Analysis of Pharmacy Student Perceptions and Attitudes Toward Web 2.0 Tools for Educational Purposes

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Yingzhi Zhang¹, Jessica Kim¹, Nadia I. Awad, PharmD, BCPS¹,
and Craig Cocchio, PharmD, BCPS¹

Abstract

Background: The use of Wikis, blogs, and podcasts can engage students in collaborative learning, allow peer feedback, and enhance reflective learning. However, no survey to date has been performed across all professional years of pharmacy students in order to obtain a comprehensive overview of student perceptions. **Objectives:** To identify the familiarity of pharmacy students with Web 2.0 resources available for medical education, and what barriers exist. **Methods:** This study surveyed students enrolled in the professional program of a US-accredited pharmacy school to assess their knowledge and current use of available online resources and attitudes toward the use of Web 2.0 technologies for educational purposes. **Results:** Of the 836 surveys distributed, 293 were collected and analyzed (35.0% response rate). Students reported using the following Web 2.0 technologies in the didactic and experiential settings, respectively: Wikipedia (88%, 70%), YouTube (87%, 41%), Khan Academy (40%, 5%), and medical or scientific blogs (25%, 38%). Although these technologies were more commonly used in the classroom, students agreed or strongly agreed such resources should be used more often in both the didactic ($n = 187$, 64%) and experiential settings ($n = 172$, 59%). The barriers associated with the use of Web 2.0 in both the didactic and experiential settings that were ranked highest among students included accuracy and quality of information and lack of familiarity among faculty members and preceptors. **Conclusion:** Pharmacy students across all professional years actively use Web 2.0 tools for educational purposes and believe that opportunities exist to expand use of such technologies within the didactic and experiential settings.

Keywords

didactic education, experiential education, social media, Web 2.0

Introduction

A paradigm shift in pharmacy education is occurring as a result of the collision between the Millennial generation students' use of social media and Web 2.0 applications in everyday life, and their pursuits of higher education.¹⁻³ In concert with this shift of pedagogy, new platforms and course management systems for disseminating information and reinforcing materials covered inside the classroom should be offered.³ Although the use of Web 2.0, which is defined as the modern generation of interactive Web-based resources,⁴ and social media technologies in education has remained relatively limited, research evaluating various aspects of Web 2.0 and social media in the profession of pharmacy as well as pharmacy education is mounting.⁵

While interest exists, there is an equal representation of the concerns regarding the legal implications of pharmacists and Web 2.0 applications and social media as well as e-professionalism in the existing literature. These works focus on social media use relating to interpersonal and intraprofessional use

by pharmacists,⁶⁻⁹ academics and administrators,¹⁰⁻¹⁴ and pharmacy students.¹⁵⁻²¹ However, social media use for the sole purpose of education is less represented.

Descriptions of the application of Wikis as an additional supplementary tool or compulsory student participation on a Wiki in pharmacy courses have demonstrated their utility as a platform for further after-class discussions or have been used to create novel therapeutic recommendations.²²⁻²⁴ Web based logs or "blogs" have been shown to function similarly by providing a vehicle for online reflective journaling and facilitating the development of learner-centered assessments.²⁵ Other studies have also suggested that use of Facebook and Twitter

¹Rutgers, The State University of New Jersey, Piscataway, NJ, USA

Corresponding Author:

Craig Cocchio, Ernest Mario School of Pharmacy, Rutgers, The State University of New Jersey, 160 Frelinghuysen Road, Piscataway, NJ 08854-8020, USA.
Email: craig.cocchio@pharmacy.rutgers.edu

can engage students in collaborative learning, improve writing skills, allow for peer feedback, and enhance reflective learning.²⁶⁻²⁹

While 3 studies have assessed the attitudes and perceptions of Web 2.0 and social media as a general concept,^{6,12} only one study has specifically addressed these tools as an educational adjunct.³⁰ In this survey among first-year pharmacy students at a school in the United States, the authors concluded that although Web 2.0 appealed in its ability to enhance communication, collaboration, and connectivity, obstacles of competency and security remained to hinder its widespread use.³⁰

Previously conducted research has adequately discussed limitations, barriers, and benefits to the application of Web 2.0 and social media in the profession of pharmacy, pharmacy education, and students' attitudes and perceptions in individual courses or professional year standing. However, to date, there has been no learner assessment performed across all professional years of pharmacy students in order to establish a baseline comprehensive overview of student perceptions of Web 2.0 and social media as an educational tool. The objective of this pre-activity learner assessment was to determine student perceptions of Web 2.0 technologies and to prepare them for incorporation of these technologies in experiential and didactic setting for students enrolled in the professional program at a school of pharmacy in the United States.

