The delivery of education and training in plastic surgery in Sub-Saharan Africa face increasing challenges. These include endemic shortages of plastic surgeons within postgraduate medical school faculties, the erosion of financial and clinical resources for teaching, and more recently, the millennial generation paradigm shift. It is generally accepted that the millennial generation will be more discerning and comfortable in their requirements for web-based learning content to support their education and training in plastic surgery. We reviewed current literature including original and review articles obtained through a search of PubMed database, Medline, Google Scholar, and hand searching of bibliographies of published articles using the keywords: social media, Blogs, Twitter, plastic surgery, and millennial generation. This article defines and explores Blogs, Podcasts, and Twitter, as web-based learning tools, and discusses how to leverage social media to maximize their educational value and effectiveness.

Keywords: Blogs, millennial generation, plastic surgery, social media, Twitter

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the rapid exchange of information with a virtual audience of limitless size, comfortably and at a low cost.[1-3] Facebook, the dominant social media platform, offers interaction in the form of text, pictures, sound files, and videos.[1] It has grown out of obscurity to over 955 million monthly active users.[2] Facebook has revolutionized the way people develop personal and professional relationships including the spread of scientific knowledge and teaching.[2-4] These benefits are enjoyed widely in almost every field in medicine today and plastic surgery is no exception.[4]

Globaly, while the debate among plastic surgeons continues about what should be taught and how it is best presented to trainees in plastic surgery, the delivery of education and training in plastic surgery in sub-Saharan Africa face increasing challenges.[5] These include endemic shortages within postgraduate medical school faculties, the erosion of financial and clinical resources for teaching, and more recently, the millennial generation paradigm shift.[6-8]

The current trainees in plastic surgery belong to the millennial generation. Born between 1980 and 1999, members of the millennial generation are also referred to as millennials, generation Y, and generation next.[9] While research into the values, learning styles, and individual differences of the millennials is currently unfolding, globalization has made the characteristics of the millennial generation relatively more uniform.[9,10] Communication is immediate, via texting, tweeting, and Skyping, with multitasking preferences such as browsing on the Internet and sending phone text messages simultaneously.[10] They are also a social group, forging lots of friendships and social circles, and pioneers of social networking.[9] Some authors have postulated that the millennial generation will be more discerning and comfortable in their requirements for web-based learning content to support their education and training in plastic surgery.[6,11-13]

Surgical education has experienced a significant paradigm shift over the past decade. The apprenticeship model has been supplanted by competing models due to a rapidly changing practice environment and advancing technologies.[14] The old dictum of “see one, do one, teach one” was a heritage by which generations of plastic surgeons have been trained. However, in the era of web based learning, this dictum is being overtaken by “Google one, see one, do one, teach one.”[15]

Despite the broad appeal and increasing popularity, there is a paucity of relevant literature on the application of social media as a learning tool for trainees in plastic surgery in sub-Saharan Africa.[5,16,17] This review defines and explores Blogs, Podcasts, and Twitter as web-based learning tools, and discusses how to leverage social media to maximize their educational value and effectiveness.

**BLOGS**

The word “blog” is a contraction of “Web Log” an online Web site that offers a resource rich multimedia environment.[18] Most blogs allow readers to leave comments and, in this way, generate conversation and encourage collaboration. Posted topics and entries by an individual or a group of individuals are regularly updated and displayed in reverse chronological order.[19,20] Perhaps, the two main advantages of blogs are their ease of use and convenience for the author to feed it with contents.[4,18,20]

The contents of each blog differ, depending on the interests and style of the author.[19] Each entry typically contains the main body, a date, time, and title about a particular topic.[18] Standard blog features include easy posting, archives of previous posts, and a standalone Web page for each post to the blog.[18] Links to other Web sites, images and a search facility may also be included. The latter feature facilitates linking to and organizing content within the same blog and from external sites, as well as posting a clinical photo from a digital camera directly to a blog.[18]

A number of peer-reviewed articles on blogs have been published. These emphasize their effectiveness in peer-to-peer communication, their applications in assessing clinical knowledge, and how they can be used to disseminate best practices and professional development.[14,18] Plastic and Reconstructive Surgery (PRS) resident chronicles is the official trainee blog of PRS.[4] It features cases and discussion in breast reconstruction, pediatric, craniofacial, hand, reconstructive, and cosmetic surgery. In addition, this blog also has a special section on procedure guides and surgical techniques.[4] Trainees in plastic surgery can subscribe for the “feed.” This option when activated automatically sends the latest news to the subscriber’s e-mail in real time as content is published. The blog also organizes and selects abstracts, making them a very useful tool to get fast access to accurate and reliable content. Sometimes, blog authors allow readers to write comments, integrate them in a more informal way than a journal, and foster a much more open and dynamic discussion.[20] Blogs have also been used in clinical research for clinical trial recruitment and data collection, allowing patients to ask questions about the trial procedures, risks, and incentives while maintaining an anonymous, nonthreatening environment.[4,18]

