

ORIGINAL ARTICLE

ASSESSMENT OF STUDENTS' PERCEPTIONS TOWARDS E-LEARNING MANAGEMENT SYSTEM (E-LMS) IN A MALAYSIAN PHARMACY SCHOOL: A DESCRIPTIVE STUDY

Mohamed Azmi H¹, Zeehan SI², Fahad S¹, Maryam F³, Hisham A⁴

¹School of Pharmaceutical Sciences, Universiti Sains Malaysia, Penang, Malaysia.

²School of Languages, Literacy and Translation, Universiti Sains Malaysia, Penang, Malaysia.

³Faculty of Pharmacy, Universiti Teknologi MARA, Pulau Pinang.

⁴College of Pharmacy, King Saud University, Riyadh, Saudi Arabia.

ABSTRACT

The study aims to evaluate students' perceptions towards e-Learning Management System (e-LMS) in pharmacy education. A cross-sectional survey was conducted among all undergraduates enrolled at School of Pharmaceutical Sciences, Universiti Sains Malaysia. A pre-validated questionnaire consisting of two domains (demographic characteristics and students' perception regarding the use of e-LMS) was used for data collection. Descriptive statistics were used to describe the demographic characteristics of the study respondents. Chi Square test was used to measure association between the study variables. All analysis was performed by using Predictive Analytical Software (PASW) v. 18. A total of 315 students completed the survey questionnaire with a response rate of 57.6%. Majority of the students (61.0%) accessed e-LMS to acquire lecture notes for their studies, followed by 53.3% have used e-LMS for the preparation of the assignments. Seventy eight percent of the respondents agreed that e-LMS is very useful and felt that e-LMS is making their studies easier. However, 50% of students claimed that poor network connection at the campus is a major barrier in accessing e-LMS. Moreover, 48% of the respondents disagreed that e-LMS should be taken into account as an assessment criterion for students' grading. Students are found to be frequently engaged in using e-LMS and believed that online based learning is enhancing their academic performances. Nevertheless, students still prefer hybrid teaching methodologies than choosing traditional system or e-learning as an alone entity.

Key words: e-LMS, perception, pharmacy students, teaching aid, assessment.

INTRODUCTION

The encroachment of Information Technology (IT) in the past decade forced radical changes in health care delivery and patient-oriented care around the globe¹. These progressions resulted in worldwide amendments of pharmacy curricula and teaching methodologies to meet increasing demands of an advanced IT based healthcare system². Within this context, Information and Telecommunication technologies (ICTs) are now being adopted as mode of effective course delivery and teaching aid at various educational levels. Such tools offer learners a control over content, pace of learning, and time management allowing them to tailor their experiences and accomplish their learning objectives in a timely fashion³⁻⁵. Therefore, e-learning is a useful teaching tool in education and is defined as "the use of internet technologies to enhance knowledge and performance"⁶.

In the current era, learning process is facilitated by electronic technologies hence processing of

transferring information in more convenient forms⁷. E-learning content delivery can shape up in either synchronous or asynchronous form. Synchronous delivery refers to real-time, instructor-led e-learning, where all learners receive information simultaneously and communicate directly with other learners. Where as in asynchronous delivery, the transmission and receipt of information do not occur simultaneously. The learners are responsible for pacing up their own instruction and learning. Regardless to the methods that are utilized, the efficacy and effectiveness of E-Learning still remains reliable and valid⁸.

In order to measure the efficiency and importance of E-Learning, users' perceptions is counted as an essential parameter of success and failure. E-learning is designed to help users keeping up the pace with management of their study objectives⁹. In addition, it also helps in dealing with ongoing and continuing updates, thus acts as a platform to seek and disseminate information at ease¹⁰. Within this context, concerns towards e-Learning

Management System (e-LMS) in enhancing students' learning process among Malaysian students are not well explored. Therefore, this research is designed and aimed to evaluate perceptions of pharmacy students towards the use of e-LMS in their pharmacy education.

METHODS

A questionnaire based, cross-sectional study was employed as the method of data collection. All pharmacy undergraduates (n=547) enrolled at School of Pharmaceutical Sciences, Universiti Sains Malaysia (USM), Penang, Malaysia were included in the study. The initial questionnaire was developed through an extensive literature review. Expertise of experts in the field of IT was also taken into consideration during the questionnaire development. The initial survey comprised of two parts. The first part consisted of demographic information including gender and academic year in which the students were enrolled. The second part consisted of 15 questions which evaluated the perception of students towards e-LMS in pharmacy education. Within this domain, 6 questions were offered as multiple choice questions. Six questions were designed in limited choice format ("yes", "no", and "maybe" or "sometimes") and two in a five-point Likert scale format ("strongly agree", "agree", "neutral", "disagree", "strongly disagree"). The last question was open ended seeking suggestions on improving students' access to e-LMS.

