Original article

Pharmacy students' perceptions towards online learning in a Saudi Pharmacy School

Dalia Almaghaslah *, Mohammed Ghazwani, Abdurahman Alsayari, Arwa Khaled

King Khalid University, Abha, Saudi Arabia

ABSTRACT

Objectives: The aim of the study was to evaluate previous exposure to online learning and preference for learning through pre-recorded online lectures with or without live active learning among pharmacy students in their fifth year.
Methods: An anonymous online survey was self-administered to fifth-year students enrolled on the Graduation Research Project Course.
Results: The response rate was 100%. Ninety-seven percent of students had previous experience with at least one online course during their pharmacy undergraduate curriculum; 76% of the courses were science courses. The majority of respondents preferred face-to-face, in-class lectures to online lectures, but 17% expressed no preference.
Conclusion: Pharmacy students expressed some interest in online learning methods within the pharmacy curriculum.

© 2018 The Authors. Production and hosting by Elsevier B.V. on behalf of King Saud University. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

Online learning has become popular in higher education (Allen and Seaman, 2011). Over the past decade, colleges and universities around the globe have shifted their education from traditional instructor-delivered dedicated lectures to more electronic learning. Healthcare disciplines' education systems are among the main professions that incorporate online learning in their curricula (Allen and Seaman, 2011).

E-learning incorporates different types of course design and teaching methods. A fully online course usually does not include face-to-face time and all content are provided online (Allen and Seaman, 2011). On the other hand, blended learning – as defined by Garrison and Kanuka (2004) – refers to the systematic integration of online and face-to-face engagement to support and enhance meaningful interaction between students, teachers and resources.

Gonzalvo et al. (2013) suggested that online learning benefits students as well as lecturers. They found that e-learning is beneficial in economies of scale, reusing recorded sessions and accessing materials regularly. They also highlighted the convenience of utilising e-learning for both students and instructors, as well as the limited costs associated with it. Similarly, Lewin et al. (2009) concluded that blended online learning offers great flexibility and responsiveness in the teaching and learning process. Gray and Tobin (2010) added that blended learning supports instructional approaches, which are difficult to achieve using traditional teaching methods, and reaches a high number of students without increasing the resources needed.

Both fully online and blended learning approaches have been found to be effective techniques for students in healthcare disciplines such as medicine, nursing and pharmacy.

The pharmacy discipline provides an excellent example of the successful implementation and utilisation of online learning modules. Geueke and Stausberg (2003) also supported the study findings of Gonzalvo et al. (2013). They added to the advantages of using the Internet to facilitate learning the fact that it allows unlimited access to the materials without any time restrictions. Elliott et al. (2009) found that e-learning allows students to study at their own pace, hence they achieve better learning outcomes.

Ernst and Colthorpe (2008) also concluded that well-designed online learning modules can get students involved in the learning process by allowing them to take part in active learning activities to enhance active learning.

---

* Corresponding author at: Department of Clinical Pharmacy, College of Pharmacy, Alsamer Campus, King Khalid University, Abha, Saudi Arabia.
E-mail address: damoazle@kku.edu.sa (D. Almaghaslah).

Pharmacists have used the Internet to access health information sources such as PubMed, the Cochrane Database of Systematic Reviews and Medscape. In addition, the Internet has been used to deliver products and services (Benetoli et al., 2015). Additionally, Yeh et al. (2014) found that e-learning was an efficient approach in providing support for pharmacy students during their internship programmes. It was particularly useful in providing therapeutic drug monitoring, pharmacokinetics, pharmacy calculations and dose adjustments.

In the meta-analysis by Means et al. (2009), most of the studies included were conducted in higher education settings. The author concluded that online education contributed to better learning outcomes as well as higher student satisfaction rates.

In pharmacy education, Lancaster et al. (2011) and Seybert and Kane-Gill (2011) successfully implemented recorded online lectures along with active learning, while Bollmeier et al. (2011) instituted online learning in a drug information course.