**TWITTER**

Twitter is a free microblog forum that allows anyone with an account to share text of ≤140 characters, either alone or in conjunction with an image.[21-23] This is known as a “tweet.” Historically, a 140-character limit was chosen to allow interoperability with SMS (short message service) text messages.[20] Beginners to Twitter often perceive the character restriction as a barrier to communication. However, this misconception usually decreases with repeated use, as tweets are easily supplemented with shortened hyperlinks to other digital media, such as videos and other websites.[4,24] Each account has a name beginning with the “@” symbol, which is known as a “handle.”[21] Tweets are visible to both registered and nonregistered users of the site. Users can “follow” other
users and their tweets, which appear in a continuous list of tweets known as a “Twitter Feed.”[21,22] Users may also read a series of tweets that are grouped based on topic, designated by a hashtag (#). For example, a tweet about hand surgery can include “#handsurgery” so that the tweet will show up when anyone searches this subject on twitter.[20–22]

Twitter has experienced rapid growth since its launch in July 2006. There were an estimated 200 million users per month actively tweeting an average of 500 million times per day in 2013, depicting it as a contemporary, ever-changing social media environment.[22–25] Plastic surgery trainees can use Twitter to tap into the already robust conversations and information published on topics within plastic surgery.[23] Individual plastic surgeons are on Twitter, as are plastic surgery associations and organizations, for example, American Society of Plastic Surgery and American Society of Aesthetic Plastic Surgeons.[22]

More recently, a Twitter Journal Club has been described. It functions in the same manner as traditional journal clubs, with the advantage of a global audience and participation for discussion. A central moderator is able to inform followers of the article to be discussed well ahead of time. Furthermore, authors of discussed articles are often invited as participants, enabling real-time interaction.[25] Twitter-based journal clubs are easily linked using a hashtag (e.g. #jc). Plastic surgery trainees can join with a unique identifiable username and interact in a meaningful way.[4,25]

Attending international conferences is usually difficult or impossible for many plastic surgery trainees in sub-Saharan Africa because of the time and expense involved. Twitter has had an expanding role in sharing data and information at PRS conferences.[26] Scientific conferences usually define an official hashtag for their meeting so that users can follow conference-related activity.[27] “Tweeting the meeting” represents an important future direction for information dissemination in plastic surgery conferences.[26] It will dramatically amplify the conference experience to a wider audience and generate international engagement and global reach.[5,18,26,28,29]

Twitter also provides an opportunity to reach potential collaborators in plastic surgery research around the world. Twitter enables the identification of clinically relevant research questions, hypotheses, and study design ideas, via the sharing of information from all relevant stakeholders, including trainees in plastic surgery.[20,28,29]

### Podcasts

Podcasts are repositories of audio or video files that can be distributed via the Internet and played on portable media players and handheld devices including cell phones.[30,31] “Podcasting” is a combination of two words: “iPod” and “broadcasting.” iPod is the name of Apple Computer’s wildly successful line of digital MP3 audio and video players. The concept of podcasting was suggested in 2000, and technological capability was available in 2001. However, podcasts and its potential use in education did not start to show up on well-known Web sites until 2003.[32,33]

Podcasting automates the laborious process of finding, downloading and aggregating material that the user is interested in and allows the user to control what they watch.[33] These files can be taken anywhere and creates content for an audience that wants to listen or view the resource as many times as they wish, at their convenience.[6,18,30] Educational podcasts, which are audio recordings of items such as plastic surgery lectures, interviews, book chapters, and journal articles, are increasing in number. Currently, they account for a significant number of podcasts available for downloading.[31,33,34]

Lectures at postgraduate revision courses in plastic surgery can be recorded by faculty and distributed over the Internet as an audio podcast with the inclusion of images from applications, such as PowerPoint.[30] Trainees in plastic surgery can go through the podcast at their own pace, backing up and reviewing material from the podcast. This is especially useful for revision of the postgraduate examinations. Prestigious scientific journals including PRS offer podcasts from their websites with a summary of selected articles of interest to the readership. Initial listings include an audio introduction to the journal and abstracts to certain articles in each section of PRS. This allows trainees to listen to a summary of key content in the journal.[30,32,33]

Several authors report that the primary learning style in at least 30% of learners is auditory.[18] Podcasts have the unique potential of offering additional support for auditory learners because the content is enlivened by hearing an actual voice and by their nature an attempt has been made to make the subject matter comprehensible and interesting.[18]

Podcasts may emerge as an important tool for recording and distributing protocols and demonstrations of technical procedures in PRS.[30,32,33] While there is no substitute for supervised live operative experience with immediate feedback, the accessibility of podcasts affords an excellent opportunity for the trainee to observe and discusses the procedure prior to performing the operation.[33,35]

