

RESEARCH

Assessing the Value of Online Learning and Social Media in Pharmacy Education

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Objective. To assess student preferences regarding online learning and technology and to evaluate student pharmacists' social media use for educational purposes.

Methods. An anonymous 36-question online survey was administered to third-year student pharmacists enrolled in the Drug Information and Clinical Literature Evaluation course.

Results. Four hundred thirty-one students completed the survey, yielding a 96% response rate. The majority of students used technology for academic activities, with 90% using smart phones and 91% using laptop computers. Fifty-eight percent of students also used social networking websites to communicate with classmates.

Conclusion. Pharmacy students frequently use social media and some online learning methods, which could be a valuable avenue for delivering or supplementing pharmacy curricula. The potential role of social media and online learning in pharmacy education needs to be further explored.

Keywords: online learning, social media, pharmacy education

INTRODUCTION

Today's student pharmacists have significant exposure to online methods of learning and social media in their pre-pharmacy educational experiences, such as online platforms and social media sites like Facebook.¹ With the advent of online learning methods and integration of technology into pharmacy education, online learning and social media may be novel methods for administering pharmacy curricula to students. In addition, as learners' preferences in pharmacy education change, faculty members and colleges and schools of pharmacy must adjust and respond accordingly.²⁻⁶

While social media is commonly used in social settings, there are few reports of its use in a professional educational setting. Cain et al studied the use of Facebook in a pharmacy management and leadership course for third-year pharmacy students.⁷ The course included an optional activity on Facebook via a closed group to provide students with a greater exposure to current topics in pharmacy management. Students reported joining the

Facebook group for this class based on potential for extra credit and opportunities to work with external experts and learn more about management and leadership.⁷ Another institution used Twitter in a pharmacy practice development, management, and evaluation course for second-year students.⁸ Students were assigned a Twitter account and were required to post a minimum of 10 tweets, which accounted for 2% of the students' total grade. Some students reported the use of Twitter during class distracted them from course discussions, while others felt that the use of tweets helped to increase the sharing of ideas among the class.⁸

Salter and colleagues' systematic review on e-learning in pharmacy education evaluated the quality of pharmacy-related e-learning effectiveness studies.⁹ E-learning was defined as learning directed through an Internet process.¹⁰ Overall, they identified 459 records through literature and database searches and found 17 articles that met criteria for inclusion in their review.⁹ The authors included studies that evaluated e-learning programs used in pharmacy education and included trials where learning, behavior, results, and participants' reactions served as the primary and secondary outcomes. Many studies that assessed changes in knowledge found significant improvements after e-learning, ranging from 7%-46%, determined by skills

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assessments, posttests, and Likert scales rating confidence or knowledge.⁹ Monaghan et al used a survey tool to create a searchable database of technology used by students and faculty members at colleges and schools of pharmacy nationwide.¹¹ All surveyed institutions reported using a course management system software, with the most common system being Blackboard (Blackboard, Washington, DC). Classroom and lecture capture, web conferencing, and interactive video conferencing were also widely used by institutions.¹¹ The social media applications Facebook and YouTube were the most commonly used by faculty members to communicate with students. By summarizing the educational technology used by numerous schools of pharmacy, the authors developed a searchable database that would allow faculty members to collaborate on the best technology available for their students.¹¹

In other professional schools, including dentistry and medicine, students reported preference and appreciation for online learning and blended approaches to instruction.^{10,12,13} Ruiz and colleagues discussed the potential uses of e-learning in medical education, including continuing education and asynchronous e-learning during practice experiences.¹⁰ In dental education, Reynolds et al performed a retrospective analysis of online survey data from 2001-2004. Dental students reported increased ease of access, time savings, and positive experiences with e-learning.¹² Schimming conducted a retrospective study of skills assessment scores and feedback of a PubMed training session for first-year medical students. Training was provided through librarian-led sessions for one class, which was compared to an e-learning-based class for subsequent medical school classes. Students completing the e-learning-based training had similar results in the PubMed skills assessment and reported greater satisfaction with the e-learning sessions when compared to the librarian-led sessions.¹³

With decreasing resources in pharmacy education, online delivery of course content may be an efficient method to deliver pharmacy curricula while optimizing classroom time for active-learning strategies.^{1,14} Studies report on technologies and student preferences regarding individual social media applications, such as Twitter and Facebook.^{7-9,11} The purpose of this study was to assess student preferences associated with the value of online learning methods such as online platforms, social media, and handheld devices.

