RESEARCH

Development of an Instrument to Measure Pharmacy Student Attitudes Toward Social Media Professionalism

Marie A. Chisholm-Burns, PharmD, MPH, MBA,[a] Christina A. Spivey, PhD,[b] Melanie C. Jaeger, BS,[b] Jennifer Williams, PharmD,[a] Christa George, PharmD[b]

[a] University of Tennessee College of Pharmacy, Memphis, Knoxville, and Nashville, Tennessee
[b] University of Tennessee College of Pharmacy, Memphis, Tennessee

Objectives. To develop and validate a scale measuring pharmacy students' attitudes toward social media professionalism, and assess the impact of an educational presentation on social media professionalism.

Methods. A social media professionalism scale was used in a pre- and post-survey to determine the effects of a social media professionalism presentation. The 26-item scale was administered to 197 first-year pharmacy (P1) students during orientation. Exploratory factor analysis was applied to determine the number of underlying factors responsible for covariation of the data. Principal components analysis was used as the extraction method. Varimax was selected as the rotation method. Cronbach's alpha was estimated. Wilcoxon signed rank test was used to compare pre- and post-scores of each item, subscale, and total scale.

Results. There were 187 (95%) students who participated. The final scale had five subscales and 15 items. Subscales were named according to the professionalism tenet they best represented. Scores of items addressing reading/posting to social media during class, an employer's use of social media when making hiring decisions, and a college/university's use of social media as a measure of professional conduct significantly increased from pre-test to post-test. The "honesty and integrity" subscale score also significantly increased.

Conclusion. The social media professionalism scale measures five tenets of professionalism and exhibits satisfactory reliability. The presentation improved P1 students' attitudes regarding social media professionalism.

Keywords: Social media, professionalism, scale development, pharmacy students

INTRODUCTION

Since the dawn of Facebook in 2004, this popular social media site has accrued around 1.5 billion active users.[1] Meanwhile, more than 500 million tweets are sent out on Twitter each day.[2] While platforms like Facebook, Twitter, and Instagram bring a new ease, expansion, and acceleration to communication, social media also comes with its own set of cautions and pitfalls. Previously, a person might have only shared certain personal and private details with a few close friends. Now however, with just the click of a button that same information can be shared with hundreds, even thousands, of people within seconds of transmission. In other words, many social media platforms are more or less public forums operating in real

time with instantaneous exchange of information. Younger generations have grown up in a world where social media is ubiquitous, and therefore feel as if social networks are part of the "natural environment."[3] For that reason, current pharmacy students in particular may be at increased risk of sharing compromising information on social media, whether intentionally or unintentionally, without having a full appreciation of the possible adverse consequences in their professional lives.

A literature review identified several studies investigating students' perspectives on social media use and professionalism. Use of social media was common, with anywhere from 67% to 99% of health care professions students reporting social media participation.[4-8] For example, Hall and colleagues found that 98% of surveyed pharmacy students primarily used social media for personal reasons, although approximately 77% of pharmacy students also used social media for academic purposes,

Corresponding Author: Marie Chisholm-Burns, College of Pharmacy, University of Tennessee Health Science Center, 881 Madison Ave., Suite 264, Memphis, TN 38163. Tel: 901-448-7141. Fax: 901-448-7053. E-mail: Mchisho3@uthsc.edu

suggesting social media has a presence in the professional lives of students.[5] In examining this intersection between social media and professionalism among graduating pharmacy students, Ness and colleagues found that 57% of participants believed they should be held responsible for any unprofessional activity found on their social media accounts.[7] Likewise, the majority of student pharmacists indicated they felt posts on sites like Facebook could affect others' opinions of them as professionals.[7,9] Such beliefs may influence the social media posting behaviors of students, as approximately 50% stated they had information on their personal sites they would not want an employer, professor, or patient to see.[7]

Similarly, only 27% of health care professions students indicated they had posted material to Facebook that the majority of participants considered unprofessional such as alcohol and drug use, sexual content, and patient information.[6] A larger percentage, 44%, reported being the subject of Facebook postings by others in which the content of said posts may be considered unprofessional.[6] Despite concerns about unprofessional posts by themselves or others, students were Facebook "friends" with individuals likely to have a presence in their professional lives: 96% were "friends" with fellow students, 73% with past colleagues, 44% with current colleagues, 5% with current professors, and 2.5% with current or previous patients.[6]

