

Challenges to web-based learning in pharmacy education in Arabic language speaking countries

Ramez M. Alkoudmani, Ramadan M. Elkalmi

Department of Pharmacy Practice, Kulliyah of Pharmacy, International Islamic University of Malaysia, Kuantan, Pahang, Malaysia

Address for correspondence:

Mr. Ramez M. Alkoudmani,
Department of Pharmacy Practice,
Kulliyah of Pharmacy, International
Islamic University of Malaysia, Kuantan,
Pahang, Malaysia.
E-mail: cpe4ever@gmail.com

ABSTRACT

Web-based learning and web 2.0 tools which include new online educational technologies (EdTech) and social media websites like Facebook® are playing crucial roles nowadays in pharmacy and medical education among millennial learners. Podcasting, webinars, and online learning management systems like Moodle® and other web 2.0 tools have been used in pharmacy and medical education to interactively share knowledge with peers and students. Learners can use laptops, iPads, iPhones, or tablet devices with a stable and good Internet connection to enroll in many online courses. Implementation of novel online EdTech in pharmacy and medical curricula has been noticed in developed countries such as European countries, the US, Canada, and Australia. However, these trends are scarce in the majority of Arabic language speaking countries (ALSC), where traditional and didactic educational methods are still being used with some exceptions seen in Palestine, Kuwait, Jordan, Saudi Arabia, Egypt, UAE, and Qatar. Although these new trends are promising to push pharmacy and medical education forward, major barriers regarding adaptation of E-learning and new online EdTech in Arab states have been reported such as higher connectivity costs, information communication technology (ICT) problems, language barriers, wars and political conflicts, poor education, financial problems, and lack of qualified ICT-savvy educators. More research efforts are encouraged to study the effectiveness and proper use of web-based learning and emerging online EdTech in pharmacy education not only in ALSC but also in developing and developed countries.

Key words: Arab countries, e-learning, online educational technologies, pharmacy education, social media, web 2.0

INTRODUCTION

E-learning, also called “web-based learning,” has been defined according to the Joint Information Systems Committee (2003) as: “Facilitated and supported learning through the use of information and communications technology.”^[1] Two different modes of e-learning have also been defined, which are electronic only and blended learning. No face-to-face

component is seen in pure e-learning courses, however, blended learning supports the traditional classroom learning besides the online learning component. The major role of educators, nowadays, is to facilitate students’ learning processes to achieve proactive learning. Web-based learning is learning via the web at any time and from anywhere using different online

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Alkoudmani RM, Elkalmi RM. Challenges to web-based learning in pharmacy education in Arabic language speaking countries. Arch Pharma Pract 2015;6:41-7.

Access this article online	
Quick Response Code: 	Website: www.archivepp.com
	DOI: 10.4103/2045-080X.160989

educational technologies (EdTech) which support students' learning, help educators to use modern methods for more interactive teaching and facilitate the learning process among their students. Web 2.0 refers to the second generation of the World Wide Web and is considered platforms where users are collaborating together and get benefits or providing services to the mass. First generation websites were static and neither responsive nor interactive. Social media websites, wikis, blogs, podcasts, learning management systems (LMSs), online whiteboards, web conferencing tools are some examples of web 2.0 tools. Web 2.0 tools have important educational applications nowadays and used widely during the last decade in educational systems. Teachers today can create their virtual classrooms supported with many online educational tools to expand their teaching outside the physical classroom and stay connected with millennial learners. Collaboration between students and their teachers has become easier than before, where students reach their teachers at any time and from anywhere. Teachers also get instant feedback from their students and try their best to make learning more individualized according to each student needs. Google docs, WordPress®, WikiSpaces®, Edmodo®, Evernote®, DropBox®, Schoology®, Moodle®, Facebook®, Twitter®, Slideshare®, Skype Classroom®, Issue®, Google Drive, Screenr®, VoiceThread®, and Socrative® are common web 2.0 tools that have been used in education. Literature has shown that using online modules and new educational tools in proper ways may help to show the appropriateness of these emerging trends in education.^[2,3] Online EdTech give solutions to many barriers that prevent educators from achieving an effective education. Knowledge today can be transferred easily to learners in different geographical locations and time zones. Numerous studies have shown barriers regarding offering effective education when using e-learning such as higher costs, poor interactive face-to-face learning, more workload on staff members, and information technology (IT) technical support.^[4,5]