METHODS

An anonymous 36-question online survey was administered via Blackboard to third-year students enrolled in the Drug Information and Clinical Literature Evaluation course from 2011 to 2013. The survey was approved by the institutional review board at University of Tennessee

Health Science Center College of Pharmacy (Tables 1 and 2). The course was designed to develop and refine skills for clinical literature searches and evaluation and health information communication for pharmacy students. This required, 3-hour course was taught synchronously on two campuses. Students were required to watch prerecorded lectures prior to class sessions that used team-based, active-learning strategies, a format that was implemented in 2012.^{1,14} Prior to 2012, the same lectures were provided; however, all material was delivered in class. After 2012, those lectures were recorded and watched prior to class, allowing time for active-learning sessions in class. Students were not required to use laptops. The multiple-choice survey was available for 14 days after each course offering. Frequency statistics were used to describe student use of social media and preferences for online learning. Percentages reported throughout are means. Students received one extra credit point in the course for completing the survey and received no penalty for not participating. Upon completion of the survey, it was noted in the gradebook that the student had completed the survey, but it was not linked to specific student results.

In this study and survey, blended learning was defined as a course that included both in-class active, team-based learning sessions and online recorded lectures. Online lectures were prerecorded and available for viewing with Mediasite (Mediasite Video Platform, Madison, WI) technology. Live lectures or active-learning sessions were defined as a faculty member delivering or facilitating content in-person synchronously from one of two campuses. Social networking websites included Facebook, MySpace, Twitter, and LinkedIn. Online platforms were also defined as Blackboard or Canvas (Canvas, Salt Lake City, UT).

Skewness and kurtosis statistics were run on ordinal variables to assess normality. Frequency and cross-tabulation statistics were used to describe categorical variables. Because of the skewed distribution of responses, nonparametric Kruskal-Wallis tests were employed to assess significant main effects across the three student cohorts. When significant main effects were found, post hoc Mann-Whitney U tests were conducted for pairwise comparisons. Chi-square tests and unadjusted odds ratios were used for between-group comparisons of categorical data. An alpha value of .05 assumed significance and all analyses were done using SPSS, v21 (IBM, Armonk, NY). All statistical analysis was run by an independent statistician.

RESULTS

Overall, 451 student pharmacists completed the course during the three years the survey was offered, with 431 students completing the survey (96%) (Table 1). The

Table 1. Demographic Survey Questions for Third-year Student Pharmacists Enrolled in the Drug Information and Clinical Literature Evaluation Course