Lack of separation between personal and professional life on social media may expose students to negative consequences for unprofessional social media posts. Numerous examples exist of students who have faced the repercussions at their colleges/universities due to unprofessional behavior on social media, with punishments ranging from professional conduct meetings to expulsion.[10] In one example, a mortuary science student was disciplined by the University of Minnesota for what they believed were inappropriate Facebook posts pertaining to her laboratory classes (posts discussed getting to "play" and take out her "aggression" with a cadaver).[11] The student was given a failing grade in lab and was required to participate in a psychiatric evaluation.[11] The student appealed the punishment to the Minnesota Court of Appeals; however, the court upheld the university's decision.[11] In a similar case, *Yoder v University of Louisville*, nursing student Yoder was expelled for violating the university's honor code when she posted on MySpace "profane observations" concerning patients she had met during clinical rotations.[10] In both cases, the court dismissed the students' notions that social media activity was protected under the right to free speech. Instead, the court reasoned that as members of a professional program, these students were required to act within the bounds of the schools' professional behavior policies.[10-12] These and other legal cases involving social media and student professionalism have led to questions of whether or not educating students on appropriate online behavior as they enter professional school would reduce the number of social media professionalism issues.

As issues concerning social media professionalism become more common, schools must adapt to manage and support students in this environment. Many are developing policies and educating their students on professional social media behavior.[8] However, one recent analysis found that only 25% of higher education institutions have social media policies.[13] Several studies found that a session discussing the school's social media policies led to a significant number of students making their Facebook profile privacy settings more restrictive.[8,14] While the change in privacy settings does not necessarily mean the professional quality of students' posts changed, it demonstrates the ability of an "educational intervention" to help students understand the possible implications of their social media actions.

Prior studies have analyzed how a discussion of proper online behavior can influence students' choice of privacy settings; however, little research has been done on how these educational interventions can influence students' actual beliefs or attitudes about professional conduct on social media. Moreover, although surveys and questionnaires pertaining to social media professionalism have been developed, a valid and reliable scale to assess pharmacy student attitudes toward social media professionalism is not available in the literature. Therefore, the purpose of this study was to develop and evaluate a scale measuring pharmacy students' attitudes toward social media professionalism. A secondary objective was to use this scale in assessing the impact of an educational presentation targeted to P1 students concerning social media and professionalism.

METHODS

The study design was twofold: development of a social media professionalism scale for use with pharmacy students; and a pre- and post-survey to determine the effects of a professionalism and social media presentation conducted during pharmacy school orientation of P1 students. The study hypothesis is that P1 students' scores on the newly developed social media professionalism scale will improve following a professionalism and social media presentation conducted during pharmacy school orientation. The study was approved by the University of Tennessee Health Science Center Institutional Review Board.

In the summer of 2015, investigators began developing a scale to measure the attitudes of pharmacy students toward social media professionalism. The first step was to

conduct a literature search (PubMed, years 1990-2015) regarding social media and professionalism. Based on this literature review, the investigators began the process of generating a pool of scale items. To limit the number of items and provide direction to scale development, the following six tenets of professionalism, as defined by the American Board of Internal Medicine and adapted for pharmacy by Hammer and colleagues were used: altruism, accountability, excellence, duty, honor and integrity, and respect for others.[15,16] The investigators determined that scale items should cover a broad range of topics pertaining to social media professionalism under each of the six tenets including, among others, classroom behaviors (eg, posting to social media while in class), conduct such as posting about unprofessional behavior to social media sites, and the authority of the college/university in monitoring and penalizing students' social media behaviors. Items pertaining to the tenet of altruism (described by Hammer and colleagues[16] as serving patient interests above one's own) were more difficult to develop than those associated with the other tenets, due to many factors including the virtual (versus in-person) nature of social media interactions. As a result, the investigators were not confident that those items based on altruism and included in the scale would be found significant or beneficial.

Items were primarily adapted from the Pharmacy Professionalism Instrument (PPI), a reliable and valid 18-item scale previously published by Chisholm and colleagues, which utilized the six tenets of professionalism.[17] PPI items were modified to reflect behaviors and attitudes pertaining to professional conduct associated with use of social media; for example, "I am able to accept constructive criticism" in the PPI becomes "I am able to accept constructive criticism regarding my social media postings" in the new social media professionalism scale. Additionally, six items were adapted (with permission) from a Facebook and professionalism questionnaire previously published by Cain and colleagues.[18] Items were also generated regarding college/university policies and guidelines on student professionalism and social media. All repeat items were eliminated and a pool of 26 items that described the six tenets of professionalism as applied to social media was generated. Content validity of the items was reviewed and affirmed.

