

## Social Media as Source of Medical Information for Healthcare Students

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### Abstract

*Introduction:* The scope of the research was a more detailed understanding of the influence of social media and the importance of student's usage of social media context in relation to medical information. The research aimed to increase the understanding of social media and the impact on medical information use, informing policy and practice while highlighting gaps in the literature and areas for further research. *Methods:* The search of PubMed database was performed in October 2015, using terms to identify peer-reviewed research in which social media technologies were an important feature for health occupations, premedical, pharmacy, nursing or medical students. A systematic approach was used to retrieve papers and extract relevant data. *Results:* There were initially identified 435 studies involving social media, healthcare information and medical students subject headings (MeSH) terminology. After filtering for free full text articles, and exclusion of not students or social media specific ones, 33 articles were reviewed. The majority of the studies were interventional studies that either assessed the outcomes of online discussion groups or teaching methods through social media. The majority of studies focused on the use of social media as a teaching tool, how students use it and the implications upon their education. The largest number of original papers was published in 2013. Facebook, Podcasts, Multiplayer virtual worlds, Blogs, and Twitter were identified as being used by medical students. *Conclusion:* Social media is used as a tool of information for students mainly as the means for engaging and communicating with students.

**Keywords:** Social Media; Blogging; Students, Pharmacy; Students, Nursing; Students, Medical

### Introduction

Through online technologies, it was possible for stakeholders to share health knowledge regardless of geographical constraints, thus encouraging the advancement of knowledge in health and other fields. A literature review of online strategies for knowledge translation showed that knowledge translation is becoming a critical component of the healthcare field, and online technologies were emerging as a key facilitator of efficient and timely knowledge exchange [1].

Social media websites have been classified by Kaplan and Haenlein according to the degree of "social presence" and the degree of "media richness" [2].

A previous research suggested that blending Learning 2.0 would take the best of Old school' and 'new school' pedagogical practices to create a vibrant and engaging world of education that transcends the quality and potential that the schools of earlier generations could have offered. The proper combination of in-class teaching with online learning would enhance the Millennial

Generation's educational experience as they demand the connectivity and technology ingrained in their learning just as it is ingrained in the world they live outside of the classroom [3,4]. Among a group of researchers were listed attributes of games for application to learning [5]. It was demonstrated by previous research that it is important for nursing [5] and pharmacy [6] education to use the power of emerging technology tools to create learning communities for sharing and exchanging ideas, research, and knowledge about nursing education.

There is a paucity of published data related to professional students' usage and attitudes toward online social networking sites and there is no evidence to determine how schools feel about this issue [7-9]. The available data in the medical community has described hazards of unprofessional online activity so rigorous researches of the usage patterns is needed. Other research suggest that policies and guidelines should be implemented to provide guidance on professionalism and ethics of communicating and delivering professional services via the Internet [6].

The scope of the research was to understand the influence of social media and the importance of student's social media usage context in retrieving medical information. The first objective of this systematic review was to synthesize evidence, including network characteristics, that social network structures can influence student's behavior. The second objective was to examine the relationship between social network structure, social network position, and medical information use across the selected types of student groups: health occupations, premedical, pharmacy, nursing, and medical.

## Material and Method

This systematic review followed the Preferred Reporting Items for Systemic Reviews and Meta-Analyses (PRISMA) guidelines [10]. This study included peer reviewed literature that was published in PubMed. Studies described social media analysis, examining relationships between participants in regards to medical information. The criteria for considering the studies are presented in Table 1.

**Table 1.** Criteria for considering studies

Item	Inclusion criteria
Population	<ul style="list-style-type: none"> <li>health occupations students, premedical students, pharmacy students, nursing students, medical students</li> <li>all social media users, all genders, age groups and participants from any racial, ethnic, cultural or religious groups will be eligible for inclusion, regardless of location</li> </ul>
Social media	Defined according to Kaplan and Haenlein's classification scheme [2], including: collaborative projects, blogs or microblogs, content communities, social networking sites, and virtual worlds.
Intervention / exposure	Social media analysis of medical information use based on the approach of social media: <ul style="list-style-type: none"> <li>Interventional data engaging the students via social media platforms</li> <li>Observational data observing student's social media behaviors</li> </ul>
Outcome of interest	<ul style="list-style-type: none"> <li>Social media usage and medical information position/s</li> <li>Peer selection in social media usage</li> <li>Peer influence in medical information use</li> </ul>
Stud design	<ul style="list-style-type: none"> <li>Primary or secondary research</li> <li>Analytic quantitative designs used to answer whether social media is effective for use in healthcare</li> <li>Descriptive and qualitative designs used to provide context to attributes that may contribute to the effectiveness or lack of effectiveness of the tools being studied. This may include: case control, cohort, cross-sectional, experimental, and intervention designs with no restrictions.</li> </ul>

### Study Exclusion Criteria

Were excluded studies that examined mobile health (e.g., tracking or medical reference apps), and real-time exchanges mediated by technology (e.g., Skype, chat rooms) [11]. Were excluded any studies that were not available in English.