FACTORS SUPPORTING THE RISE AND SUCCESS OF E-LEARNING

Motivation and positive perceptions and attitudes of tutors and students toward e-learning and digital literacy should be taken into consideration for successful e-learning adoption. The rise of e-learning is affected by the availability of computers and personal laptops and the growth of the internet. Internet speed connection helps learners to download large size videos or to

watch these videos directly from the Internet browser. Familiarity with e-learning, students' expectations, and advantages over traditional education are other factors that help the rise of e-learning.^[6] Successful implementation of e-learning is not an easy step and needs organizational, cultural, and IT supports. Conducting training and continuous professional development courses for educators with a supportive learning environment and technical assistance are essential for the successful adaptation of e-learning.

ADVANTAGES AND DISADVANTAGES OF E-LEARNING AND ONLINE EDUCATIONAL TECHNOLOGIES

Seeking knowledge from experts and educators all over the globe is facilitated today by e-learning. Learners are bombarded by thousands of free or paid online courses available on the Internet nowadays. However, millennial learners seek knowledge that meets their needs wherever and whenever they want with lower costs. Literature has shown that online EdTech help to create interactive, collaborative, proactive, and universal learning communities, where sharing of knowledge is becoming easier.^[7] Online learning is not easy for learners whose IT skills are weak. On the other hand, attending online courses can help learners to improve their IT skills and confidence regarding using these emerging online tools. Online LMS are web-based applications that can be used to deliver online courses supported with educational modules, interactive board discussions, quizzes, assignments, grading systems, and announcements to help students stay updated with the latest activities during the online course.^[8] Online learning also offers private access to educational materials for each learner. Although web-based learning has advantages, at the same time, some obstacles prevent achieving successful online learning such as extensive IT supports and maintenance costs, poor face-to-face communication, and high dropout rates.^[4,5,9] Extensive use of online EdTech may distract students from learning and can decrease students' social skills, but with blended learning this problem can be minimized.^[7]

E-LEARNING AND ONLINE EDUCATIONAL TECHNOLOGIES TRENDS IN MEDICAL AND PHARMACY EDUCATION

Emerging online EdTech and other web 2.0 tools and social media websites like Facebook have been used in pharmacy and medical education. These new trends in education can help educators to reach

the public and build online networks and study groups with their students or peers.^[10-12] Previous studies have shown that e-learning helps health care providers to stay updated with the latest trends in their fields, and its promising role in improving medical education since the last decade in the past century.^[13-15] Literature has shown that e-learning courses have been comparable to traditional ones.^[16,17] Other studies have shown that e-learning courses have been more effective than traditional courses.^[6,18] Nevertheless, another study reported that there was no significant difference between e-learning and traditional medical teaching, and a positive attitude toward information communication technology (ICT) makes the application of it more effective.^[17] Blended learning has also been implemented in pharmacy education to complement the traditional educational methods. Blended learning has been an effective way to teach cardiology pharmacotherapy courses.^[19] Attitudes toward online courses in medical education have varied. Dental students at the University of Birmingham found that the e-course was a positive way to complement traditional education, while the teaching staff has negative attitudes.^[20] Students at China Medical University have positive attitudes toward e-learning, but they did not have enough skills to deal with LMSs.^[21] Knowledge and performance skill were enhanced among nursing students who attended an online course and their attitude toward that learning method was positive.^[22] Effectiveness of online learning as a way to achieve more satisfaction among medical and dental students has been reported.^[23] Moodle is a popular online LMS, which helped clinician educators to facilitate online learning and to create an interactive learning environment. Well-designed web-based learning materials have enhanced performance skills in the vital signs assessment of the nursing students.^[24] Learning was enhanced when e-learning modules were relevant and related to the learners' everyday work.^[25] Web-based learning was helpful for the vast majority of medicine and dentistry students at the University of British Columbia.^[26] Third and 4th year Danish medical students were satisfied with online discussions related to an e-learning course about head injury and associated treatment and observation guidelines in the emergency room.^[27] Interactive, asynchronous web-based learning modules have been used successfully as an alternative to traditional teaching among osteopathic 3rd year medical students.^[28] Pharm D students can be taught the traditional statistics course successfully using innovative online instructional technologies.^[29] A