To assess the newly developed scale, it was administered to 197 P1 students on their first day of pharmacy school orientation in the fall of 2015 (nine repeat P1 students were excluded due to past exposure to pharmacy school presentations and lectures regarding social media and professionalism). Demographic data (age, race/ethnicity, and gender) were collected to provide a general description of

the student population. This administration of the scale also served as a pre-test in evaluating the impact of a professionalism and social media presentation conducted on day 3 of orientation. During the presentation, students received information on how professionalism is defined in the profession of pharmacy, and the college's guidelines for student professional conduct were detailed (Appendix). Examples of unprofessional conduct were reviewed including examples that involved the use of social media. Students were informed about the structure and function of the college's professional conduct committee and how to report unprofessional conduct to that committee (Appendix). On the final day of the week-long orientation, the P1 students were administered the social media professionalism scale as a post-test. For both the pre- and post-test, a 5-point Likert scale was used to assess level of agreement or disagreement with each item, ranging from 1="strongly disagree" to 5="strongly agree." Participation in the study was voluntary and investigators were blinded to the identity of participants.

Data analysis was performed using IBM SPSS Statistics 22.0 (Armonk, New York). Demographic data were summarized as descriptive statistics, as were the scores of each pre- and post-survey item. Data were evaluated to determine whether each item had sufficient variance to proceed with further analysis. Scores of negatively worded items were reversed so that higher scores indicated more professional attitudes. Scale dimensionality, defined as the number of separate constructs assessed by scale items, was examined using exploratory factor analysis.[16] Exploratory factor analysis was applied to the pre-test data to determine the number of underlying components or factors responsible for the covariation of the data.[17,19] Principal components analysis was used as the extraction method. Varimax was selected as the rotation method as it minimizes the number of items with high loadings on each factor.[19] Items were considered to have loaded on a factor if the factor loading was greater than .5 on that factor and less than .4 on any other factor.[17] Scale reliability, defined as the extent to which the scale produces stable and consistent (rather than random) scores, was estimated using Cronbach's alpha coefficient of internal consistency, which indexes homogeneity of scale items for each factor/subscale and for the scale as a whole.[20-22] For new scale development, a Cronbach's alpha between .65 and .7 is considered minimally acceptable, although .7 or above is preferable.[23,24]

Due to non-normal distribution of the data, a comparison of pre- and post-item scores was conducted using the Wilcoxon signed rank test. Wilcoxon signed rank test was also used to compare the pre- and post-scores of each factor/subscale found in the factor analysis and the total

scale. As a total of 21 tests were conducted (15 items, five subscales, and one total scale), Bonferroni's adjustment was applied ($p<.05$ divided by 21), thus making the alpha level $p<.002$.

RESULTS

Of 197 P1 students, 187 (95%) participated in the study and provided both pre- and post-survey data. The students were 56.7% female and 43.3% male. Regarding race/ethnicity, the students were 73.3% white, 13.3% Asian, and 11.1% black (the remaining 2.2% were categorized as 'other' for study purposes). Mean (SD) age of the students was 23.6 (3.2).

After examining the descriptive statistics of the 26-item scale, all items were determined to have sufficient score range to undergo exploratory factor analysis. In the exploratory factor analysis, eight factors/subscales were identified. Two factors had only one item each and, as a result, were deleted from the scale (leaving six factors and 24 items). Another factor was composed of two items, which in combination did not reflect any of the six tenets of professionalism; the items were thus deleted from the scale (leaving five factors and 22 items). An additional seven items were deleted from the scale because they failed to load on any of the factors. The remaining 15 items were included in the final version of the scale. Refer to Table 1 for frequency of student responses to pre-test scale items and final factor loadings for each item. Refer to Table 2 for mean and median scores of the 15 items. Possible total scores of the 15-item scale range from 15 to 75, with higher scores indicating more professional attitudes (Table 3). Cronbach's alpha coefficient of the final social media professionalism scale was .72.

The five subscales were named according to the professionalism tenet they most appropriately represent: honesty and integrity, respect for others, accountability, duty, and excellence. The sixth tenet, altruism, was not represented among the factors in the factor analysis. Each subscale has a possible score range of 3 to 15, with higher scores indicating more professional attitudes. See Table 3 for mean and median scores of the subscales. The variance for the "honesty and integrity" subscale was 23%, "respect for others" subscale was 12%, "accountability" subscale was 11%, "duty" subscale was 8%, and "excellence" subscale was 7%. Item to total correlations ranged from .28 to .69 on the five factors/subscales.