Search Strategy

The PubMed database was searched for relevant articles. The search was undertaken by October 2015 and included papers published up November when the search was undertaken. The PubMed database was searched for relevant articles using the search query in Figure 1.

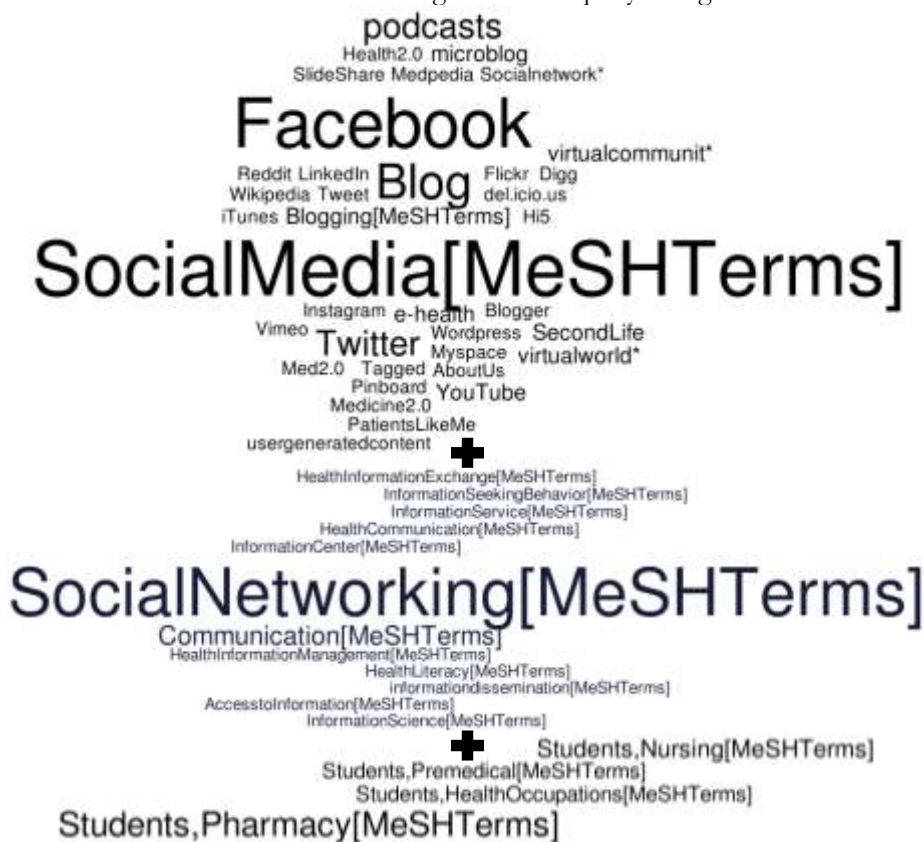


Figure 1. PubMed search strategy

Selection of Studies

Data was extracted using home-made standardized forms and any duplicates were removed. In the first round of screening, titles and abstracts were screened for inclusion. Following preliminary screening, eligibility was assessed through full-text screening.

Data Extraction

A data extraction form was developed and pilot-tested on a randomly selected subsection of studies. The extraction form was amended based on outcomes and feedback from the pilot testing phase. This ensured a comprehensive data extraction process and optimize the usability of the extraction form. The data extraction form ensured that the review extracts pertinent data to provide a comprehensive synthesis of the literature regarding social media analysis of medical information usage. The form provided a mechanism to elicit data to describe key findings and the nature of social media influences on medical information use. As per the PRISMA guidelines, data was extracted from each study that meets the inclusion criteria, including: participants; interventions; results; social media analysis methodology [10].

Data was extracted independently by the two reviewers and compared. Any discrepancies regarding data categorization were discussed as a group, after which a consensus was reached and a final database was compiled.