Survey Question	Options	2011 (%) n=143	2012 (%) n=128	2013 (%) n=160
Which of the following modes of delivery do you prefer for lectures in your pharmacy curriculum?	Live lecture	38.5	40.6	54.4
	Recorded lecture	44.8	41.4	31.3
	No preference	16.8	17.2	14.4
	Unanswered	0	0.8	0
Were you enrolled in any online courses during your undergraduate curriculum?	Yes	53.1	51.6	50.6
	No	46.9	48.4	48.8
	Unanswered	0	0	0.06
If you were enrolled in any online courses during your undergraduate curriculum, were any of them focused specifically on science (ie, organic chemistry, biology, immunology)?	Yes	21.7	21.9	30
	No	76.2	74.2	68.9
	Unanswered	2.1	3.9	3.1
Do you believe that online courses are equal to live classroom lectures in regards to educational value?	Yes	29.4	35.9	35
	No	58	53.1	65
Which of the following methods is your preferred method for testing within the curriculum?	Unsure	12.6	10.9	0
	Integrated examinations	-	-	61.3
	Traditional examinations	-	-	31.9
	Neither	-	-	6.9
	Online only	-	-	4.4
	Classroom only	-	-	35
Which of the following class structures do you prefer within the curriculum?	Blended classroom	-	-	60.6
	Smart phone	90.2	90.6	76.9
	Stationary of handheld gaming device	7	0.8	1.9
	Desktop computer	51.7	55.5	57.5
	Laptop computer	90.9	91.4	91.3
	iPad or tablet	17.5	42.2	64.4
How have you used social networking websites (ie, Facebook, MySpace, Twitter, LinkedIn) to help with learning in your curriculum?	Communicate with classmates about questions pertaining to course content	57.3	53.9	62.5
	Work on group assignments	22.4	29.7	11.9
	Have not used social networking for this	20.3	16.4	25.6
	0-25%	18.9	14.1	13.8
Approximately what percentage of your pharmacy classmates are you connected with via social networking websites (ie, Facebook, MySpace, Twitter, LinkedIn)?	26-50%	45.5	46.1	19.4
	51-75%	24.5	28.9	28.8
	76-100%	11.2	10.9	38.1

Table 2. Student Preferences for Technology and Social Networking

Student Preferences	Value for academic success ^a Median (interquartile range)		
	2011	2012	2013
Smart phones	4 (4)	5 (1)	4 (1)
Tablets	1 (2)	3 (3)	4 (2)
Text messaging	4 (1)	4 (1)	3 (1)
E-mail	5 (1)	5 (1)	5 (1)
Blogs	2 (2)	1 (2)	1 (1)
Social networking	3 (2)	3 (1)	3 (1)
Library website	5 (1)	5 (1)	4 (1)
Online platforms	5 (0)	5 (0)	5 (1)
Paper textbooks	4 (1)	4 (1)	3 (1)
E-books	4 (3)	3 (3)	3 (2)
Freely available course content	3 (2)	3 (3)	4 (1)
Frequency of Use			
Text messaging	4 (2)	4 (2)	3 (2)
E-mail	5 (2)	5 (1)	5 (1)
Blogs	1 (1)	1 (1)	1 (0)
Social networking	3 (2)	3 (1)	3 (2)
Library website	3 (1)	3 (0)	4 (1)
Online platforms	2 (1)	2 (1)	2 (1)
Paper textbooks	2 (2)	2 (1)	2 (2)
E-books	4 (1)	5 (1)	5 (1)
Freely available course content	2 (1)	2 (1)	3 (2)
Appropriate to connect with professor on social networking			
Academic reasons	2 (2)	3 (2)	3 (1)
Personal reasons	2 (2)	4 (2)	3 (1)

^aNumbers are listed as part of a Likert scale, with 5 being extremely/always/strongly agree, and 1 being don't use/never/strongly disagree

course and survey were offered synchronously on both the Memphis and Knoxville campuses. Student demographics between campuses are similar for all years studied. A high response rate on the survey was achieved, with approximately 97% in 2011, 98% in 2012, and 92% in 2013.

In 2011 and 2012, more students preferred recorded lectures, but the majority of students stated a preference for live lectures or classes in 2013. Approximately half (52%) of the students were enrolled in online courses during their undergraduate curriculum, with one-quarter (25%) of those courses being specifically focused on science. When surveyed, 59% of students did not consider online courses to be equal to live classroom lectures in regards to educational value, with the majority of students (61%) preferring a blended classroom structure.

The majority of students use technology for courses or academic activities, with 90% of students using smart phones and 91% using laptop computers. Smaller numbers of students reported desktop computers (54%), iPad or tablets (30%), or stationary/handheld gaming devices (4%) for educational activities. When surveyed about the use of technology, the majority of students consider smart

phones (75%) and e-mail (93%) extremely or significantly valuable to their academic success (Table 2).