Data collection

The questionnaire was tested for its reliability (Cronbach's $\alpha=0.75$) and validity. Little modification was needed after the completion of the process. The study was conducted from October-November 2011. Data was collected by distributing the questionnaires to the students of first, second and third year pharmacy professionals after their classes at main campus of USM. However, the questionnaires were emailed to the personal e-mail addresses of 175 students enrolled in fourth year as they were involved in clerkship at health campus of USM located in Kelantan, Malaysia. The cover letter of the questionnaire assured participants of the confidentiality of their responses and the right to withdraw from the study at any point.

Ethical approval

The study was approved by internal ethical

committee of Discipline of Social and Administrative Pharmacy (DSAP), School of Pharmaceutical Sciences, Universiti Sains Malaysia (DSAP/EA/14/2011). The informed consent was assumed on return of the completed survey.

Data analysis

Descriptive statistics were applied to compute the demographic characteristics of the study participants. Inferential statistics (Chi-square test) were used to measure association between the study variables. A p-value of <0.05 was considered as significant. All analyses were performed by using Predictive Analytical Software (PASW) v. 18.

RESULTS

A total of 315 students responded to the survey giving a response rate of 54.8%. The demographic characteristics of the study participants are presented in Table 1. The cohort was dominated by females (n=227, 72.1%). Majority of the students (n=262, 83.2%) were enrolled into Bachelor of Pharmacy degree programme upon completion of their matriculation programme.

Table 1. Characteristics of the study participants (n=315)

Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	88	27.9
Female	227	72.1
Study Year		
First year	95	30.2
Second year	66	21.0
Third year	67	21.2
Fourth year	87	27.6

Majority of the participants gave positive feedback towards E-Learning when they were inquired that whether usage of e-LMS helps and facilitates their studies. A significant association was observed when this question was compared with study year ($p=0.031$). Two hundred and fifty four participants

(80.6%) disagreed to the statement that e-LMS is a burden in their studies. Moreover, significant

association was observed among all other study variables (Table 2).

Table 2. Association between students' perception and demographic factors (N = 315)

Items	Response	n (%)	p-value	
			Gender	Study Year
1	Yes	245 (77.8)	0.893	0.031
	No	70 (22.2)		
2	Yes	204 (64.7)	0.035	0.439
	No	111 (35.2)		
3	Yes	236 (74.9)	0.542	0.644
	No	79 (25.1)		
4	Yes	61 (19.4)	0.208	0.500
	No	254 (80.6)		
5	Yes	152 (48.3)	0.391	0.204
	No	163 (51.7)		
6	Yes	120 (38.1)	0.369	0.000
	No	195 (61.9)		

¹Do you agree that e-LMS makes your studies easier?

²Does the network connection affect the frequencies of your access to e-LMS?

³Do you find the interface of e-LMS user friendly?

⁴Do you think e-LMS will be a burden in your studies?

⁵Will you still use e-LMS if it is not compulsory for grading purposes?

⁶Do you think e-LMS as a medium for lecturers to conduct classes during holidays is a good idea?

The participants were asked that whether network connection affect their frequency of accessing e-LMS. Majority of the study participants (n=204, 64.7%) agreed to the statement and a significant association ($p=0.035$) with gender was noted. Two hundred and thirty six respondents (74.9%) agreed that e-LMS is user-friendly and were comfortable with the current interface. Majority of the participants (n=195, 61.9%) disagreed that e-LMS can be used as a medium to conduct classes during holidays. Study year was found to be significantly associated with this statement ($p<0.001$). As e-LMS is mandatory for the students during their professional years in the pharmacy school for grading purposes, mixed responses were recorded when the participants were inquired regarding their

future use of e-LMS, if it is not used for grading purpose. One hundred and fifty two (48.3%) agreed that they will continue using e-LMS regardless of its requirement for grading purposes.

Majority of the participants (n=219, 69.5%) believed that e-LMS enabled them to create a platform of discussion among other students and lecturers (Table 3). This statement was statistically significant between gender ($p=0.004$) and year of study ($p=0.003$). With respect to the usage of e-LMS as a measure of student's academic grading tool, (n=61, 19.4%) participants strongly disagreed while (n=149, 47.4%) disagreed that use of e-LMS as an assessment measure for academic grading is not useful either as a part or whole.