However, the most efficient teaching approach for the pharmacy professional is not yet certain (Suda et al., 2013). The current generation is less likely to be attracted to traditional teaching methods. It has been suggested that today's students prefer to use technology in their education and show higher satisfaction rates with e-learning (Blouin et al., 2009).

2. Background

The College of Pharmacy at King Khalid University (KKU) has adopted an online learning strategy along with the traditional instructor-delivered dedicated lectures. Both fully online learning and blended learning are currently implemented. The College of Pharmacy aimed to increase the utilisation of e-learning, and encouraged all its departments to have at least 30% of their courses delivered electronically.

The main reason for developing online learning was to meet the needs of students who have clashes in their timetable and would not otherwise be able to take certain courses. It was also aimed at helping students living some distance from the university, including those in rural surrounding areas, or students who have transport difficulties, especially females. Faculty members also have some flexibility in terms of schedule and geographical location. Another reason was to avoid having to schedule sessions at times considered to be less desirable to students and instructors. Additionally, obtaining better learning outcomes by enhancing student-teacher interaction was an important factor in pursuing the delivery of online education. For benefitting universities is to cover shortage of staff in certain departments by hiring international staff residing outside the country.

3. Aim and objectives

The aim of the study is to evaluate previous exposure to online learning and preference for learning through pre-recorded online lectures with or without live active learning among pharmacy students in their fifth year.

To identify what pharmacy courses students perceived to be suitable for an online learning methods mode of delivery.

To find out the most preferred student-teacher communication method from students' perspectives. To find out the acceptable frequency of class live time in blended courses.

To find out students' preferred method of viewing lectures.

4. Methods

An anonymous online survey was designed and self-administered within KKU learning management system,

Blackboard (Bb). Fifth-year (level 10) pharmacy students enrolled on the Graduation Research Project course in the College of Pharmacy at KKU had access to the questionnaire for three weeks (from November through December 2016).

The data collection tool consists of 10 multiple-choice and multiple answer questions (Appendix A) adopted from (Suda et al., 2013). Participation in the study was voluntary, but five extra marks were awarded to students who completed the survey. Students were asked about their preferences relating to online leaning methods in the pharmacy curriculum. Face-to-face lectures are defined as those in which a faculty member delivers instructional content in person from either KKU campuses (Greiger or Alsamer). Lectures viewed using Bb are considered as online lectures.

Results were downloaded and stored in Microsoft Excel spreadsheets. Data from both campuses was collated in a single Excel sheet. It was then transferred to SPSS "version 25" for MAC for analysis. The results were described in terms of frequencies, percentages, Chi Square was used to evaluate differences for categorical data. P value < 0.05 was considered significant.

Ethics approval was obtained from the research committee at the College of Pharmacy at KKU.

5. Results

Of the 47 students on the course, all 47 completed the online survey (100% response rate). Sixty-four percent (n = 30) of the students were based on the female campus, while the remaining 36% (n = 17) were based on the male campus.

Ninety-seven percent (n = 45) of the participants had prior experience with at least one online course during their undergraduate curriculum P = .0001. Among those who had prior experience with online courses, 76% (n = 36) had taken online science courses during their undergraduate curriculum P = .0001. Table 1 summarises the students' demographics.

Table 2 shows that 72% (n = 34) of respondents preferred traditional in-class lectures P = .002 over the online interactive lectures (43%; n = 20)) P = .307 and online recorded lectures (30%; n = 14) P = .013. However, 17% (n = 8) of respondents expressed no preference P = .0001.

Students indicated learning the most from traditional face-to-face lectures 57% (n = 27), followed by online lectures, either interactive 21% (n = 10) or recoded 21% (n = 10) P = .002.