In the comparison of the pre- and post-survey scores, three scale items were significant (Table 2). The score of Item 1, which addressed reading/posting to social media during class, significantly increased from pre-test (3.1 ± 1.2 [median 3.0, mode 2.0]) to post-test (3.3 ± 1.2 [median 4.0, mode 4.0]; $Z = -3.58$, $p<.001$). The score of Item 6, which addressed an employer's use of social media when making hiring decisions, increased from pre-test (3.5 ± 1.1 [median 4.0, mode 4.0]) to post-test (3.7 ± 1.0 [median 4.0, mode 4.0]; $Z = -3.04$, $p=.002$). The score of Item 14, which addressed a college/university's use of social media as a measure of professional conduct, increased from pre-test (3.8 ± 0.9 [median 4.0, mode 4.0]) to post-test (4.0 ± 0.8 [median 4.0, mode 4.0]; $Z =-3.28$, $p=.001$). Of the subscales, only the "honesty and integrity" subscale score significantly increased from pre-test (11.3 ± 2.3 [median 11.0, mode 11.0]) to post-test (11.9 ± 2.0 [median 12.0, mode 12.0]; $Z = -3.98$, $p<.001$) (Table 3).

DISCUSSION

With an increasing number of people using social media on a regular basis, the need to educate pharmacy students on social media professionalism, and to then measure the effects of such programs using reliable and valid instruments, is becoming more apparent. The purpose of this study was to develop and evaluate a social media professionalism scale to measure student attitudes regarding this construct, as such a scale is not currently available in the academic pharmacy literature. Item generation was a focal point of this project, ultimately producing 26 items that underwent factor analysis. Following factor analysis, the number of items was reduced for the following reasons: several items did not load on any factor; two factors had only one item each; and one factor did not reflect any of the six tenets of professionalism. The final 15-item scale included five factors/subscales representing five of the six tenets of professionalism. As expected by investigators during item generation, the tenet of altruism was not reflected in the scale factors. Due to the virtual nature of social media interactions, it was difficult for investigators to develop items that reflected the application of altruism in a social media setting. Cronbach's alpha of the total scale, .72, was deemed satisfactory/acceptable per published guidelines on interpretation of the coefficient.[23,24] Thus, the scale, referred to as the Pharmacy Social Media Professionalism Instrument (PSMPI), is considered a reliable measure.

An additional objective of this study was to determine whether or not an educational session on social media and professionalism during orientation week could change P1 students' attitudes about professional online behavior. Pre- and post-test scores of the PSMPI were used to assess the effect of an educational presentation on social media and professionalism conducted during P1 orientation. The presentation introduced students to the following definition of professionalism in pharmacy: "Adherence to a set of values comprising both a formally

Table 1. Frequency of Students' Responses to Pre-Test Scale Items and Factor Loadings for Each Factor/Subscale[a]

Item Number	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
1. I read and/or post to social media sites while attending class or work (this does not include social media postings that are part of class or work assignments).[b]	13	63	27	57	27	-.01	-.15	.11	.63	.40
2. If the university or college is concerned about my social media postings, I readily accept the critique.	2	2	19	107	57	-.06	.12	.79	.06	-.10
3. I believe professional students should be held to higher standards than others regarding the image they portray on social media sites.	2	4	14	85	82	.23	.06	.66	-.01	.31
4. I complete my class assignments without being distracted by social media.	6	50	36	54	41	.09	.05	.09	.84	-.13
5. I follow through with my work (ie, job) responsibilities without my attention being diverted by social media.	0	23	19	84	61	.00	.34	-.37	.76	-.07
6. An employer of PharmD graduates should be able to use a prospective employee's social media site profile information and/or postings when making a hiring decision.	10	27	53	58	39	.78	.07	-.05	.02	.07
7. I am able to accept constructive criticism regarding my social media postings.	1	1	10	112	63	.21	.51	.39	.16	-.10
8. In my social media postings, I treat all individuals with the same respect, regardless of perceived race, ethnicity, gender, socioeconomic background, religion, or sexual orientation.	0	0	3	69	115	-.05	.84	.01	.16	.15
9. I do not need to be diplomatic when expressing ideas and opinions in social media postings.[b]	3	14	68	67	35	-.01	.10	.10	-.03	.72
10. It is not important to carefully construct postings to social media sites.[b,c]	4	1	19	104	58	.23	.11	-.20	-.19	.71
11. If the university or college is concerned about my social media postings, I readily accept the consequences.	1	8	31	97	50	.34	.18	.67	.08	.08
12. It is okay to post descriptions of how you broke school or job rules on social media.[b]	4	0	4	57	122	-.04	.10	.12	.15	.62

(*Continued*)

Table 1. (*Continued*)