Analysis

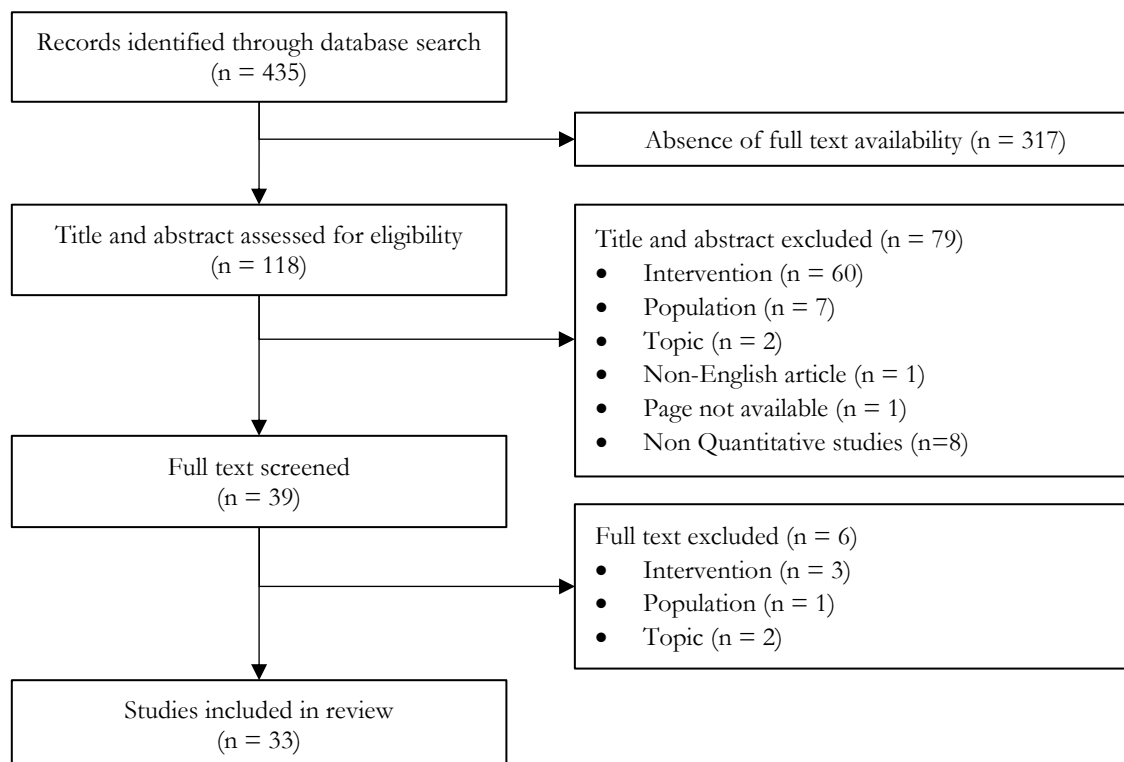
Qualitative, quantitative and mixed-method data that meets the inclusion criteria for the review,

including methodological rigor, credibility and quality standards as outlined, were described and synthesized using narrative synthesis [12]. This approach is used to synthesize the evidence relevant to the research questions, summarizing and explaining the findings of included studies. Results were presented as percentages and associated 95% confidence intervals using an exact method [13] for qualitative variables. Comparisons between groups on qualitative variables were done with Z-test for proportions at a significance level of 5%. The sample sizes were summarized as median and interquartile range ( $IQR=(Q1-Q3)$ , where  $Q1$  = first quartile and  $Q3$  = third quartile) since the data proved not normally distributed. Comparisons in regard of sample size used in interventional compared with observational studies were tested using Mann-Whitney test at a significance level of 5%.

Preliminary synthesis developed an initial description of the included study results, incorporating outcome statistics against research questions where possible. As patterns across study results emerge from the preliminary synthesis, reviewers interrogated the data to identify and gain an understanding about any factors that may explain differences in direction and/or effect. The narrative synthesis of evidence is expected to be reported in a table format, highlighting the key outcomes and addressing the research questions. In order to avoid potential biases, key points of difference between studies were identified.

## Results

There were initially identified 435 studies involving social media, healthcare information, and medical students subject headings (MeSH) terminology. Filtering for free full text articles, remained 27.12% of the results. Of these studies, 85 were excluded because they were not specific to medical students (e.g., included teachers, adult ambulatory care patients, medical librarians, veterinary students, schools), or did not involve social media (e.g., mobile application, e-learning modules, forums). The PRISMA flow diagram is shown in Figure 2.