web-based distance-learning course about principles of human nutrition was effectively delivered to 3rd year pharmacy students.^[30] Podcasting is another way of using web 2.0 tools for educational purposes. Application of podcasts in medical education has been noticed vividly. Audio podcasts can be streamed online or downloaded by an audience who can listen to recordings at any time and from anywhere using iPhones, iPads, tablet devices, or personal laptops. *The best science medicine podcast* is an example of using podcasts in medical education. The main aim is to provide pharmacists, clinicians, and other health care providers evidence-based, practical, and relevant information on rational drug therapy.^[31] Webinars are live online presentations which can be recorded and watched later. Live online webinars offer a synchronous way of learning, while recorded webinars are considered asynchronous. Webinars about therapeutics which have been developed by the School of Pharmacy, University of Wisconsin-Madison, were accepted by practicing pharmacists who were satisfied with this online method in seeking practical information.^[32]

USING FACEBOOK IN PHARMACY EDUCATION

Pharmacists today are using social media websites more than other health care professionals.^[33] Social media websites can facilitate sharing information and online educational materials quickly.^[34] In December 2014, the statistics showed that about 890 million daily active users on average were using Facebook, and the vast majority of them were outside the US and Canada.^[35] Integration of web 2.0 tools like Facebook into pharmacy education may be useful to engage pharmacy students to learn in a consistent manner. The literature showed that millennial pharmacy students, nowadays, prefer using EdTech tools and web-based learning. They are also using Facebook for educational purposes to share their experiences and knowledge through Facebook groups and pages.^[36-39] Social media websites and other online EdTech and web 2.0 tools could offer benefits to pharmacists if used in an appropriate way. Tower *et al.* (2013) examined students' perceptions of the efficacy of using Facebook as an educational tool. The study showed that Facebook could enhance students' self-efficacy in learning and support students to develop their learning.^[40] Facebook has also been used successfully as a method of informal learning and to engage pharmacy students to participate and discuss various topics related to the offered course.^[41,42] Using Facebook

has allowed pharmacy students to discuss topics more openly and has encouraged classroom discussions at University of Rhode Island College of Pharmacy.^[43]

E-LEARNING IN PHARMACY EDUCATION AMONG DIFFERENT ARABIC LANGUAGE SPEAKING COUNTRIES

Arabs had a positive impact on the pharmacy profession 100 of years ago. Baghdad introduced the first owned community pharmacy in the 8th century AD.^[44] Although pharmacy practice is evolving rapidly around the globe, it is slowly evolving in the majority of Arabic language speaking countries (ALSC) where the general public view of the community pharmacist is like a person who is selling products in a supermarket.^[45] A bachelor's degree in pharmaceutical sciences is still the first professional pharmacy degree in most Arab countries, and which takes 4–5 years, while a Pharm D degree has been offered in some Arab countries such as Saudi Arabia, Jordan, Lebanon, Palestine, Egypt, and Qatar.^[45] The English language is the language of instruction at the majority of schools of pharmacy in ALSC, where the Arabic language is the language of instruction in the higher educational system in Syria according to the Syrian Ministry of Higher Education.^[46] Teaching pharmaceutical sciences in the majority of the ALSC depends on didactic lecturing and knowledge-based teaching. However, new attempts and methods of instruction that provide interactive and problem-based learning (PBL), self-directed and case-based learning, and computer-assisted learning have been adopted in several countries such as Kuwait, Jordan, Saudi Arabia, Egypt, UAE, and Qatar.^[45,47,48] Three models of e-learning that have been recognized in the Middle East (ME) region include: Virtual e-learning, hybrid, and a traditional university e-learning.^[49] Implementation of e-learning in pharmacy education and the educational system in general was hard in ALSC because of major barriers, such as ICT problems, higher connectivity costs, unequal income distribution, immoral values and dangers to the family and society, low public esteem for online learning as a credible way to seek knowledge, poor education, language barriers with resistance against the English language, the relative absence of Arab initiatives to adopt e-learning, lack of qualified ICT-savvy educators, copyright issues, wars and political conflicts, and the digital gap between Arab states and other countries around the world.^[50-54] Connectivity in ALSC has been considered under the global average scores, although Gulf countries were considered far better than other Arab states according to ICT facts and figures in 2014.^[55] Lack of