Item Number	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
13. A student can be held accountable for his/her social media presence under college/ university/campus codes of conduct or guidelines for professional behavior.[c]	1	7	21	100	57	.70	.12	.27	.05	.03
14. The college/university can use a student's social media presence as a measure of his/her professional conduct.	3	16	41	90	37	.86	.06	.19	.01	-.01
15. I am respectful to individuals who have different backgrounds than mine in my social media postings.	0	0	3	83	101	.10	.72	.26	-.08	.23

[a]Factors/subscales defined as follows: Factor 1=Honesty and Integrity; Factor 2=Respect for Others; Factor 3=Accountability; Factor 4=Duty; Factor 5=Excellence
[b]Reverse-scored items
[c]Note: data were missing for one participant

agreed upon code of conduct and the informal expectations of patients, colleagues, and society" (Appendix).[16] The presentation also provided descriptions of qualities, values, and behaviors considered to reflect professionalism, which are elaborated upon by leading organizations in pharmacy practice and education (Appendix). Presenters paid particular attention to the issue of student professionalism within social media, giving students several examples of social media posts that would be deemed as unprofessional behavior.

The consequences of unprofessional student behavior on social media sites were also discussed, including examples of sanctions that could be imposed by the college (eg, suspension, expulsion) as well as long-term consequences in future hiring decisions. Findings of the study indicate the educational presentation was successful in improving students' attitudes toward social media professionalism. Specifically, scores for three of the survey items significantly increased from pre- to post-test. After the orientation session, students were more opposed to posting to social media during class (Item 1), and were more likely to agree with employers' use of social media to influence hiring decisions (Item 6), as well as schools' use of social media as a measure of students' professional conduct (Item 14).

The ongoing need for education on social media professionalism is demonstrated by past studies, which indicate that many students do not fully comprehend or agree with how their social media presence may impact their professional image and be used to judge them as professionals. For example, an issue that has become more critical – and controversial – as the use of social media has become more widespread is its role in the hiring decisions of potential employers. Ness and colleagues found that pharmacy students were almost evenly divided in their opinion of whether social media profiles should or should not influence hiring decisions.[7] In contrast, Hall and colleagues noted that less than 30% of pharmacy students believed it was fair for employers to utilize social media behavior in hiring decisions.[5] Despite students' feelings on the matter, it seems they may be aware of the effects their social media presence can have on their ability to be hired. The majority (74%) of students in the Ness and colleagues study indicated they planned on changing certain aspects of their social media site prior to applying for jobs.[7]

With more and more cases of social media unprofessionalism occurring, such as the previously described University of Minnesota and University of Louisville cases, many school administrators and faculty are exploring the possible benefits of educating students on appropriate online behavior. Several studies have shown such educational sessions to be beneficial. In a study of Canadian medical students, Walton and colleagues analyzed the changes students made to privacy settings on their Facebook profiles following an educational intervention on social media behavior.[8] The session addressed risks of social media in health care and summarized the stances of several organizations and regulatory groups. Both before and after the session, researchers examined whether students' profiles could be found, if personal information was disclosed, and if other comments and activity were