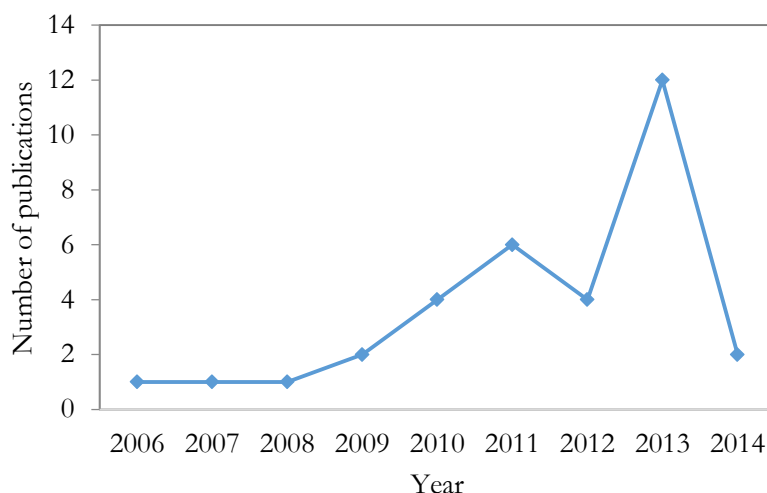


**Figure 2.** PRISMA flow diagram of selection procedure for systematic review

The largest number of original research studies (6.36% – 95%CI [21.304–54.454]) were identified as being published in 2013 (Figure 3).

The following types of social media were used by studies included in the analysis:

- Facebook: 30.30% – 95%CI [15.24–48.39]
- Podcasts: 18.18% – 95%CI [6.15–36.27]
- Multiplayer virtual worlds: 12.12% – 95%CI [3.12–27.18]
- Blogs: 9.09% – 95%CI [3.12–24.15]
- Twitter: 6.06% – 95%CI [0.09–21.12]
- Mixed social media platforms: 12.12% – 95%CI [3.12–27.18]



**Figure 3.** Number of studies meeting criteria for systematic review, by year (studies published through October 1<sup>st</sup> 2015)

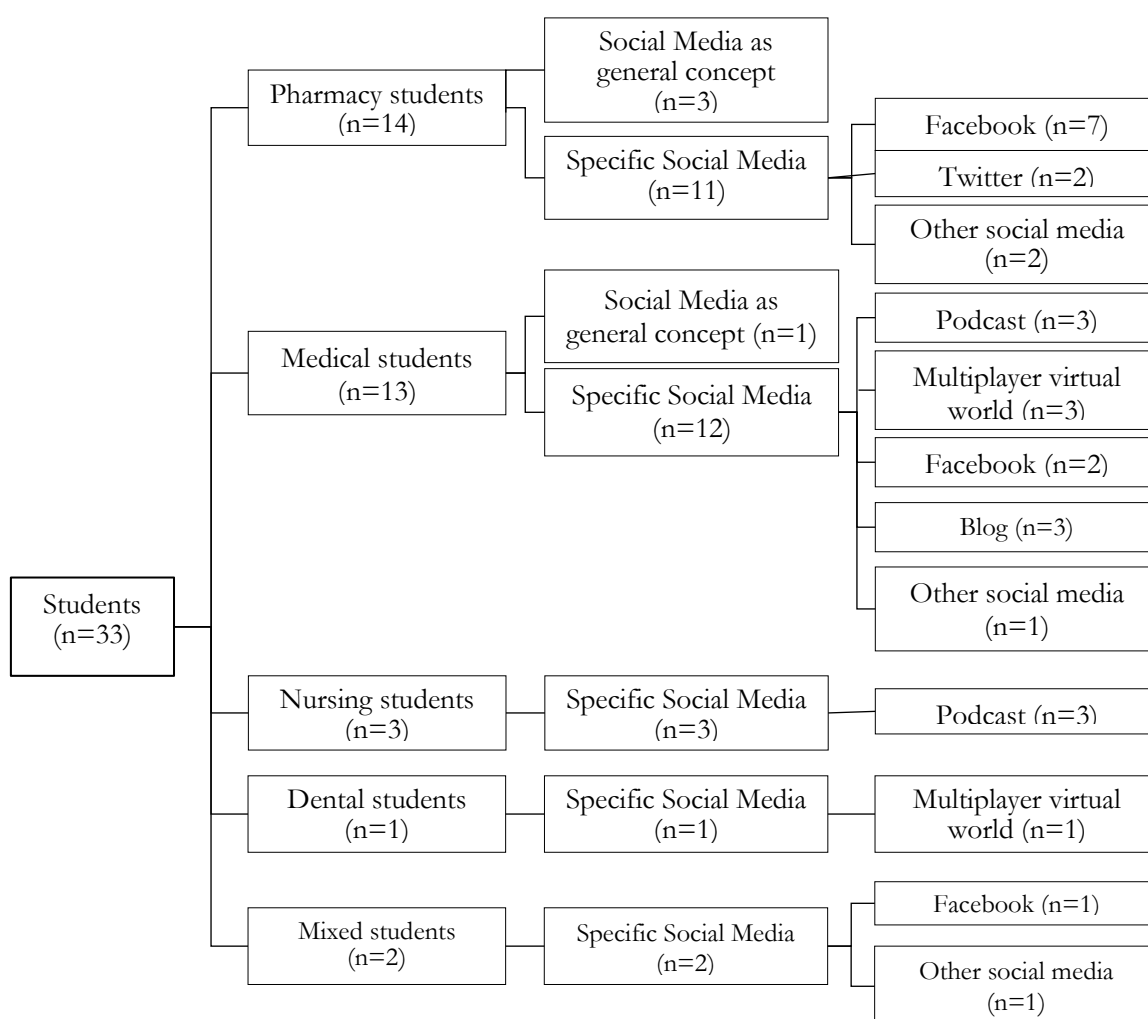
A percentage of 12.12% 95%CI [3.122-27.181] studies exclusively involved other types of social media platforms, like Sina Weibo, Ning, UMMedWiki or vodcasts.