As shown in Table 3, for a course with online lectures on Bb, 89% (n = 42) of respondents were interested in meeting for a face-to-face component, for selected live lectures, active learning activities, or both P = .002. For a blended online course, almost half of the students (49%; n = 23) suggested that meeting weekly was a sufficient frequency for live classroom time P = .04. Communicating with the lecturer of a course with an online component was preferred to be through meeting in the faculty during on-campus office hours (45%; n = 21), followed by online discussion board on Bb (30%; n = 14), passing a question to the group leader (21%; n = 10) and email (4%; n = 2) P = .001.

The top three courses currently delivered as full online courses that students suggested should continue to be delivered through this method were: Communication Skills in Pharmacy Practice (77%; n = 36) P = .0001, Pharmacy Regulations and Ethics (72; n = 34) P = .002 and Hospital Pharmacy (66%; n = 31) P = .013. On the other hand, other courses were found to be less suitable for a fully online mode of delivery, such as Pharmaceutical Microbiology (6%, n = 3) P = .0001, Pharmacognosy (13%; n = 6) P = .0001 and Medical Terminology (40%; n = 19) P = .189.

Table 4 shows courses that are currently taught either through blended learning or traditional in-class lectures. Most of the students showed a preference for incorporating online learning in Marketing (85%, n = 40) P = .0001 and Graduation Research Project

Table 1
Demographics of survey pharmacy students.

	N (%)	N (%)	Chi square	P value
Gender	Male 17 (36)	Female 30 (64)	3.596	.058
Campus	Alsamer 30 (64)	Greiger 17(36)	3.596	.058
Prior exposure to online learning	45 (96)	2 (4)	39.340	.0001

Table 2
Student learning preference for the pharmacy curriculum.

	N (%) of students	Chi-square	P value
Lecture viewing preference[*]			
Traditional in-class	34 (72)	9.383	.002
Online interactive on Bb	20 (43)	1.043	.307
Online recorded on Bb	14 (30)	6.149	.013
No preference	8 (17)	20.447	.000
Preferred style of learning[**]		12.298	.002
Traditional in-class session	27 (57)		
Online interactive on Bb	21 (10)		
Online recorded on Bb	21 (10)		

[*] Multiple answer question.
[**] Multiple choice question.

Table 3
Student learning preference for the pharmacy curriculum.

	N (%) of Students	Chi-Square	P value
For a course with BB lectures			
Selected live lectures	15 (32)	3	.002
Both active learning and live lectures	21 (45)		
Lectures Not necessary to meet	5 (11)		
Frequency of live class time		2	.040
Twice monthly	8 (17)		
Weekly	23 (49)		
Once monthly	16 (34)		
Asking questions		3	.001
Meeting the course instructor during office hours	21 (45)		
Passing questions with the group leader	10 (21)		
Emailing the course instructor	2 (4)		
Asking questions through an online discussion board on Blackboard	14 (30)		

Table 4
Student preference for online learning pharmacy curriculum courses.

Course	N (%) of students	Chi-square	Significance
Courses that are currently provided as fully online			
Pharmaceutical Microbiology	3 (6)	35.766	.0001
Communication skills in Pharmacy Practice	36 (76)	13.298	.0001
Hospital pharmacy	32 (68)	6.149	.013
Pharmacy Regulations and Ethics	34 (72)	9.383	.002
Pharmacognosy	6 (13)	26.064	.0001
Medical Terminology	19 (40)	1.723	.189
Courses that are currently provided either in a traditional style or blended online learning			
Pharmaceutical Chemistry	5 (11)	29.128	.0001
Pharmaceutics	6 (13)	26.064	.0001
Marketing	40 (85)	23.17	.0001
Pharmacy Administration	24 (51)	.021	.888
Graduation Research Project	33 (70)	7.681	.0006
Therapeutics	3 (6)	35.766	.0001
Phytochemistry	6 (13)	26.064	.0001

(70%, n = 33) P = .0006 courses. Fewer students recommended this mode of learning for Pharmaceutical Chemistry, Pharmacy Administration, Pharmaceutics or Therapeutics.