Table 2. Pre- and Post-test Statistics of Scale Items

Item Number	Pre-test Mean (SD) Pre-test Median (Mode)	Post-test Mean (SD) Post-test Median (Mode)	*p* value
1. I read and/or post to social media sites while attending class or work (this does not include social media postings that are part of class or work assignments).[a]	3.1 (1.2) 3.0 (2.0)	3.3 (1.2) 4.0 (4.0)	<.001
2. If the university or college is concerned about my social media postings, I readily accept the critique.	4.2 (0.7) 4.0 (4.0)	4.2 (0.8) 4.0 (4.0)	.46
3. I believe professional students should be held to higher standards than others regarding the image they portray on social media sites.	4.3 (0.8) 4.0 (4.0)	4.3 (0.7) 4.0 (4.0)	.92
4. I complete my class assignments without being distracted by social media.	3.4 (1.2) 4.0 (4.0)	3.5 (1.1) 4.0 (4.0)	.16
5. I follow through with my work (ie, job) responsibilities without my attention being diverted by social media.	4.0 (1.0) 4.0 (4.0)	3.9 (1.0) 4.0 (4.0)	.14
6. An employer of PharmD graduates should be able to use a prospective employee's social media site profile information and/or postings when making a hiring decision.	3.5 (1.1) 4.0 (4.0)	3.7 (1.0) 4.0 (4.0)	.002
7. I am able to accept constructive criticism regarding my social media postings.	4.3 (0.6) 4.0 (4.0)	4.3 (0.6) 4.0 (4.0)	.74
8. In my social media postings, I treat all individuals with the same respect, regardless of perceived race, ethnicity, gender, socioeconomic background, religion, or sexual orientation.	4.6 (0.5) 5.0 (5.0)	4.6 (0.6) 5.0 (5.0)	.31
9. I do not need to be diplomatic when expressing ideas and opinions in social media postings.[a]	3.6 (0.9) 4.0 (3.0)	3.8 (1.0) 4.0 (4.0)	.06
10. It is not important to carefully construct postings to social media sites.[a]	4.1 (0.8) 4.0 (4.0)	4.2 (0.9) 4.0 (4.0)	.62
11. If the university or college is concerned about my social media postings, I readily accept the consequences.	4.0 (0.8) 4.0 (4.0)	4.2 (0.7) 4.0 (4.0)	.003
12. It is okay to post descriptions of how you broke school or job rules on social media.[a]	4.6 (0.7) 5.0 (5.0)	4.4 (1.0) 5.0 (5.0)	.02
13. A student can be held accountable for his/her social media presence under college/university/campus codes of conduct or guidelines for professional behavior.	4.1 (0.8) 4.0 (4.0)	4.3 (0.7) 4.0 (4.0)	.01
14. The college/university can use a student's social media presence as a measure of his/her professional conduct.	3.8 (0.9) 4.0 (4.0)	4.0 (0.8) 4.0 (4.0)	.001
15. I am respectful to individuals who have different backgrounds than mine in my social media postings.	4.5 (0.5) 5.0 (5.0)	4.5 (0.6) 5.0 (5.0)	.71

[a]Reverse-scored items (higher scores indicate more professional attitudes)

visible, in addition to verifying the visibility of other items. The percentage of students with visible items decreased post-intervention. In particular, the visibility of "questionable content" decreased from 6.6% to 2.0% post-intervention.[8] Additionally, personal information disclosed decreased from 33.1% to 24.5%.[8] In a similar study, Williams and colleagues found that a significant number of students made their profile not visible following a session that covered college of pharmacy's professionalism policies and educated students on the possibility of their online profiles being seen by future employers, faculty, and patients.[14]

The findings of these prior studies demonstrate the ability of an educational intervention to make students aware of the need for increased privacy settings; however, a literature review did not reveal any studies determining such an intervention's ability to change students' opinions and attitudes about social media professionalism. The current study fills that gap, providing evidence that an educational presentation on social media professionalism provided during P1 orientation can improve student attitudes, particularly toward posting to social media during class and use of an individual's social media profile and postings by employers in

Table 3. Pre- and Post-test Statistics of Subscales and Total Scale

	Pre-test Mean (SD) Pre-test Median (Mode)	Post-test Mean (SD) Post-test Median (Mode)	*p* value
Honesty & Integrity	11.3 (2.3) 11.0 (11.0)	11.9 (2.0) 12.0 (12.0)	<.001
Respect for Others	13.4 (1.3) 13.0 (12.0)	13.3 (1.5) 13.0 (15.0)	.76
Accountability	12.4 (1.78) 12.0 (12.0)	12.6 (1.8) 13.0 (15.0)	.08
Duty	10.5 (2.57) 10.0 (12.0)	10.7 (2.5) 11.0 (12.0)	.14
Excellence	12.3 (1.81) 12.0 (12.0)	12.3 (2.4) 12.0 (12.0)	.64
Total Scale	59.9 (5.9) 60.0 (58.0)	60.8 (6.3) 60.0 (58.0)	.003

hiring and by colleges/universities in assessing student conduct.

This study is not without limitations. Validity testing of the PSMPI was limited to content validity, as the study largely focused on scale development and exploratory factor analysis. While testing of the scale's nomological validity (wherein the scale is correlated in a theoretically predicted manner to related constructs/variables) is desirable, such testing would be a challenge in this case as outcome measures which are theoretically related to social media professionalism would first need to be identified. Possible measures related to student professionalism – student organization membership (being a member of one versus multiple organizations), employment setting (working at a pharmacy versus another setting) – were previously suggested by Chisholm and colleagues, but were discarded by the same investigators as too simplistic and subjective. Being a member of an organization or being employed in a certain setting does not in itself capture the complex values and behaviors indicative of professionalism. The question thus remains open as to what measure(s) should be used in nomological validity testing of a student professionalism instrument such as the PSMPI.