Of the 33 studies, a significant percentage of the research papers included in the systematic review included medical students ( $Z=2.494$ ,  $p<0.05$ ), nursing students ( $Z=16.348$ ,  $p<0.0001$ ), dental students ( $Z=31.48$ ,  $p<0.0001$ ) or mixed types of students ( $Z=21.16$ ,  $p<0.0001$ ) (Figure 4).

Around half of the research papers included in the review were published in journals with impact factor (57.58% - 95%CI [39.49-75.67]; Am J Pharm Educ, BMC Med Educ, J Dent Educ, J Gen Intern Med, Scand J Trauma Resusc Emerg Med). The studies including pharmacy students were published in The American Journal of Pharmaceutical Education and studies including dental students were published in Journal of Dental Education. As per the JCR Impact Factor, the association between 1st domain Education, scientific disciplines with Q2 and 2nd domain Pharmacology & Pharmacy with Q3 (21.05%, 95%CI [15.24-48.39]) were the most encountered among the 19 articles which were published in ISI indexed journals.

The median of sample sizes was of 70 (IQR (26–132)) for interventional studies and of 316 (IQR (277–503)) for observational studies, the difference being statistically significant (Mann Whitney test: statistic=-3.04,  $p=0.0024$ ).

The percentage of interventional studies was significantly higher compared with observational studies ( $Z= -4.0614$ ,  $p<0.0001$ ).



**Figure 4.** Student population categories included in the studies analyzed in the review

## Discussion

Social media can be used as a powerful tool of information for health occupations, premedical, pharmacy, nursing or medical students. The majority of the studies in this systematic review were interventional studies that either assessed the outcomes of online discussion groups or teaching through social media.

Online discussion groups were formed using Blogs [14,15], including microblogs [16-18], Facebook [19-21] and wikis [22] (Figure 4). Blogs were found suitable to promote transparency and communication [14], create cohesion and establish another link for them with the faculty [15]. Microblog-based learning methods were well received by students. Microblog-based case studies were perceived as a study tool for information sharing, collaborative learning, promoting interaction, and sense of community. On the other hand, findings suggested that some students disliked this form of education because of the low quality of interaction, distractions and the difficulty to follow a large volume of the posts [16]. A study, that assessed the effectiveness of using Twitter as a means of interaction between faculty members, guests and students, indicated that tweeting frequently and consistently encouraged class participation, allowed them to voice their opinion, and to share ideas [17]. Another study, assessing Twitter as an in-class backchannel tool, showed that students seemed more engaged, commenting and asking a greater number of questions, but it was unknown if the increased engagement was due to the novelty and the active-

behavior element of tweeting [18]. Facebook facilitated the learning process by enabling discussions [19,20] and by exposing students to “real world” situations [21]. An educational wiki provided a computable, comprehensive, and focused compendium on the core content of medical education. Faculty used it to extract reliable data for curriculum coordination and quality assurance [22].

Teaching through social media was done through multiplayer virtual world games [23-25], combinations of social media platforms [26], vodcasts [27] and podcasts [28-33]. Using multiplayer virtual world training showed results if used as a supplement to the traditional classroom training [23-25]. Web-based collaborative tools (Ning and Skype) were integrated into an existing course and were leverage to connect interprofessional students from different locations but with mixed educational results [26]. Using vodcasts while teaching a class resulted in improved student performance and favorable student perceptions about the instructional approach [27]. In 2007, there was no evidence to suggest that learning using podcasts was effective [28]. In another study published in 2010, students valued video podcasts for convenience and ability to review, but found them less engaging than live lectures [29]. On the other hand, 3 studies have shown that students found the availability of podcasts helpful for their learning [30-33]. Exam results indicated that the availability of podcasts was also associated with improved exam performance [30]. In addition to their usage in blended learning, the podcasts were often downloaded by the interested public, despite their specialized contents [32].