6. Discussion

These findings suggest that pharmacy students at KKU still prefer traditional in-class methods to online learning. However, they did express some interest in online learning methods. Online learning was found to be beneficial for both students and faculty members economically. It also allows students to revise the recorded material as necessary (Gonzalvo et al., 2013). Online learning was suggested to be convenient for both students and instructors, according to (Gonzalvo et al., 2013). The low cost of implementing and utilising online learning makes this an attractive option in delivering lectures in pharmacy education. Previously published studies have supported the use of online learning in pharmacy education (Vaughan, 2009; Ruehter et al., 2012; Gonzalvo et al., 2013; Suda et al., 2013; Bollmeier et al., 2011).

The concept of continuous access to online learning materials was found to be useful in certain pharmacy courses. Having access to the recorded lectures helped students in preparing for their final exams in an introductory Drug Information course (Freeman et al., 2006).

Previously published literature has also indicated that the incorporation of online instructions supports students' preparation for lectures and results in better examination scores, patient counselling skills, documentation skills and overall pharmacotherapy knowledge (Bollmeier et al., 2011; Ruehter et al., 2012; Brown et al., 2007).

According to our survey results, the majority of students were in favour of incorporating online learning methods in certain courses such as Communication Skills in Pharmacy Practice, Pharmacy Regulations and Ethics, Hospital Pharmacy, Marketing and the Graduation Research Project.

It is likely that these findings are reflective of the courses' perceived difficulty (in the students' eyes), as these courses might have less demanding coursework compared to Pharmaceutics, Microbiology and Therapeutics.

Aljadhey et al. (2017) suggested that the use of technology is limited in pharmacy education in Saudi Arabia. Self-directed learning and active learning methodologies are not widely implemented in the curricula of pharmacy schools around the Kingdom. The students in this study have not been routinely exposed to active learning methods. For that reason, the concept of allowing class time for more interactive learning methodologies is not fully justifiable to or understood by them.

As active learning methods are not widely used in pharmacy education at KKU College of Pharmacy, the students do not fully grasp the concept of online learning. This is evident as they still prefer traditional face-to-face, in-class sessions. In addition, their preferred mode of communication with the course instructor is meeting in-person during office hours. This is likely a consequence of the limited use of technology by the teaching staff. It was also indicated by respondents that they prefer interactive online sessions to recorded sessions, which also shows that our students are interested in traditional, dedicated teaching methods more than self-learning, as suggested by Aljadhey et al. (2017). Our students are used to 'spoon feeding' teaching methods, as through these methods they do not need to actively engage in their learning process.

Comparing our findings with a recent study in USA by Hamilton et al. (2016) who concluded that students were completely comfortable with using online learning and social media for academic and course purposes and the fact that they preferred blended courses over fully online because it allow time for in-class, active, and team-based activities confirms that our students, who come from different culture and have different learning style, still face the fear of being involved in interactive in-class or online sessions which requires further engagement.

Increasing student engagement and immersion in the learning environment is a key in pharmacy education because of the demand for higher levels of learning within the pharmacy profession. Academics need to incorporate more active learning into the pharmacy curriculum to foster the required skills and other desirable learning outcomes in students (Seybert and Kane-Gill, 2011). In our context, this will help in changing students learning autonomy to more independent learners and will probably change their learning preference towards online.

The survey has several limitations. The questionnaire focused mainly on the fully online courses at KKU College of Pharmacy. It did not specify the level of difficulty of the previous courses that students took using online learning methods (i.e. introductory-versus advanced-level courses). Additionally, the study focused on students' perceptions towards online learning using our online learning management system (Blackboard). Saudi students' learning styles and Saudi education's teaching methods are different from those in developed countries (i.e. the limited use of active learning and self-learning methodologies). Therefore, these findings might be generalisable only to other colleges in developing countries in general and in Saudi Arabia in particular especially, those that have access to this kind of technology or whose students' have similar learning styles.