Another possible limitation is that the total variance explained by the subscales was approximately 61%. One source provides a "rule of thumb" recommending 70% or greater total variance explained in factor analysis, while other sources are less prescriptive and suggest the focus should be on achieving a minimum number of factors to explain a maximum percentage of the variance.[19,25,26] As the minimum desired and expected number of factors (representing five of the six tenets of professionalism) was found in the factor analysis, this would suggest the percentage of total variance explained is acceptable. Additionally, we did not assess if students had received education or training on social media and professionalism prior to the educational session conducted during P1 orientation. However, the pre/post survey design allowed each student to serve as their own control, facilitating measurement of changes in PSMPI scores before and after the educational presentation. Therefore, assessment of previous education was rendered unnecessary.

CONCLUSION

The increasing prevalence of social media in the lives of pharmacy students has prompted the need for education and evaluation regarding professional conduct in social media utilization. A scale developed to assess student attitudes toward social media professionalism, the Pharmacy Social Media Professionalism Instrument (PSMPI), measures five tenets of professionalism and exhibits satisfactory reliability measures. Using the PSMPI, this study demonstrated that educational presentations are an effective method for improving pharmacy students' attitudes regarding social media professionalism. Future studies should investigate the long-term impact of social media professionalism education and training, as fading of beneficial effects may necessitate periodic "refresher" educational sessions and training on social media professionalism.

REFERENCES

1. Facebook newsroom statistics. http://newsroom.fb.com/company-info/. Accessed September 22, 2015.
2. Twitter statistics. https://about.twitter.com/company. Accessed September 28, 2015.
3. Oblinger D. Boomers, Gen-Xers, Millennials: understanding the new students. *Educause Rev.* 2003;38(4):37-47.
4. Jawaid M, Khan MH, Bhuto SN. Social network utilization (Facebook) & e-professionalism among medical students. *Pak J Med Sci.* 2015;31(1):209-213.
5. Hall M, Hanna L-A, Huey G. Use and views on social networking sites of pharmacy students in the United Kingdom. *Am J Pharm Educ.* 2013;77(1):Article 9.

6. White J, Kirwan P, Lai K, Walton J, Ross S. 'Have You seen what is on Facebook?' The use of social networking software by health care professions students. *BMJ Open*. 2013;3(7):e003013.

7. Ness GL, Sheehan AH, Snyder ME, Jordan J, Cunningham JE, Gettig JP. Graduating pharmacy students' perspectives on e-professionalism and social media. *Am J Pharm Educ*. 2013;77(7): Article 146.

8. Walton JM, White J, Ross S. What's on YOUR Facebook profile? Evaluation of an educational intervention to promote appropriate use of privacy settings by medical students on social networking sites. *Med Educ Online*. 2015;20:28708.

9. Bongartz J, Vang C, Havrda D, Fravel M, McDanel D, Farris KB. Student pharmacist, pharmacy resident, and graduate student perceptions of social interactions with faculty members. *Am J Pharm Educ*. 2011;75(9):Article 180.

10. Cain J, Fink JL. Legal and ethical issues regarding social media and pharmacy education. *Am J Pharm Educ*. 2010;74(10):Article 184.

11. Mawer E. Minnesota Supreme Court sides with university on punishment for Facebook posts. Silha Center for the Study of Media Ethics and Law. http://silha.umn.edu/news/Summer2012/SILHACENTERMinnesotaSupremeCourtSideswithUniversityUniversityofMinnesota.html. Accessed October 21, 2015.

12. Jaschik S. Banned from blogging. *Inside Higher Ed*. 2013. https://www.insidehighered.com/news/2013/06/06/appeals-court-upholds-blogging-related-expulsion-student-nursing-school. Accessed October 29, 2015.

13. Pomerantz J, Hank C, Sugimoto CR. The state of social media policies in higher education. *PLoS One*. 2015;10(5):e0127485.

14. Williams J, Feild C, James K. The effects of a social media policy on pharmacy students' Facebook security settings. *Am J Pharm Educ*. 2011;75(9):Article 177.

15. American Board of Internal Medicine Committees on Evaluation of Clinical Competence and Clinical Competence and Communication Programs. *Project Professionalism*. Philadelphia, PA: American Board of Internal Medicine; 2001:5–6.

16. Hammer DP, Berger BA, Beardsley RS, Easton MR. Student professionalism. *Am J Pharm Educ*. 2003;67(3):Article 96.

17. Chisholm MA, Cobb H, Duke L, McDuffie C, Kennedy WK. Development of an instrument to measure professionalism. *Am J Pharm Educ*. 2006;70(4):Article 85.

18. Cain J, Scott DR, Akers P. Pharmacy students' Facebook activity and opinions regarding accountability and e-professionalism. *Am J Pharm Educ*. 2009;73(6):Article 104.