Educational Activity

This pre-activity learner assessment was performed as a cross-section study that was approved by the institutional review board. Eligible subjects consisted of students enrolled in professional years of an accredited 0-6 type program of a school of pharmacy in the United States of America. Class rosters available to faculty members were utilized to obtain student email addresses. The students were e-mailed a request to participate in the study as well as a Web link to the survey itself. Demographic data were collected regarding the student's year of study (professional year 1, 2, 3, or 4).

An electronic cross sectional survey using Qualtrics Research Suite software version 45,814 (Qualtrics Labs, Provo, UT) was used to obtain subject opinions. The survey tool consisted of questions that assessed the pharmacy student's general knowledge and current use of available online resources and attitudes toward the utility of Web 2.0 technologies for educational purposes. Questions were designed with the intention of determining whether faculty members and/or preceptors provided social media resources for educational purposes in the didactic and experiential settings. Responses related to questions aimed to assess utilization of Web 2.0 resources in the didactic setting were analyzed across all professional years; for those questions asked to determine previous and current utilization of Web

Table 1. Baseline Characteristics (N = 293).

Characteristic	n (%)
Professional year rank (PY)	
PY1	108 (37)
PY2	74 (25)
PY3	56 (19)
PY4	55 (19)
Gender	
Male	90 (31)
Female	203 (69)
Current use of Web 2.0/social media ^a	
Facebook	277 (95)
LinkedIn	118 (40)
Twitter	84 (29)
Pinterest	68 (23)
GooglePlus	60 (20)
Redit	16 (5)
Tumblr	10 (3)
Flickr	3 (1)
Instagram	3 (1)
None	3 (1)

^aRespondents could select all categories that applied.

2.0 resources in the experiential settings, responses were analyzed for those students who have participated in introductory and advanced pharmacy practice experiences (ie, students enrolled in years 2 through 4 of the professional program). The survey tool is provided in the appendix.

After completion of the survey, the subjects were invited to submit their emails to be entered in a drawing for 1 of 4 gift cards valued at US\$25 each. The email was not tied nor linked to their responses in the survey. The survey remained open for responses to be collected for a period of 3 weeks between October 15, 2013, to November 8, 2013, and 2 reminders were e-mailed to the pool of subjects over the course of this period. Chi-square analysis was used to compare nominal data and Kruskal-Wallis for ordinal data between professional year groups, where appropriate.

Results

A total of 836 students in the professional years 1 through 4 were identified as being eligible to complete the survey. Out of 836 surveys distributed, 293 surveys were completed and analyzed (35.0% response rate). Baseline demographics of the surveyed population can be found in Table 1. The largest number of responses came from students in professional year 1 (PY1) of study (n = 108, 37%), with response rates progressively dropping off as the student's year of study increased (PY2: n = 74, 25%; PY3: n = 56, 19%; PY4: n = 55, 19%). Additionally, the majority of respondents were female (n = 203, 69%), although this is relatively in keeping with the female-to-male ratio of pharmacy students at the school of pharmacy (62% vs 38%, respectively).³¹

Table 2. Use of Web 2.0 and Social Media in Pharmacy Education in the Didactic Setting Across All Professional Years, n (%) (N = 293)^a.

	PY1	PY2	PY3	PY4	P Value ^b	Total
YouTube	91 (36)	62 (25)	48 (19)	50 (20)	.02	251 (87)
Wikipedia	93 (36)	64 (25)	49 (19)	49 (19)	.903	255 (88)
Medical/scientific blog	18 (25)	21 (30)	11 (15)	21 (30)	.02	71 (25)
Khan Academy	49 (43)	40 (35)	19 (16)	7 (6)	<.0001	115 (40)
Other	4 (18)	5 (23)	4 (18)	9 (41)	<.0001	22 (8)
Never used	3 (50)	1 (17)	2 (33)	0 (0)	.507	6 (2)

^aRespondents could select all categories that applied.^bChi-square analysis.**Table 3.** Use of Web 2.0 and Social Media in Pharmacy Education in the Experiential Setting Across All Professional Years, n (%) (N = 185)^a.