The observational studies focused on observing the professionalism among students [34-39] and the use and views on social networking sites of students [40-42]. It was also observed student's interaction with faculty members [43], the effects of a social media policy on students' social media security settings [44] and the adverse health effects and unhealthy behaviors among students using social media [45].

Professionalism among students was reviewed on Facebook [34,35,38,40] through questionnaires [34,35] and secondary social media research [38,39] and on mixed social media platforms [36,37] through questionnaires. Through questionnaires, it was observed that students believed that if their site was private there was more latitude with the posted content [34] and that individuals should not be held accountable to authority figures for information posted on Facebook [35]. Crawling through student's Facebook profiles, it was found that there were a small number of profiles that showed unprofessional content, profiles had limited privacy but gave full access to photo albums that contained personal photos of the students' children, spouse, and friends [38]. Another secondary research showed that use of Facebook is more common among students, and most chose to keep their profiles open to the public. Their personal information is readily available, and many include information that is not usually disclosed in a doctor-patient relationship [40]. Among the examples of unprofessional online behaviors investigated, the most commonly observed by students were use of foul language, pictures in which they are wearing bathing suits and those related to alcohol consumption, but these behaviors drew much less rejection than violation of patients' privacy [36]. Last but not least, students understood the importance of maintaining professionalism on their social media sites, even though it represented their imagine as a person, not as a professional, and being used for personal expression and correspondence [37]

As studies suggested the implementation of social media policies [36,38] or at least that students should be aware of the issues related to social media and professionalism [34,35,40], the effects on students' social media were to increase the security settings, not permitting unwanted third parties to have visibility on their wall, photo, and video information, but leaving demographic information, links, and number of friends visible [44]. Additionally, in the Facebook-related situations, students viewed contact between faculty members and students as a boundary violation [43].

Uses and views of students on social networking sites were research through questionnaires [39,41] and through secondary research [42]. Most student users were aware of the sites' privacy features and choose to apply them [39]. Students showed interest in serious games and massively multiplayer online games as pedagogical vehicles and specifically as epistemic constructs to help them develop ethical and professional ways of knowing, being, acting and interacting in the medical community [41]. Students shared through blogs views, experiences and insights regarding preparation for exams or experiences of clinical rotations [42].

A study found association between Facebook use and many adverse health effects (musculoskeletal disorders and eye disorders) and unhealthy behavior [45].

#### *Limitations*

The strengths of the paper lie in the comprehensive and systematic approach of the literature review. Nevertheless, there are limitations to this systematic review that warrant considering. First, it is possible that, despite the attempts to capture all pertinent articles through the use of numerous carefully selected search terms, some relevant studies may have unintentionally been excluded. It is possible that studies pertinent to this review may have been missed as a result of keywords used in the article selection process. Secondly, another potential limitation of the study is the inclusion criteria for free full text articles only. The deliberate and detailed approach to reviewing only full-text articles, may have excluded relevant articles. However, trends for use of social media within students were observed, as described above.

#### *Future Directions*

Social media and social networking platforms are relatively novel ways of communication, driven primarily by young people, which have been growing and changing ever since their emergence in the early 21<sup>st</sup> century.

Understanding how students engage on social media and use information will enable teachers and medical schools to make their curricula more online-friendly.

The number of students using social networking platforms daily continues to grow steadily and this ubiquity can help teachers engage with them on a platform they may already be using.

For example, communicating with students about courses, laboratories, or even allowing them to ask questions and share content directly through social networking platforms could greatly facilitate student-teacher communication and increase student's participation in their learning process. Encouraging them to take part in the construction phase of a course will not only help to train today's learners, but will also cultivate tomorrow's medical educators. Secondly, with the emergence of mobile technology, social media are becoming increasingly "real time", immediate, and local. The combination of social media with mobile technology makes it possible to learn about students' behaviors, and to intervene with relevant and timely messaging, coaching, and interventions. Furthermore, computer-generated predictive analytics could be established to screen social media for keywords or images associated with their issues, automating the process of social media surveillance in a more student-accepted format, which may feel less "creepy" to them while still capturing important opportunities for positive intervention. In the future, the rich data available through social media and mobile technology may enable schools to become more proactive about teaching.