web 2.0 usage in Arab states' universities compared to Western universities has been reported, and it is in its infancy.^[56] However, Facebook (Inc. Menlo Park, California, USA) and Twitter (Inc. San Francisco, CA, USA) are the most popular web 2.0 tools that have been used among Saudi Arabia Universities.^[57] Online degrees have also been considered not valuable by the general public in that region to give the learner job opportunities.^[58] A recent study regarding struggles of adopting e-learning in Arab educational systems showed that the majority of respondents had positive attitudes of e-learning and EdTech and that they can be implemented in Arab countries.^[51] Governmental and Administrative supports have a crucial role to adopt ICT in educational systems.^[59] Arab decision makers have a will to decrease the digital gap and invest more money in developing the infrastructure of ICT and the educational system, such as initiatives of building online universities in Libya, Bahrain, Saudi Arabia, Tunisia, UAE, Syria, Iraq, and Lebanon.^[60,61] The digital gap between ALSC and other nations encouraged Arab governments to undertake several initiatives to minimize that gap. Oman's Ministry of Education has collaborated successfully with EduTech ME since 2002 to provide e-learning solutions to around 590 schools.^[62] WebCT, Moodle, and Blackboard are popular LMSs that have been used successfully in Libya and Egypt.^[61] In Tunisia, the Waheeb online learning platform has been developed by the e-learning team of the Higher School of Sciences and Techniques of Tunisia as a LMS which has supported the Arabic language with the English and French languages as well.^[63] Jordan has started working on developing ICT and distance learning since 2002 to create Jordanian knowledge networks as a step to make a shift from traditional to novel educational methods.^[58] E-learning implementation in Libya has still been in the early stages like other Arab states. The Libyan Higher Education and Research Network initiative has been undertaken by the Libyan government to develop a whole educational system and implement e-learning and novel methods of teaching in Libyan universities.^[61] Studies about the effectiveness and value of e-learning in Arab states have been reported in the literature. Previous and extensive use of the Internet, availability of technical support, the ease of use, and students' confidence were the major factors affecting the students' adoption of e-learning in Arab Open University in Jordan.^[64] A study done by the Saudi Arabian Communications and Information Technology Commission found that about half of society members were aware of e-learning, and the minority of them have never personally used it because of the very low Internet penetration rate by

the general public.^[65] A lack in the online educational materials introduced in the Arabic language has been reported.^[66] There is a lack of studies about the effectiveness of online EdTech and e-learning as new methods of teaching pharmaceutical sciences globally and in Arab states especially. However, in West Bank Palestine, videoconferencing and telemedicine have been used successfully among pharmacy students and instructors as a blended learning method due to struggles to move between university campuses and hospitals.^[67] Pharmacy students in Egyptian Universities had positive attitudes and were aware of the new trends in pharmacy education around the world, and preferred new EdTech besides traditional methods of teaching.^[48] Another Egyptian study showed that e-learning courses could help medical instructors and students to learn collaboratively and overcome barriers that prevent students from interacting with instructors using online discussions provided by LMSs. Students were satisfied with the e-learning course as a novel method in medical education and showed positive results compared to traditional teaching methods.^[68] Digital libraries have been used among education and nursing students to reveal the roles of digital libraries in facilitating the learning process as a novel method of seeking knowledge because millennial learners are familiar with Internet and computer technologies.^[69] Online discussion boards have also been used successfully to facilitate, increase interactions between students and lecturers and complement traditional PBL sessions at Qassim Medical School in Saudi Arabia.^[70]