	PY2	PY3	PY4	P Value ^b	Total
YouTube	16 (21)	24 (32)	47 (20)	<.0001	76 (41)
Wikipedia	40 (31)	43 (33)	47 (36)	.15	130 (70)
Medical/scientific blog	29 (41)	20 (28)	31 (30)	.305	71 (38)
Khan Academy	4 (44)	4 (44)	1 (11)	.333	9 (5)
Other	12 (32)	12 (32)	13 (35)	.959	37 (20)
Never used	15 (79)	4 (21)	0 (0)	<.0001	19 (10)

^aRespondents could select all categories that applied.^bChi-square analysis.

The vast majority of students surveyed indicated that they used the social media site Facebook (www.facebook.com; n = 277, 95%), while other forms of Web 2.0 technology were used less: LinkedIn (www.linkedin.com; n = 118, 40%), Twitter (www.twitter.com; n = 84, 29%), Pinterest (www.pinterest.com; n = 68, 23%), GooglePlus (www.plus.google.com; n = 60, 20%), Flickr (www.flickr.com; n = 3, 1%), and other sites (n = 32, 11%). Most students also reported using Web 2.0 social media in pharmacy education, with Wikipedia (www.wikipedia.org; n = 255, 88%) and YouTube (www.youtube.com; n = 251, 87%) being the most common resources used in the didactic setting (Table 2). A significant portion of students, however, also reported having used Khan Academy (www.khanacademy.org; n = 114, 40%) and medical or scientific blogs (n = 71, 25%) to augment their education. Six students (2%) reported having never used any form of Web 2.0 media for educational purposes.

The number of students who use these same resources diminished in the experiential setting, with a smaller percentage of students indicating Wikipedia (n = 130, 70%) and YouTube (n = 76, 41%) as their preferred social media references (Table 3). Although a slightly larger percentage of students used medical or scientific blogs (n = 71, 38%) as compared to the didactic setting, nearly 20% of respondents reported having never used Web 2.0 resources of any kind in the experiential setting. For those pharmacy students who stated that they have used social media for educational purposes, 170 (83%) indicated that the resource was not provided to them by a faculty member.

With respect to their attitudes toward Web 2.0 resources and social media in pharmacy education, 187 (64%) students either agreed or strongly agreed that such resources should be used more often in the didactic setting (Figure 1). Similarly, 172 (59%) students held a similar attitude toward Web 2.0 resources in the experiential setting. Regarding the students' attitudes toward sharing the sources of information found through Web 2.0 resources, 219 (75%) students agreed or strongly agreed that information gained from Web 2.0 resources should be shared with other students and 199 (68%) agreed that it should be shared with faculty members or preceptors.

With regard to barriers to the use of Web 2.0 and social media in pharmacy education, accuracy and quality of information was generally regarded as the biggest barrier to use of Web 2.0 resources in pharmacy education in both the didactic (n = 216, 77%) and experiential settings (n = 172, 61%), respectively (Table 4). However, lack of familiarity among faculty members and preceptors appeared to be a bigger concern in the didactic (n = 140, 50%) than in the experiential setting (n = 93, 33%). Conversely, access to devices for viewing Web 2.0 resources was a larger consideration for students on experiential rotations (n = 94, 34%) compared to students in the didactic setting (n = 63, 22%). Additional barriers provided by subject comments included "misconceptions about the utilization of these resources," a preference for "classic learning" and "resentment toward having to use social media for learning if one did not use it in his personal life," and the opinion that use of Web 2.0 resources is "not very professional."

Figure 1. Student attitudes regarding future use of Web 2.0 and social media in pharmacy education.

Table 4. Barriers Associated With the Use of Web 2.0 and Social Media in Pharmacy Education^a.

Barrier	Didactic Setting, n (%)	Experiential Rotations, n (%)
Accuracy and quality of information	216 (77)	172 (61)
Lack of familiarity among students	41 (15)	37 (13)
Lack of familiarity among faculty members and preceptors	140 (50)	93 (33)
Access to devices for viewing	63 (22)	94 (34)
Other	5 (2)	27 (10)

^aRespondents could select all categories that applied.