7. Conclusion

Pharmacy students at KKU College of Pharmacy showed some interest in online learning methods, particularly in certain courses. Decision makers at KKU College of Pharmacy might find the research useful in making decisions about what courses should be fully online or blended. In addition, these findings might help in setting rules and policies to maximise the benefits of utilising this technology to promote pharmacy education and to enhance students' experiences with online learning.

Acknowledgements

Conflicts of interest

The authors declare that there are no conflicts of interest.

Appendix A. The questionnaire

1. Were you enrolled in an online course during your pharmacy undergraduate degree?
   A. Yes
   B. No
2. If yes, were any of these courses science classes?
   A. Yes
   B. No
3. Which of the following modes of delivery do you typically prefer for lectures in the pharmacy curriculum?
   A. Face-to-face lecture
   B. Online live session
   C. Online recorded session
   D. No preference
4. Please indicate which type of presentation you learn the most from?
   A. Recorded lecture viewed on Blackboard
   B. Interactive online lecture on Blackboard
   C. Face-to-Face lecture from either campus
5. For fully online courses, lectures were only available on Blackboard. Do you feel that you would be able to keep pace with the course by viewing lectures weekly as scheduled?
   A. Yes, It is easier to keep pace
   B. No, having a fixed time slot for each lecture makes attending lectures easier
6. If you took a course where the lectures were viewed using Blackboard, would you like to meet 'in person' for some lectures or an active learning component (e.g. case study discussion or problem-based learning) or recitation?
   A. Active learning activities
   B. Selected face-to-face lectures
   C. Both active learning and face-to-face lectures
   D. Not necessary to meet
7. If there was a course where the lectures were viewed using Blackboard, how frequently throughout the semester would you like to meet 'in-person' for recitation sessions?
   A. Twice monthly
   B. Weekly
   C. Once monthly
8. If you took a course where the lectures were viewed using Blackboard, what would you prefer most as an available means of asking instructors questions?
   A. Meeting the course instructor during office hours
   B. Passing questions with the group leader
   C. Emailing the course instructor
   D. Asking questions through an online discussion board on Blackboard
9. Of the courses listed below that are currently provided as fully online, which would you like to continue as fully online course?
   A. Pharmaceutical Microbiology (PHT 407)
   B. Communication Skills in Pharmacy Practice (CPH 547)
   C. Hospital Pharmacy (CPH 546)
   D. Pharmacy Regulations and Ethics (CPH 545)
   E. Pharmacognosy (PHG 521)
   F. Medical Terminology (Med-230)
10. Of the courses listed below that are currently provided either in a traditional dedicated-instructor delivered lecture style or blended online learning, which would you be interested in having lectures only available on Blackboard with a recitation or lab component?
    A. Therapeutics
    B. Medicinal Chemistry
    C. Pharmaceutic
    D. Pharmacology
    E. Graduation Research Project
    F. Management
    G. Marketing

References

Allen, I.E., Seaman, J., 2011. Going the distance: online education in the United States. SCOLE (Sloan Center for Online Education at Olin and Babson Colleges), Needham, MA.

Aljadhey, H., Asiri, Y., Albogami, Y., Spratto, G., Alshehri, M., 2017. Pharmacy education in Saudi Arabia: a vision of the future. Saudi Pharm. J. 25 (1) 88–92.

Benetoli, A., Chen, T.F., Aslani, P., 2015. The use of social media in pharmacy practice and education. Res. Soc. Admin. Pharm., 11.1, 1–46.

Bollmeier, S.G., Wenger, P.J., Forinash, A.B., Gleason, B.L., 2011. Impact of an online self-paced lecture to teach primary literature evaluation to second professional year students. Curr. Pharm. Teach. Learn. 3, 148–153.