CONCLUSION AND RECOMMENDATIONS

The digital gap between ALSC and other nations has encouraged Arab governments to undertake initiatives to adopt ICT and e-learning in educational systems. Although adaptation of e-learning and new EdTech in the majority of ALSC is still in its infancy, there is a will to take advantage and minimize the digital gap. Pharmacy education is evolving rapidly in some Arab countries toward using novel teaching methods, where it is still depending on traditional methods in the majority of Arab states. However, more research efforts are recommended to study the effectiveness of online EdTech and e-learning as a novel method in pharmacy education in ALSC and other developing and developed countries. Successful implementation of new EdTech in pharmacy education around the globe could help pharmacists and pharmacy students to seek knowledge according to their learning style at any time and from anywhere. Collaboration

between pharmacists and other health care providers around the world is critical toward achieving the best pharmaceutical care for patients in the near future, which will be enhanced using web 2.0 tools including online EdTech and social media websites.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Committee JIS. Effective Practice with e-Learning; 2003. Available from: http://www.elearning.ac.uk/effprac/html/start_aims.htm. [Last accessed on 2014 Dec 30].
2. Hermans R, Tondeur J, van Braak J, Valcke M. The impact of primary school teachers educational beliefs on the classroom use of computers. *Comput Educ* 2008;51:1499-509.
3. Saadé RG, He X, Kira D. Exploring dimensions to online learning. *Comput Human Behav* 2007;23:1721-39.
4. Zhu E. Interaction and cognitive engagement: An analysis of four asynchronous online discussions. *Instr Sci* 2006;34:451-80.
5. Shen D, Nuankhieo P, Huang X, Amelung C, Laffey J. Using social network analysis to understand sense of community in an online learning environment. *J Educ Comput Res* 2008;39:17-36.
6. Cook DA, Hatala R, Brydges R, Zendejas B, Szostek JH, Wang AT, *et al.* Technology-enhanced simulation for health professions education: A systematic review and meta-analysis. *JAMA* 2011;306:978-88.
7. Blazer C. Literature review: Educational technology. Research Services, Miami-Dade County Public Schools; 2008.
8. Canvas. Canvas in Higher Education; 2015. Available from: <http://www.instructure.com/higher-education/>. [Last accessed on 2015 Mar 07].
9. Ahmed HM. Hybrid e-learning acceptance model: Learner perceptions. *Decis Sci J Innov Educ* 2010;8:313-46.
10. Selwyn N. Web 2.0 Applications as Alternative Environments for Informal Learning – A Critical Review. Paper Presented at: Paper for CERI-KERIS International Expert Meeting on ICT and Educational Performance; 2007.
11. Munoz C, Towner T. Opening Facebook: How to use Facebook in the College Classroom. Paper Presented at: Society for Information Technology and Teacher Education International Conference; 2009.
12. Brown JS, Adler RP. Open education, the long tail, and learning 2.0. *Educause Rev* 2008;43:16-20.