Table 3. Student's delivery/format preferences

Items	Level of agreement*(n, %)					p-value	
	SA	A	N	D	SD	Gender	Study Year
1	57(18.1)	219(69.5)	0 (0)	30(9.5)	9(2.9)	0.893	0.031
2	22(7.1)	82(26.1)	0 (0)	149(47.4)	61(19.4)	0.035	0.439

*SA= Strongly Agree, A=Agree, N=Neutral, D=Disagree, SD=Strongly Disagree.

¹Do you agree that e-LMS is able to create a platform of discussion among lecturers and students?

²Do you agree that participation in e-LMS should be taken into account as partial assessment of a student's grade?

While discussing frequency of accessing e-LMS, most of the participants (n=121, 38.4%) responded that they access e-LMS 3-5 times a week. However, e-LMS was accessed every day by quite less number of students (n=28, 8.9%). The prime reason of e-LMS usage was to obtain lecture notes (n=192, 61.0%), followed by assignment submission (n=168, 53.3%) and to undertake online quizzes (n=117, 37.1%). Moreover, majority of the participants found e-LMS useful in preparing their own lecture notes (n=168, 53.3%) and assignments. Whereas, few participants were interested in gaining additional resources and reading materials via e-LMS (n=74, 23.4%). Participants were more interested in receiving hybrid courses over traditional and online distance courses (n=163, 51.7%). Even though, network connectivity and time constrains were pointed out as an obstacle in accessing e-LMS, 246 (78.1%) of the respondents confirmed e-learning as a useful medium to gain knowledge and showed intentions to keep using it for future studies.

As part of potential suggestions for improvement, majority of the participants recommended generating a section for question bank from past year exam questions which may help them in preparation of their examination. Up gradation of the network connection system in the campus thus enhancing the efficiency of student's usage of e-LMS with a more user-friendly interface was also suggested.

DISCUSSION

E-learning information and communication systems, whether networked or not, serves as specific media

to implement the learning process. It is the catalyst that is changing the whole model of learning in this century, for school pupils, university students, for employees as well as for the ongoing training and development of professionals¹¹. There is a continuous ongoing debate on the effectiveness of educational systems around the world, yet assessment of user's perceptions and experiences is always considered as a gold standard. The role of IT in Malaysian health education system is interlinked with its services provided in the health care system. To name, e-prescribing, Hospital Information System (HIS) are some of the IT based services introduced to provide an integrated information system for patients' data management and to provide best care to the patients with least errors. Different ministries are working closing on national level to provide ICT facilities to schools and communities, however; lack of infrastructure, connectivity, technical support, stability of the system and teaching staffs' skills are among the challenges faced to achieve this goal. It is evident that the future of Malaysian health care system is in the hand of IT based services where the government is aiming to achieve paper less hospitals all over the country¹². Keeping this in view, role of e-LMS in pharmacy education can be appreciated by improving the IT skills and by producing pharmacists more receptive towards IT based health care system.

Regarding the perceived efficacy of e-LMS, majority of the participants prefer to use e-LMS in their academic studies. Based on this we can predict that students perceive e-LMS as useful and convenient compare to the conventional lectures conducted in the class rooms. Moreover, lecture notes can be easily downloaded, be kept by the

student as a record and can access any time. Students do save time and effort in completing their projects. This finding is similar to the study conducted by Ryan (2001)¹³ which concluded that internet-based learning can overcome some traditional barriers such as time and place in acquiring knowledge. In another study, nearly all students (92.7%) believed that by combining the lecture notes provided in class with e-LMS, will be very useful because the features of e-LMS produces a friendly learning environment¹⁰.

Furthermore, in this study only few students were using e-LMS for online discussions, either through forum learning, or by posting e-mails to the lecturers. It is also suggested that the lack of community of online learning are among the challenges faced by students¹⁴. In addition, a significant relationship between students' perceived sense of community and perceived cognitive learning was indicated in another study of the same nature⁹.

With respect to academic grading criteria, it is reported that assessment is an indispensable part of teaching and learning¹⁵. If a student is tested on higher-order thinking skills, they are likely to adopt the desirable deep holistic approach to e-Learning. On the contrary, if students are tested on lower-order thinking skills, they would probably be encouraged to practice the undesirable surface atomistic approach to learning. However, despite its importance, assessment is always constantly feared by educators and is short-changed by instructional designers^{15,16}. In the light of such references, participants from our study did not wish to be graded academically and participation in online discussion or forum just for the sake of marks and assessment was rejected.