19. Statistical analysis: a manual on dissertation and thesis statistics in SPSS. http://www.statisticssolutions.com/wp-content/uploads/SPSS%20Manual.pdf. Accessed September 29, 2015.

20. Ghiselli EE, Campbell JP, Zedeck S. *Measurement Theory for the Behavioral Sciences*. San Francisco, CA: Freeman; 1981.

21. Hinkin TR. A brief tutorial on the development of measures for us in survey questionnaires. *Organ Res Methods*. 1998;1(1):104-121.

22. Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika*. 1951;16(3):297-334.

23. DeVellis RF. *Scale Development: Theory and Applications*. 3rd ed. Thousand Oaks, CA: SAGE Publications; 2012.

24. Vaske JJ. *Survey Research and Analysis: Applications in Parks, Recreation and Human Dimensions*. State College, PA: Ventur; 2008.

25. Lorenzo-Seva U. How to report the percentage of explained common variance in exploratory factor analysis. Technical report. 2013. Department of Psychology, Universitat Rovira I Virgili, Tarragona, Spain. http://psico.fcep.urv.es/utilitats/factor/documentation/Percentage_of_explained_common_variance.pdf. Accessed October 21, 2015.

26. Preacher KJ, Zhang G, Kim C, Mels G. Choosing the optimal number of factors in exploratory factor analysis: a model selection perspective. *Multivariate Behav Res*. 2013;48:28-56. http://www.quantpsy.org/pubs/preacher_zhang_kim_mels_2013.pdf. Accessed October 21, 2015.

Appendix. Details of Professionalism Presentation During Orientation

I. Individual professionalism was introduced to students as consisting of a set of core values and demonstrated behaviors, as defined by the American Association of Colleges of Pharmacy and the *American Journal of Pharmaceutical Education* in the article "Student Professionalism" [item (a) below]. During the presentation, professionalism in pharmacy was defined as "adherence to a set of values comprising both a formally agreed upon code of conduct and the informal expectations of patients, colleagues, and society. The key values include acting in a patient's best interests, responsiveness to the health needs of society, maintaining the highest standards of excellence in the practice of pharmacy, and in the generation and dissemination of knowledge." Also described to students were the six tenets of professionalism: altruism, accountability, respect for others, excellence, duty, and honor and integrity.

The definition of professionalism was further expanded upon using additional published definitions and descriptions, as listed in (b) through (d) below.
a. Student professionalism [*American Journal of Pharmacy Education* 2003;67: Article 96]
b. The Ten Traits of a Professional [*Journal of the American Pharmaceutical Association* 2000;40(1):96-102]
c. Code of Ethics for Pharmacists [http://www.pharmacist.com/code-ethics]
d. Accreditation Council for Pharmacy Education 2016 Standard 4.4 Professionalism [https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf]

II. Guidelines on professionalism provided to students during orientation
a. University of Tennessee College of Pharmacy Standards for Student Professional Conduct (http://www.uthsc.edu/pharmacy/current_students/code_of_conduct.php)
b. University of Tennessee Health Science Center Student Code of Conduct (http://catalog.uthsc.edu/content.php?catoid=4&navoid=302#Student_Code_of_Conduct)

III. Examples of unprofessional conduct given during presentation
a. Repeatedly being late to class or rotations
b. Overtly rude behavior to students or faculty
c. Not answering emails
d. Plagiarism
e. Sexual harassment
f. Non-academic use of electronics in class
g. Inappropriate displays of affection in class
h. Inappropriate posts on social media including filthy language, pornography, and music alluding to the abuse of women

IV. Description of the University of Tennessee College of Pharmacy Professional Conduct Committee
The Professional Conduct Committee is a standing committee that is responsible for assuring professional behaviors among College of Pharmacy students. This committee is responsible for reviewing cases in which student behaviors are not consistent with the College of Pharmacy Guidelines for Student Professional Conduct and/or the UTHSC Standards of Conduct as outlined in the campus student handbook, *The Center Scope.* The Committee is advisory to the Faculty regarding policies, procedures, and guidelines related to professionalism in the College of Pharmacy, and advisory to the Dean regarding specific incidents of student misconduct.
Membership includes representatives from the Faculty (at least two full-time Faculty member from each department), three students, one graduate student, and one resident. The Associate Dean for Student Affairs serves *ex officio* as a voting member. Individual members and the Chairperson are appointed annually by the Dean.

V. How to report unprofessional conduc:
A standardized form is available on the College of Pharmacy's website (login using institutional ID and password is required). The form asks for the following information: first and last name of student being reported and background information/comments on the incident being reported.