## **Conclusions**

Although many teaching institutions remain timid about the use of social media in the teaching process, this review demonstrates that social media is already being used for a variety of purposes and in a number of different ways to engage and educate students. Most studies done to date have been interventional in nature, examining students' engagement through social media and the resulting implications on their school results. Although these explorations are essential, further exploration and development of these strategies into building effective teaching platforms that can positively impact the learning process of students is warranted. One of the greatest challenges in harnessing social media is the constant and rapid pace of evolution, including the continual development of new technologies and the ever-changing popularity and adoption of specific platforms among different user demographics. In order to stay on top of this rapidly evolving field, ongoing study of the use of social media by students is critical. Further research is necessary to establish whether social media can be an effective tool to help achieve positive learning outcomes in the students' population.



## Conflict of Interest

The authors declare that they have no conflict of interest.

## References

1. Mairs K, McNeil H, McLeod J, Prorok J, Stolee P. Online strategies to facilitate health-related knowledge transfer: a systematic search and review. *Health Info Libr J.* 2013;30(4):261-77.
2. Kaplan AM, Haenlein M. Users of the world, unite! The challenges and opportunities of Social Media. *Business Horiz.* 2010;(53):59-68.
3. Hopkins D. The emergence of online learning in PN Education. *J Pract Nurs.* 2008;58(4):4-7.
4. Cain J, Fox B. Web 2.0 and pharmacy education. *Am J Pharm Educ.* 2009;73(7):120.
5. Skiba D. Nursing education 2.0: games as pedagogical platforms. *Nurs Educ Perspect.* 2008;29(3):174-5.
6. Benetoli A, Chen T, Aslani P. The use of social media in pharmacy practice and education. *Res Social Adm Pharm.* 2015;11(1):1-46.
7. Oakley M, Spallek H. Social media in dental education: a call for research and action. *J Dent Educ.* 2012;76(3):279-87.
8. von Muhlen M, Ohno-Machado L. Reviewing social media use by clinicians. *J Am Med Inform Assoc.* 2012;19(5):777-81.
9. Cain J. Online social networking issues within academia and pharmacy education. *Am J Pharm Educ.* 2008;72(1):10.
10. Moher D, Liberati A, Tetzlaff J, Altman D, The Prisma Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Int J Surg.* 2010;8(5):336-41.
11. Hamm M, Chisholm A, Shulhan J, Milne A, Scott S, Given L, et al. Social media use among patients and caregivers: a scoping review. *BMJ Open.* 2013;3(5):e002819.
12. Popay J, Roberts H, Sowden A, Petticrew M, Arai L, Rodgers M, et al. Guidance on the conduct of narrative synthesis in systematic reviews: A product from the ESRC Methods Programme Version: Lancaster University; 2006.
13. Jäntschi L, Bolboacă S. Exact Probabilities and Confidence Limits for Binomial Samples: Applied to the Difference between Two Proportions. *TheScientificWorldJOURNAL* 2010;10: 865-878.
14. Wurche B, Klauer G, Nürnberger F. "PULS." – a Blog-based Online-Magazine for Students of Medicine of the Goethe University Frankfurt. *GMS Z Med Ausbild.* 2013;30(1):Doc3.
15. Poonawalla T, Wagner R. Assessment of a blog as a medium for dermatology education. *Dermatol Online J.* 2006;12(1):5.
16. Wang T, Wang F, Shi L. The use of microblog-based case studies in a pharmacotherapy introduction class in China. *BMC Med Educ.* 2013;13:120.
17. Fox B, Varadarajan R. Use of Twitter to Encourage Interaction in a Multi-campus Pharmacy Management Course. *Am J Pharm Educ.* 2011;75(5):88.
18. Camiel L, Goldman-Levine J, Kostka-Rokosz M, McCloskey W. Twitter as an In-Class Backchannel Tool in a Large Required Pharmacy Course. *Am J Pharm Educ.* 2014;78(3):67.
19. DiVall M, Kirwin J. Using Facebook to Facilitate Course-Related Discussion Between Students and Faculty Members. *Am J Pharm Educ.* 2012;76(2):32.
20. Estus E. Using Facebook Within a Geriatric Pharmacotherapy Course. *Am J Pharm Educ.* 2010;74(8):145.
21. Cain J, Policastri A. Using Facebook as an Informal Learning Environment. *Am J Pharm Educ.* 2011;75(10):207.
22. Thompson C, Schulz W, Terrence A. A Student Authored Online Medical Education Textbook: Editing Patterns and Content Evaluation of a Medical Student Wiki. In *AMIA Annu Symp Proc*; 2011, p. 1392-1401.
23. Creutzfeldt J, Hedman L, Felländer-Tsai L. Effects of pre-training using serious game technology on CPR performance – an exploratory quasi-experimental transfer study. *Scand J*