Sun et al (2008) stated that information technology does not matter at all in assessment of student's performance¹⁷. This statement is somehow vague and misleading. In e-Learning environments, poor technology with frequent technical difficulties will definitely discourage learners from taking online courses. In the current study, the possibility of limited connectivity or problems in accessing e-LMS at the time of assessment cannot be ruled out. Access to network connection is the main problem faced by students. Network connection is an unstable variable as it can sometimes disconnect either without prior notice or without the students' awareness. Since most of the students stay in the university's hostel, highly dense occupancies cause

students to share the usage of internet. With a lower bandwidth, the connection speed is slow tremendously. This instability does affect the students' usage on e-LMS. Since e-LMS is also used to undertake online quizzes, unstable internet connections may take longer times to complete the quiz or in some cases it can be left incomplete. Besides that, when the assessment is near, network traffic at the school's e-LMS is usually packed and causes congestion to the system. Thus, students will then be unable to conduct the assessment.

In the broader context of E-Learning, hypermedia is another useful computer-based system that helps user to retrieve information. It enables users to obtain or provide access to texts, audio, video recording and any other computer related information¹⁸. Hypermedia tools can be surely considered as an advantage to the education system. Nevertheless, if misused, a deeper observation shows the risk, as it will burden instead of facilitating the student. This happens if sensory channels are overloaded, also considering that the student is not expert of the learning domain¹⁹. However, currently the e-LMS of USM have yet to undergo major online assessments and nor the curricular is bombarded with too much of information. This can be one of the reason that most of the students indicated that e-LMS is not a burden for them; in fact it helps them for convenience sake.

In a study done by Link & Marz (2006), many students disagreed with the statement that e-learning could replace traditional ways of teaching²⁰. This corresponds with the findings of our study which indicated that students prefer hybrid courses which includes lectures and tutorials with online learning as an addition. If learning was conducted only with lectures and tutorials, the learning process was believed to be boring and unattractive. Vice versa, learning by using e-LMS only is insufficient as there is less interaction between the lecturers and students. More than half of the participants reported that they prefer hybrid courses over traditional courses or online distance learning courses. A study done by Garnham and Kaleta (2002) showed that 80% of the students recommended hybrid courses to their friends²¹. Most frequently, they appreciated the convenience and the freedom to work at home at their own pace.

Despite the wealth of research exposing the benefits of online interaction, frequent interaction

and participation in online discussions is not a guarantee of higher grades^{22,23}. Therefore, by encouraging students involved ardently in online discussions is unlikely to improve their performance. Our findings are in line with what is reported earlier by Davies and Graff (2005) that students seldom use e-LMS for online discussion purposes²³.

The findings also confirmed that females spent more time on e-LMS as compared to males. According to Garcia *et al* 2010, "although men are more prone to use computers than females, females tend to prefer communicative activities"²⁴. Supporting our findings, it was mentioned that e-learning is a flexible and inter-active learning approach which is most suited to women²⁵.

Limitations

The study focused students enrolled at School of Pharmaceutical Sciences, USM. Thus it is not wise and logical to generalize our results to a wider population. We had to use a mix technique to distribute the questionnaires as fourth year students were not present at the campus where the study was conducted. Although a response rate of 57% was achieved, this could have been better if face to face interviews were conducted. Emailing questionnaires always have their limitations and these may have contributed to a lower response rate.

CONCLUSION

Students at School of Pharmaceutical Sciences, USM are frequently engaged in using e-LMS as they consider it convenient and easy to use. Students do feel that online based learning is enhancing their academic performances. However, factors including network connection and lag time hinder many of them from frequent use of e-learning. Nevertheless, students still prefer hybrid courses as mode of education which is the mixture of traditional and online teaching methodologies rather than choosing traditional system or e-learning as an individual entity.

Recommendations

Updated educational material with interesting animations should be uploaded in e-learning system in order to draw student's attention. Lecturers should revise information in online based learning and encourage their students to take an active part in using e-LMS. A nationwide study involving

students from different courses such as medicine, nursing, physiotherapy etc should be conducted to achieve students' perceptions regarding e-learning from a wider perspective. At the same time, lecturer's /instructor's knowledge and command on IT skills and perceptions towards e-LMS should be access prior to implement any new IT related teaching tools. As evident from the results broad band facilities and internet connection should be improved and lecturer should be encouraged to use e-LMS as part of their assessment.