Blouin, R.A., Riffee, W.H., Robinson, E.T., Beck, D.E., Green, C., Joyner, P.U., Persky, A. M., Pollack, G.M., 2009. AACP Curricular Change Summit Supplement: Roles of innovation in education delivery. Am. J. Pharmaceutical Education, 73, Article 154.

Brown, M.C., Kotlyar, M., Conway, J.M., Seifert, R., St Peter, J.V., 2007. Integration of an internet-based medical chart into a pharmaco-therapy lecture series. Am. J. Pharm. Educ., 71(3), Article 53.

Elliott, R.A., McDowell, J., Marriott, J.L., Calandra, A., Duncan, G., 2009. A pharmacy preregistration course using online teaching and learning methods. Am. J. Pharm. Edu. 73 (5), 77.

Ernst, H., Colthorpe, K., 2008. Instructional voluntary active-learning opportunities for pharmacy students in a respiratory physiology module. Am. J. Pharm. Edu. 72 (2), 28.

Freeman, M.K., Schrimsher, R.H., Kendrach, M.G. (2006). Student perceptions of online lectures and WebCT in an introductory drug information course. Am J Pharm Educ., 70(6), Article 126.

Garrison, D.R., Kanuka, H., 2004. Blended learning: uncovering its transformative potential in higher education. Internet High Educ. 7 (2), 95–105.

Geueke, M., Stausberg, J., 2003. A meta-data-based learning resource server for medicine. Comput. Methods Prog. Biomed., 72(3), 197–208.

Gonzalvo, J.D., Chomicki, J.R., Chu, M.A., Frail, C.K., 2013. Incorporation of online clinical topic modules in an introduction to advanced pharmacy practice experience course. Curr. Pharm. Teach. Learn. 5 (5), 438–443.

Gray, K., Tobin, J., 2010. Introducing an online community into a clinical education setting: a pilot study of student and staff engagement and outcomes using blended learning. BMC Med. Educ. 10, 6.

Hamilton, L.A., Franks, A., Heidel, R.E., McDonough, S.L., Suda, K.J., 2016. Assessing the value of online learning and social media in pharmacy education. Am. J. Pharm. Educ. 80 (6), 97.

Lancaster, J.W., McQueeney, M.L., Van Amburgh, J.A., 2011. Online lecture delivery paired with in class problem- based learning.... does it enhance student learning? Curr. Pharm. Teach. Learn. 3, 23–29.

Lewin, L.O., Singh, M., Bateman, B.L., Glover, P.B., 2009. Improving education in primary care: development of an online curriculum using the blended learning model. BMC Med. Educ. 9 (33), 33. 10.1186/1472-6920-9-33. Available at http://www.biomedcentral.com/1472- 6920/9/33.

Means, B., Toyama, Y., Murphy, R., Bakia, M., Jones, K., 2009. U.S. Department of Education, Office of Planning, Evaluation, and Policy Development, Evaluation of evidence-based practices in online learning: a meta-analysis and review of online learning studies. Washington, D.C., 2009 (online). Available at: http://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf.

Ruehter, V., Lindsey, C., Graham, M., Garavalia, L., 2012. Use of online modules to enhance knowledge and skills application during an introductory pharmacy practice experience. Am. J. Pharm. Educ., 76(4): Article 69.

Seybert, A.L. & Kane-Gill, S.L., 2011. Elective course in acute care using online learning and patient simulation. Am. J. Pharm. Edu., 75, Article 54.

Suda, K.J., Guirguis, A.B., Easterling, J.L., Franks, A.S., 2013. Online education: student pharmacist exposure and perceptions. Pharm. Edu. 13 (1), 172–176.

Vaughan, K.T.L., 2009. Development of targeted online modules for recurring reference questions. Med. Ref. Serv. Q 28 (3), 211–220.

Yeh, Y., Chen, H., Cheng, K., Hou, S., Yen, Y., Liu, C., 2014. Evaluating an online pharmaceutical education system for pharmacy interns in critical care settings. Comput. Methods Program. Biomed., 113(2), 682–689.