Discussion

The results of the survey revealed that the majority of students were highly familiar with Web 2.0 technologies; many used more than one form of social media, and nearly 90% used Wikipedia, YouTube, or both for educational purposes in the classroom setting. Although fewer students used these resources in the experiential setting, still roughly half used one or both. Indeed, only a small percentage of students believed that lack of familiarity among students was a barrier to the use of Web 2.0 resources. Moreover, as 87% of students reported that they did not receive these resources from faculty members or preceptors, it might be assumed that the students either sought out these resources on their own initiative or were referred to them by their peers. This may be evidence of the development of pharmacy students toward adult education and of self-directed, lifelong learning.³² Although

previous literature has questioned the feasibility of incorporating self-directed learning into pharmacy curricula in a virtual patient case setting,³³ this study adds to the evidence that social media may serve as an inroads to this learning method.²²⁻²⁹ By utilizing techniques pharmacy students are already incorporating in a self-directed manner, the results of this study suggest that social media may be a method of successfully incorporating self-directed learning into pharmacy curricula, consistent with both the intended educational outcomes of the Center of Advancement of Pharmacy Education as well as the accreditation standards of the Accreditation Council of Pharmacy Education.^{34,35}

Although information accuracy was the primary reason students expressed hesitant attitudes toward the use of Web 2.0 resources for education, the lack of familiarity among educators was the second largest barrier. The fact that more students felt impeded by this barrier in the classroom setting

than on experiential rotations suggests the perception that preceptors are more in tune with Web 2.0 technologies than faculty members. Technologies provided through many academic institutions are equipped with capabilities of educationally directed blogging, Wiki development, or podcasting.³ However, the literature focusing on the e-professionalism and limitations of social media in professional pharmacy arenas may have skewed the opinions of many pharmacy faculty to curb these issues by completely avoiding these technologies altogether.^{6-21,30}

One interesting trend within the results of the survey to be noted that is worthy of discussion is the fact that the rates of use of Web 2.0 technologies remained relatively similar among students enrolled in years 1 through 4 of the professional years of the program. As students progress through their educational careers, it is expected that they become self-directed in seeking out resources to help facilitate and guide their learning, as this is an essential skill for students to develop as they make their inevitable transition to practitioners. In order for students to be able to search through the multitude of resources via Web 2.0 technologies for the evidence-based information related to the practice of pharmacy, faculty members and preceptors alike can play a big role in the provision of such resources to students early on in the course of their professional years.³⁶⁻³⁸ In this way, students can begin to develop methods of critically appraising these resources for accuracy and quality, and as they become more familiar in the types of social media resources that are of value and relevance to clinical questions at hand, not only will the utilization of Web 2.0 technologies theoretically increase, but students will potentially become more self-directed in seeking out information through these available resources for themselves as well.

The results of this study should be considered in the context of the existing limitations. The survey tool utilized in this study to assess student perceptions of Web 2.0 technologies was not validated. As a result, although intent of questions of the survey were to determine if faculty were providing these resources and the frequency of use, if any, we cannot rule out that students may have misinterpreted this as any self-directed use of these social media or Web 2.0 resources. However, no such validated survey tool is currently available. The generalizability of these results may also be limited since we surveyed only a single school of pharmacy as well as the higher proportion of respondents being of early professional year standing. Future research in this area should include a multicentered approach. In addition, the survey was conducted at a single institution that employs traditional methods of teaching in both the didactic and experiential settings; the results may have differed if the survey was conducted at an institution where nontraditional methods of teaching and/or distance learning is employed.

Despite these barriers, however, the high degree of positivity shown by students toward the use of resources in both the didactic and experiential settings also suggests that students believe these obstacles are not insurmountable. The

fact that most students believe Web 2.0 resources should be used as an education resource both in the classroom and in the experiential setting reveals that pharmacy students are willing and capable of using Web 2.0 technologies despite the apparent barriers. The results, however, may not be an accurate representative of student attitudes and perceptions on the national level.

