2 shows that the most cited factor were related to the user such as the user's available time (cited by almost 40% of students) and the user's IT experience (24%). Some non-technical determinants cited by the students were related to of the course instructors such as the instructor's support (cited by almost 19% of students) and the instructor online availability (cited by almost 18% of students). Moreover, almost 16% of that IT

staff service quality is another non-technical determinant, and another 16% of students indicated it is related to the classmate's online availability. Clarity of the e-learning system's objective and awareness were cited by almost 15% and 14 % of students respectively. Other reported non-technical determinants are university support (almost 13% of students), student's internet experience (12%), rewards(10%), trust(10%) and mandatory use(6%).

Individual Benefits of E-Learning System Use:

The 101 students pointed out various individual benefits from their use of the e-learning to supplement their traditional classes. Table 3 shows that the mostly cited benefit was improved computer and Internet skills, cited by almost 35% of the students. Students also indicated that the use of the system improved their connectivity with others (cited by almost 29% of students), speeded up the access to course materials(28%), enhanced flexibility(23%), improved their creativity(23%), improved their performance(22%), saved them time(21%), improved the quality of their study (21%). The students also highlighted that the use of the system added more fun and enjoyment to the course (almost 20%) and developed a sense of community(17%), provided them a better control of their learning(15%), improved their satisfaction (13%) and improved convenience(12%).

Table 1: Technical determinants of E-learning system use.

Technical Factors	Freq (n=101)	(%)
System speed	55	54.46%
System availability	31	30.69%
System ease of use	30	29.70%
Security	28	27.72%
information sufficiency	24	23.76%
System reliability	19	18.81%
system accessibility	18	17.82%
Information Accuracy	18	17.82%
Information relevancy	17	16.83%
Information timeliness	16	15.84%
information understandability	14	13.86%

Table 2: Non-technical determinants of e-learning system use.

Technical Factors	Freq (n=101)	(%)
Time	40	39.60%
IT experience	24	23.76%
Instructor's support	19	18.81%
Instructor's online availability	18	17.82%
IT staff service quality	16	15.84%
Colleagues' online availability	16	15.84%
Clarity of the system's objective	15	14.85%
Awareness	14	13.86%
University support	13	12.87%
Internet experience	12	11.88%
Rewards	10	9.90%
Trust	10	9.90%
Mandatory use	6	5.94%

Table 3: Individual benefits of e-learning system use.

Individual Benefits	Freq (n=101)	(%)
Improved computer/Internet skills	35	34.65%
Connectivity with others	29	28.71%
Quick access to materials	28	27.72%
Flexibility	23	22.77%
Improve your creativity	23	22.77%
Improve your performance	22	21.78%
Saving time	21	20.79%
Improve the quality of your study	21	20.79%
Enjoyment/fun	20	19.80%
Developing a sense of community	17	16.83%
Provide a better control on your learning	15	14.85%
Improve your satisfaction	13	12.87%
Convenience	12	11.88%

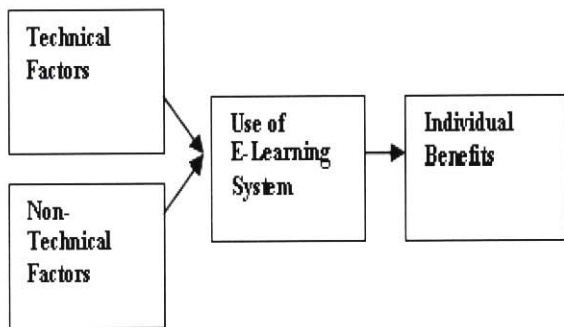


Fig 1: The Study Investigation.

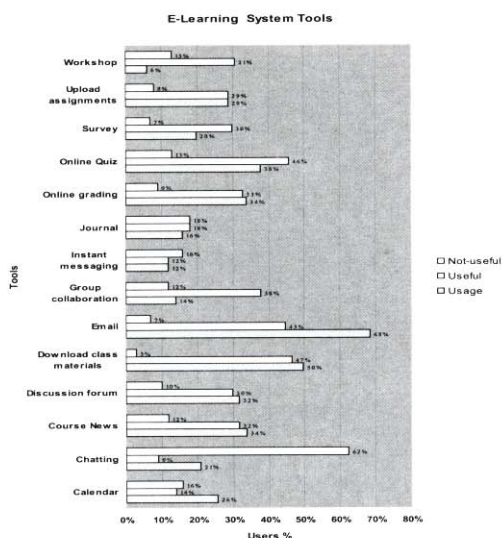


Fig 2: E-Learning System Tools Chart

CONCLUSION

The popularity of e-learning systems has been growing in the last few years. This study aimed to examine the specific tools of e-learning system that have been utilized to support the delivery of classes and their degree of usefulness. It also revealed the technical and non-technical determinants and benefits of the students' use of the e-learning system as a supplementary tool for the traditional classes

The study offered useful implications for practice and research. This study provided an initial framework to quantitatively test determinants and benefits of the e-learning system. This investigation is very limited in the e-learning context specifically in the developing countries. The study also provided useful insights for the practitioners (Instructors and academic institutions). Instructors should ensure in their course design that the use of e-learning tools should be relevant to the students' studying tasks. They also should constantly encourage the students to use the e-learning system, and provide them enough time to use it. Developers should ensure that the system has good quality characteristics in terms of speed, ease of use, reliability and functionality. Also, the system should be available to the students. Moreover, developers should ensure that the system provides tangible results that are useful.

This study was a pilot investigation and sample was selected based on accessibility. Thus, further empirical quantitative studies are important to test the statistical significance of these revealed factors, and a random selection would increase the strength of external validity.

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