13. Bernardo V, Ramos MP, Plapler H, De Figueiredo LF, Nader HB, Anção MS, *et al.* Web-based learning in undergraduate medical education: Development and assessment of an online course on experimental surgery. *Int J Med Inform* 2004;73:731-42.
14. Childs S, Blenkinsopp E, Hall A, Walton G. Effective e-learning for health professionals and students – Barriers and their solutions. A systematic review of the literature – findings from the HeXL project. *Health Info Libr J* 2005;22 Suppl 2:20-32.
15. Cook DA, Levinson AJ, Garside S, Dupras DM, Erwin PJ, Montori VM. Internet-based learning in the health professions: A meta-analysis. *JAMA* 2008;300:1181-96.
16. Fordis M, King JE, Ballantyne CM, Jones PH, Schneider KH, Spann SJ, *et al.* Comparison of the instructional efficacy of Internet-based CME with live interactive CME workshops: A randomized controlled trial. *JAMA* 2005;294:1043-51.
17. Wutoh R, Boren SA, Balas EA. eLearning: A review of Internet-based continuing medical education. *J Contin Educ Health Prof* 2004;24:20-30.
18. Al-Jewair TS, Azarpazhooh A, Suri S, Shah PS. Computer-assisted learning in orthodontic education: A systematic review and meta-analysis. *J Dent Educ* 2009;73:730-9.
19. Crouch MA. An advanced cardiovascular pharmacotherapy course blending online and face-to-face instruction. *Am J Pharm Educ* 2009;73:51.
20. Gupta B, White DA, Walmsley AD. The attitudes of undergraduate students and staff to the use of electronic learning. *Br Dent J* 2004;196:487-92.
21. Liaw SS. Investigating students' perceived satisfaction, behavioral intention, and effectiveness of e-learning: A case study of the blackboard system. *Comput Educ* 2008;51:864-73.
22. Gerdprasert S, Pruksacheva T, Panijpan B, Ruenwongsa P. An interactive web-based learning unit to facilitate and improve intrapartum nursing care of nursing students. *Nurse Educ Today* 2011;31:531-5.
23. Puljak L, Sapunar D. Web-based elective courses for medical students: An example in pain. *Pain Med* 2011;12:854-63.
24. Kaveevivitchai C, Chuengkriankrai B, Luecha Y, Thanooruk R, Panijpan B, Ruenwongsa P. Enhancing nursing students' skills in vital signs assessment by using multimedia computer-assisted learning with integrated content of anatomy and physiology. *Nurse Educ Today* 2009;29:65-72.
25. Blackman IR, Mannix T, Sinclair PM. Developing renal nurses' buttonhole cannulation skills using e-learning. *J Ren Care* 2014;40:55-63.
26. Broudo M, Walsh C. MEDICOL: Online learning in medicine and dentistry. *Acad Med* 2002;77:926-7.
27. Worm BS, Jensen K. Does peer learning or higher levels of e-learning improve learning abilities? A randomized controlled trial. *Med Educ Online* 2013;18:21877.
28. Peska DN, Lewis KO. Uniform instruction using web-based, asynchronous technology in a geographically distributed clinical clerkship: Analysis of osteopathic medical student participation and satisfaction. *J Am Osteopath Assoc* 2010;110:135-42.
29. Ried LD. A distance education course in statistics. *Am J Pharm Educ* 2010;74:172.
30. Rochester CD, Pradel F. Students' perceptions and satisfaction with a web-based human nutrition course. *Am J Pharm Educ* 2008;72:91.
31. Allan JM. Best Science Medicine Podcast. Canada Therapeutics Education Collaboration; 2015. Podcast. Available from: <http://www.therapeuticseducation.org/bs-medicine-podcast>. [Last accessed on 2015 Jan 5].
32. Buxton EC, Burns EC, De Muth JE. Professional development webinars for pharmacists. *Am J Pharm Educ* 2012;76:155.
33. Lupiáñez-Villanueva F, Mayer MA, Torrent J. Opportunities and challenges of Web 2.0 within the health care systems: An empirical exploration. *Inform Health Soc Care* 2009;34:117-26.
34. Cook DA. Web-based learning: Pros, cons and controversies. *Clin Med* 2007;7:37-42.
35. Newsroom f. Statistics; 2015. Available from: <http://www.newsroom.fb.com/company-info/>. [Last accessed on 2015 Mar 07].
36. Cain J. Online social networking issues within academia and pharmacy education. *Am J Pharm Educ* 2008;72:10.
37. Chretien KC, Greysen SR, Chretien JP, Kind T. Online posting of unprofessional content by medical students. *JAMA* 2009;302:1309-15.
38. Gormley GJ, Collins K, Boohan M, Bickle IC, Stevenson M. Is there a place for e-learning in clinical skills? A survey of undergraduate medical students' experiences and attitudes. *Med Teach* 2009;31:e6-12.
39. Sandars J, Schroter S. Web 2.0 technologies for undergraduate and postgraduate medical education: An online survey. *Postgrad Med J* 2007;83:759-62.
40. Tower M, Latimer S, Hewitt J. Social networking as a learning tool: Nursing students' perception of efficacy. *Nurse Educ Today* 2014;34:1012-7.
41. Cain J, Policastri A. Using Facebook as an informal learning environment. *Am J Pharm Educ* 2011;75:207.
42. DiVall MV, Kirwin JL. Using Facebook to facilitate course-related discussion between students and faculty members. *Am J Pharm Educ* 2012;76:32.
43. Estus EL. Using facebook within a geriatric pharmacotherapy course. *Am J Pharm Educ* 2010;74:145.
44. Jafar S. Articles-pharmacy in Baghdad. *Pharm J* 2000;265:273-4.
45. Kheir N, Zaidan M, Younes H, El Hajj M, Wilbur K, Jewesson PJ. Pharmacy education and practice in 13 Middle Eastern countries. *Am J Pharm Educ* 2008;72:133.
46. MOHE. Syrian Higher Education System; 2004.