Conclusions

This study suggests that pharmacy students across all professional years of study are actively using social media and Web 2.0 technologies for both social and educational purposes. Moreover, the prevailing attitude appears to be that there is a legitimate place for such technologies in both the didactic setting and on experiential rotations. By understanding and appropriately guiding the use of these resources, faculty and preceptors can have a preeminent role in helping to ensure the quality and accuracy of information students find through social media or Web 2.0 technologies and thus help break down the largest obstacle toward their more widespread use.

Appendix

Q1 In which professional year are you currently in?

- ☐ Professional Year 1 (P1) (1)
- ☐ Professional Year 2 (P2) (2)
- ☐ Professional Year 3 (P3) (3)
- ☐ Professional Year 4 (P4) (4)

Q2 Gender

- ☐ Male (1)
- ☐ Female (2)

Q3 Which of the following Web 2.0 or social media accounts do you currently use? (You may select more than one response.)

- ☐ Facebook (1)
- ☐ Twitter (2)
- ☐ Pinterest (3)
- ☐ LinkedIn (4)
- ☐ Google Plus (5)
- ☐ Flickr (6)
- ☐ Tumblr (7)
- ☐ Other (Please specify) (8)

Q4 Please identify any of the following web resources you have used to supplement your understanding of a topic learned in the classroom. (You may select more than one response.)

- ☐ YouTube (1)
- ☐ Medical/Scientific Blog (2)
- ☐ Khan Academy (3)

- ☐ Wikipedia (4)
- ☐ Podcasts (5)
- ☐ Other (Please specify) (6)
- ☐ I have never used a web resource for this purpose. (7)

Q5 Please identify any of the following web resources you have used to supplement your understanding of a topic learned during experiential rotations. (You may select more than one response.)

- ☐ YouTube (1)
- ☐ Medical/Scientific Blog (2)
- ☐ Khan Academy (3)
- ☐ Wikipedia (4)
- ☐ Podcasts (5)
- ☐ Other (please specify) (6)
- ☐ I have never used a web resource for this purpose. (7)

Q5b Was the link or direction to this resource provided to you by the faculty member lecturer/preceptor?

- ☐ Yes (1)
- ☐ No (2)

Q19 Have you ever used a file-sharing program such as Dropbox or Google Docs to share documents with other students so as to supplement your learning experience?

- ☐ Yes (1)
- ☐ No (2)

Q20 Have you ever used a file-sharing program such as Dropbox or Google Docs to share documents with a professor, preceptor, or teaching assistant so as to supplement your learning experience?

- ☐ Yes (1)
- ☐ No (2)

Q21 Have you ever used an online chat room or web-based video conferencing software for academic purposes (e.g. group meetings, Q&A sessions with your professor or preceptor, online classrooms)

- ☐ Yes (1)
- ☐ No (2)

Q6b The use of web resources or social media . . .

- ☐ Enhanced my learning and understanding (1)
- ☐ Did not enhance my learning and made me more confused (2)
- ☐ Neither enhanced or worsened my learning (3)

Q7 Please identify barriers to the professional use of social media and Web 2.0 resources in the classroom setting. (You may select more than one response.)

- ☐ Accuracy and quality of information in the web based resource (1)
- ☐ Lack of familiarity with social media or web based resources among the students (2)
- ☐ Lack of familiarity with social media or web based resources among the faculty (3)
- ☐ Access to devices to view the web resource (4)
- ☐ Other (Please specify) (5) _____

Q8 Please identify barriers to the professional use of social media and Web 2.0 resources on experiential rotations. (You may select more than one response.)

- ☐ Accuracy and quality of information in the web based resource (1)
- ☐ Lack of familiarity with social media or web based resources among the students (2)
- ☐ Lack of familiarity with social media or web based resources among the faculty (3)
- ☐ Access to devices to view the web resource (4)
- ☐ Other (please specify) (5) _____

Q9 Please describe your attitudes with regards to the following statements.

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Social media and Web 2.0 resources should be used as an education resource in the classroom setting. (1)	☐	☐	☐	☐	☐
Social media and Web 2.0 resources should be used as an education resource on experiential rotations. (2)	☐	☐	☐	☐	☐

Q10 Please describe your attitudes with regards to the following statements.

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
The information found on social media and Web 2.0 resources should be shared with other fellow students. (1)	☐	☐	☐	☐	☐
The information found on social media and Web 2.0 resources should be shared with faculty members and preceptors. (2)	☐	☐	☐	☐	☐

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