ACKNOWLEDGEMENT

The authors acknowledge all undergraduate students of School of Pharmaceutical Sciences, USM for their participation in the study.

REFERENCES

1. Towle A. Continuing medical education: changes in health care and continuing medical education for the 21st century. *Br Med J* 1998; **316**(7127): 301-4.
2. Masys DR. Advances in information technology. Implications for medical education. *Western J Med* 1998; **168**(5): 341-7.
3. Adams DA, Nelson RR, Todd PA. Perceived usefulness, ease of use, and usage of information technology: a replication. *MIS Quarterly* 1992; **16**(2): 227-47.
4. McFarlan FW. Information technology changes the way you compete. *Harvard Bus Rev* 1984; **62**(3): 98-103.
5. Powell TC, Dent-Micallef A. Information technology as competitive advantage. The role of human, business, and technology resources. *Strategic Manage J* 1997; **18**(5): 375-405.
6. Ruiz JG, Mintzer MJ, Leipzig RM. The impact of e-learning in medical education. *Academic Medicine* 2006; **81**(3): 207-12.
7. Buzzetto-More NA, Koohang A. Student perceptions of various e-learning components. *Interdisciplinary Journal of*

- Knowledge and Learning Objects* 2008; 4:113-35.
8. Cook DA. Web-based learning: pros, cons and controversies. *Clinical Medicine, Journal of the Royal College of Physicians* 2007; 7(1): 37-42.
 9. Jiang M, Ting E. A study of factors influencing students' perceived learning in a web-based course environment. *International Journal of Educational Telecommunications* 2000; 6(4): 317-38.
 10. Erah PO, Dairo EA. Pharmacy students perception of the application of learning management system in patient-oriented pharmacy education: university of Benin experience. *International Journal of Health Research* 2009; 1(2): 63-72.
 11. Greenfield S. Tomorrow's people: how 21st century technology is changing the way we think and feel. e-Penguin, 2004.
 12. Ismail A, Jamil AT, Rahman AFA, et al. The implementation of Hospital Information System (HIS) in tertiary hospitals in malaysia: a qualitative study. *Malaysian Journal of Public Health Medicine* 2010; 10(2): 16-24.
 13. Ryan S. Is online learning right for you. *American Agent & Broker* 2001; 73(6): 54-8.
 14. Song L, Singleton ES, Hill JR, et al. Improving online learning: student perceptions of useful and challenging characteristics. *The Internet and Higher Education* 2004; 7(1): 59-70.
 15. Govindasamy T. Successful implementation of e-Learning: Pedagogical considerations. *The Internet and Higher Education* 2001; 4(3-4): 287-99.
 16. Burgess LA. WebCT as an e-learning tool: a study of technology students' perceptions. *Journal of Technology and Education* 2003; 15(1): 6-15.
 17. Sun PC, Tsai RJ, Finger G, et al. What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education* 2008; 50(4): 1183-202.
 18. Jonassen DH. Hypertext/hypermedia. Educational Technology Publications: New Jersey, 1989.
 19. Ardito C, De Marsico M, Lanzilotti R, et al. Usability of e-learning tools 2004. Available from: <http://tesi.fabio.web.cs.unibo.it/twiki/pub/Tesi/DocumentiRitenutiUtili/p80-ardito.pdf>. (Accessed 1 January 2012).
 20. Link T, Marz R. Computer literacy and attitudes towards e-learning among first year medical students. *BMC Med Educ* 2006; 6(1): 34.
 21. Garnham C, Kaleta R. Introduction to hybrid courses. *Teaching with Technology Today* 2002; 8(6): 617-26.
 22. Karayan SS, Crowe JA. Student perceptions of electronic discussion groups. *The Journal* 1997; 24(9): 69-71.
 23. Davies J, Graff M. Performance in e-learning: online participation and student grades. *Br J Educ Technol* 2005; 36(4): 657-63.
 24. Cuadrado-Garcia M, Ruiz-Molina ME, Montoro-Pons JD. Are there gender differences in e-learning use and assessment? Evidence from an interuniversity online project in Europe. *Procedia Soc Behav Sci* 2010; 2(2): 367-71.
 25. Kramarae C. American Association of University Women Educational Foundation: The third shift. Women learning online. Washington DC: American Association of University Women Educational Foundation, 2001.