- Available from: <http://www.emeraldinsight.com/doi/pdfplus/10.1108/09684880410517405>. [Last accessed on 2015 Jan 5].
47. Al-Wazaify M, Matowe L, Albsoul-Younes A, Al-Omran OA. Pharmacy education in Jordan, Saudi Arabia, and Kuwait. *Am J Pharm Educ* 2006;70:18.
 48. El-Awady el-SE, Moss S, Mottram D, O'Donnell J. Student perspectives on pharmacy curriculum and instruction in Egyptian schools. *Am J Pharm Educ* 2006;70:9.
 49. Mirza AA, Al-Abdulkareem M. Models of e-learning adopted in the middle east. *Appl Comput Inform* 2011;9:83-93.
 50. Abouchedid K, Eid GM. E-learning challenges in the arab world: Revelations from a case study profile. *Qual Assur Educ* 2004;12:15-27.
 51. Babiker M. Challenges and Future of E-Learning in the Arab World. *INTED2014 Proceedings*; 2014. p. 5156-65.
 52. Dutta S, Coury ME. ICT challenges for the arab world. *Glob Inf Technol Rep* 2002;2003:116-31.
 53. Hamdy A. ICT in Education in Libya. *Libya Country Report*; 2007. [Last accessed on 2009 Oct 5].
 54. Mirza AA. *Saudi Arabia and the internet technology. World*; 1998.
 55. Union IT. *ICT Facts and Figure*; 2015. Available from: [http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures 2014-e.pdf](http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures%2014-e.pdf). [Last accessed on 2015 Jan 5].
 56. Chaurasia MA. Comparative study in adoption of Web 2.0 technologies between western and arab universities 2011.
 57. Aqil M, Ahmad P, Hussain A. Use of web 2.0 in Saudi Arabia universities. *Int J Inf Dissemination Technol* 2013;3:158-66.
 58. Dirani KM, Yoon SW. Exploring open distance learning at a Jordanian university: A case study. *Int Rev Res Open Distance Learn* 2009, Vol. 10.
 59. Andersson AS, Grönlund Å. A conceptual framework for e-learning in developing countries: A critical review of research challenges. *Electron J Inf Syst Dev Ctries* 2009, Vol. 38.
 60. Fraij L. Online Learning in the Arab World Talal Abu Ghazaleh University Company (TAGI-UNI); 2013.
 61. Rhema A, Miliszewska I. Towards e-learning in higher education in Libya. *Issues Informing Sci Inf Technol* 2010;7:423-37.
 62. East CN. Edutech Implements Solution in Oman Schools; 2006. Available from: <http://www.cpilive.net>. [Last accessed on 2015 Jan 5].
 63. Chorfi H, Jemini M. Innovative e-Learning Experimentations by use of Waheeb: A Tunisian Platform. Paper Presented at: EDEN Second Research Workshop Research and Policy in Open and Distance Learning Hildesheim, March, 2002 Germany; 2002.
 64. Abbad MM, Morris D, De Nahlik C. Looking under the bonnet: Factors affecting student adoption of e-learning systems in Jordan. *Int Rev Res Open Distance Learn* 2009, Vol. 10.
 65. Al-Kahtani NK, Ryan JJ, Jefferson TI. How Saudi female faculty perceive internet technology usage and potential. *Inf Knowl Syst Manage* 2006;5:227-43.
 66. Al-Khalifa HS. Building an Arabic Learning Object Repository with an ad hoc Recommendation Engine. Paper Presented at: Proceedings of the 10th International Conference on Information Integration and Web-based Applications and Services; 2008.
 67. Abdeen H, Zaben M, Shtaya A. The Value of E-Learning in the Palestinian Medical School. Paper Presented at: 1st E-Learning Excellence Forum. Dubai, UAE; January, 15-18, 2008.
 68. Abdelhai R, Yassin S, Ahmad MF, Fors UG. An e-learning reproductive health module to support improved student learning and interaction: A prospective interventional study at a medical school in Egypt. *BMC Med Educ* 2012;12:11.
 69. Taie ES, Mohamed KA. The role of digital libraries in Egyptian higher education. *Dig Middle East Stud* 2009;18:40-56.
 70. Alamro AS, Schofield S. Supporting traditional PBL with online discussion forums: A study from Qassim Medical School. *Med Teach* 2012;34 Suppl 1:S20-4.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.