Results were similar for the frequency of use of technology for academic or course purposes. Smart phones (73%), tablets (53%), text messaging (50%), and e-mail (80%) were reported as being used always or often for academic or course purposes. While considered extremely or significantly valuable, the library website (39%) and online platforms (86%) were less often used always or often by students.

Fifty-eight percent of students used social networking websites to communicate with classmates, while only 21% of students used these websites to work on group assignments. In addition, 21% of students indicated that they did not use social networking to help with learning activities. When compared to 2011 and 2012, more students in 2013 were connected to classmates via social media ($p=0.001$). When asked if they felt comfortable using social networking to communicate with other students about coursework, 75% of students strongly agreed or agreed in 2013, and 82% agreed in 2011 and 2012. The students were also queried on the appropriateness of

a professor connecting with students on social networking sites for academic reasons. Overall, 45% of students strongly agreed or agreed that such connection was appropriate in 2011 and 2012 and 18% in 2013, but 31% of students in 2013 neither agreed nor disagreed. When asked about appropriateness of professors connecting with students on social networking for personal reasons, the results were similar. In general, 49% of students strongly agreed or agreed with the statement in 2011 and 2012, and 21% in 2013 and 41% of students in 2013 neither agreed nor disagreed, respectively.

DISCUSSION

This study demonstrates that pharmacy students are comfortable with and use social media and online learning methods for academic and course purposes. To our knowledge, this is the first study that assessed the student preferences and experience regarding social media and online learning. In 2013, more students preferred a live lecture format, which may be partially explained by including more active-learning sessions in the classroom in the course after a course redesign in 2012.^{1,14} In addition, many courses in the curriculum have traditionally been lecture only. However, in the past several years, the college has strived to incorporate more active and team-based learning into the overall curriculum using more small-group activities. Based on the results of this survey, students prefer a more blended approach, which includes both in-class, active, team-based learning sessions and online recorded lectures. It is interesting to note that students preferred a blended approach and not an online-only course. Many of the class sessions in the first and second years of our professional curriculum are lecture-based, while several courses in the third year use more active-learning or blended approaches. As students are approaching their practice experiences, they may prefer a different method or one that might further engage them. This study has implications for pharmacy educators as they consider which teaching methodologies may be best suited for their students. By flipping the classroom or providing blended learning opportunities, the students may be more engaged in the in-class activities after watching online lectures.^{15,16}

Compared to 2011 and 2012, fewer students in 2013 used paper textbooks for academic or course purposes ($p < 0.001$). Less than half of the students (47.5%) in 2013 found paper textbooks somewhat valuable, while 27.5% either found textbooks not valuable or did not use them. Over the past several years, students may have begun to rely on notes, slides, and other information sources to prepare for examinations, as demonstrated with the 2013 class. As faculty members prepare courses and

readings for students, they should consider that students may be less inclined to read material in traditional formats such as paper textbooks. Other options, such as social media and online platforms may be additional avenues to provide learning resources.

Regarding social media, more students in 2013 reported communicating with classmates about course content compared to 2011 and 2012. In addition, more students were connected with their classmates on social networking websites. Many of the students surveyed felt it was appropriate for professors to connect with students on social networking sites for academic or social reasons. This may have an impact on students and faculty members in regard to professionalism on social media. Our study has relevance to pharmacy education as schools of pharmacy further explore the use of online learning and social media platforms for curriculum delivery or supplementation. Online learning can be used to deliver certain coursework and paired with active-learning opportunities in the classroom to augment student knowledge. In addition, social media platforms may be useful as tools to further discuss and engage pharmacy students. This study is not without limitations. It was completed at one institution and was part of a single course. Moreover, the course format was restructured in 2012 to allow for more online learning, though the lecturers did remain consistent.

CONCLUSION

Pharmacy students actively use social media and prefer some online learning methods to support their learning and academic success, which could be valuable avenues for delivering or supplementing pharmacy curricula. When updating pharmacy curricula, schools of pharmacy should consider the inclusion of online learning and social media methods to support the changing educational climate and preferences of today's learners.

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