- Trauma Resusc Emerg Med. 2012;20(79):79.
24. Creutzfeldt J, Hedman L, Medin C, Heinrichs W, Felländer-Tsai L, Eysenbach Ge. Exploring Virtual Worlds for Scenario-Based Repeated Team Training of Cardiopulmonary Resuscitation in Medical Students. *J Med Internet Res*. 2010;12(3):e38.
  25. El Tantawi M, El Kashlan M, Saeed Y. Assessment of the Efficacy of Second Life, a Virtual Learning Environment, in Dental Education. *J Dent Educ*. 2013;77(1):1639-1652.
  26. Pittenger A, Westberg S, Rowan M, Schweiss S. An Interprofessional Diabetes Experience to Improve Pharmacy and Nursing Students' Competency in Collaborative Practice. *Am J Pharm Educ*. 2013;77(9):197.
  27. Pierce R, Fox J. Vodcasts and Active-Learning Exercises in a "Flipped Classroom" Model of a Renal Pharmacotherapy Module. *Am J Pharm Educ*. 2012;76(10):196.
  28. Palmer E, Devitt P. A method for creating interactive content for the iPod, and its potential use as a learning tool: Technical Advances. *BMC Med Educ*. 2007;7:32.
  29. Schreiber B, Fukuta J, Gordon F. Live lecture versus video podcast in undergraduate medical education: A randomised controlled trial. *BMC Med Educ*. 2010;10:68.
  30. Meade O, Bowskill D, Lymn J. Pharmacology as a foreign language: A preliminary evaluation of podcasting as a supplementary learning tool for non-medical prescribing students. *BMC Medic Educ*. 2009;9:74.
  31. Meade O, Bowskill D, Lymn J. Pharmacology podcasts: a qualitative study of non-medical prescribing students' use, perceptions and impact on learning. *BMC Medic Educ*. 2011;11:2.
  32. Münch-Harrach D, Kothe C, Hampe W. Audio podcasts in practical courses in biochemistry – cost-efficient e-learning in a well-proven format from radio broadcasting. *GMS Z Med Ausbild*. 2013;30(4):Doc44.
  33. Mostyn A, Jenkinson C, McCormick D, Meade O, Lymn J. An exploration of student experiences of using biology podcasts in nursing training. *BMC Med Educ*. 2013;13:12.
  34. Gettig J, Lee N, Fjortoft N. Student and Faculty Observations and Perceptions of Professionalism in Online Domain Scenarios. *Am J Pharm Educ*. 2013;77(9):192.
  35. Cain J, Scott D, Akers P. Pharmacy Students' Facebook Activity and Opinions Regarding Accountability and E-Professionalism. *Am J Pharm Educ*. 2009;73(6):104.
  36. Rocha P, de Castro N. Opinions of Students from a Brazilian Medical School Regarding Online Professionalism. *J Gen Intern Med*. 2014;29(5):758-764.
  37. Ness G, Sheehan A, Snyder M, Jordan J, Cunningham J, Gettig J. Graduating Pharmacy Students' Perspectives on E-Professionalism and Social Media. *Am J Pharm Educ*. 2013;77(7):146.
  38. Henry R, Molnar A. Examination of Social Networking Professionalism Among Dental and Dental Hygiene Students. *J Dent Educ*. 2013;77(11):1425-30.
  39. Thompson LA, Dawson K, Ferdig R, Black EW, Boyer J, Coutts J, et al. The Intersection of Online Social Networking with Medical Professionalism. *J Gen Intern Med*. 2008;23(7):954-7.
  40. Hall M, Hanna LA, Huey G. Use and Views on Social Networking Sites of Pharmacy Students in the United Kingdom. *Am J Pharm Educ*. 2013;1(9):77.
  41. Kron F, Gjerde C, Sen AFM. Medical student attitudes toward video games and related new media technologies in medical education. *BMC Med Educ*. 2010;10:50.
  42. Pinilla S, Weckbach L, Alig S, Bauer H, Noerenberg D, Singer K, et al. Blogging Medical Students: A Qualitative Analysis. *GMS Z Med Ausbild*. 2013;30(1):Doc9.
  43. Bongartz J, Vang C, Havrda D, Fravel M, McDanel D, Farris K. Student Pharmacist, Pharmacy Resident, and Graduate Student Perceptions of Social Interactions with Faculty Members. *Am J Pharm Educ*. 2011;75(9):180.
  44. 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):177.
  45. Al-Dubai S, Ganasegeran K, Al-Shagga M, Yadav H, Arokiasamy J. Adverse Health Effects and Unhealthy Behaviors among Medical Students Using Facebook. *ScientificWorldJournal*. 2013;2013:465161.