The benefits associated with Blogs, Podcasts, and Twitter as learning tools also bring a myriad of ethical challenges.[1,2,36–38] The potential violation of patient privacy, confidentiality, and professional codes of practice and how these vary with geographical and cultural norms in sub-Saharan Africa remain a significant concern.[4,33] Paradoxically, some of the perceived drawbacks relate to the open nature of social media and the remarkable ease of sharing information.[19] Thus, when generating and distributing confidential material digitally, there is always the possibility that it may fall into wrong hands.[33,39] Negative effects associated with social media use, such as the posting of disparaging patient reviews online, have been described.[2,3] This has the potential to reach a wide
Trainees in plastic surgery need to be aware of copyright restrictions that may not permit the dissemination of certain materials. Notably, the same copyright protections exist for the author of a work regardless of whether the work is in print, in a library database, on a blog, or in any social media format. When in doubt, trainees should be encouraged to seek approval from the copyright owner prior to using materials.\[13,28,39-41\]

Equally important but less well understood is the notion of how without proper regulation, the cosmetic and esthetic industry may influence Blogs, Twitter, and Ppodcasts, clouding the boundaries between evidence-based medicine and advertisement.\[31\] Plastic surgery professional societies in sub-Saharan Africa must provide leadership roles by providing training on how to navigate and validate accuracy of information provided by industry.\[4,16,17,28\]

Concerns about social media having a distracting effect on academic performance appear to be unfounded.\[10\] A randomized control trial was recently conducted comparing the performance of prehealth professions students in classes where social media was integrated versus the performance of those in classes where it was not. The researchers found that the engagement level and grades of the social media group were significantly higher than those of the control.\[10\] The authors opined that the incorporation of social media led to a substantive improvement in communication, a valuable skill for future doctors who will be expected to communicate effectively with patients, peers, and other health-care professionals.\[10\] Future studies are needed in sub-Saharan Africa to evaluate the role of social media on system-based practice in plastic surgery, including longitudinal follow-up to determine its impact on plastic surgery practice.

**Conclusion**

The millennial generation bestows on the current trainees in plastic surgery, traits such as an orientation to teamwork and comfort with cutting-edge technology. Blogs, Twitter, and Podcasts provide different forums that will facilitate the acquisition of core medical competences in patient care, interpersonal and communication abilities, professionalism, and system-based practice. Social media cannot fully replace books, journals, and personal contact, but it is a valuable addition to the former.

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There are no conflicts of interest.

**References**

1. Koch H, Dabernig J, Allert S, Puchinger M, Scharnagl E. Plastic surgeons and the Internet: Results of a worldwide survey. Ann Plast Surg 2002;49:466-9.
2. Vardanian AJ, Kusnezov N, Im DD, Lee JC, Jarrahy R. Social media use and impact on plastic surgery practice. Plast Reconstr Surg 2013;131:1184-93.
3. Montemurro P, Porcinik A, Hedén P, Otte M. The influence of social media and easily accessible open information on the aesthetic plastic surgery practice: Literature review and our own experience. Aesthetic Plast Surg 2015;39:270-7.
4. Grajales FJ 3rd, Sheps S, Ho K, Novak-Lauscher H, Eysenbach G. Social media: A review and tutorial of applications in medicine and health care. J Med Internet Res 2014;16:e13.
5. Hadley GP, Mars M. Postgraduate medical education in paediatric surgery: Videoconferencing – A possible solution for Africa? Pediatr Surg Int 2008;24:223-6.
6. Stevens RJ. Do trainees want e-learning in plastic surgery? J Plast Reconstr Aesthet Surg 2011;64:e47-9.
7. Mullan F, Frehywot S, Omaswa F, Buch E, Chen C, Greyson SR, et al. Medical schools in sub-Saharan Africa. Lancet 2011;377:1113-21.
8. Lewis KO, Cidon MJ, Seto TL, Chen H, Mahan JD. Leveraging e-learning in medical education. Curr Probl Pediatr Adolesc Health Care 2014;44:150-63.
9. Ibrahim A, Asuku ME. Reaching Our Successors: Millennial Generation Medical Students and Plastic Surgery as a Career Choice. Niger J Surg 2016;22:12-6.
10. Mayorga EP, Bekerman JG, Palis AG. Webinar software: A tool for developing more effective lectures (online or in-person). Middle East Afr J Ophthalmol 2014;21:123-7.
11. Stevens RJ, Hamilton NM. Is there a digital generation gap for e-learning in plastic surgery? J Surg Educ 2012;69:344-9.
12. Larvin M. E-learning in surgical education and training. ANZ J Surg 2009;79:133-7.
13. McAndrew M, Johnston AE. The role of social media in dental education. J Dent Educ 2012;76:1474-81.
14. Pugh CM, Watson A, Bell RH Jr., Brasil KJ, Jackson GP, Weber SM, et al. Surgical education in the internet era. J Surg Res 2009;156:177-82.
15. O’Leary DP, Corrigan MA, McHugh SM, Hill AD, Redmond HP. From theater to the world wide web – A new online era for surgical education. J Surg Educ 2012;69:483-6.
16. Mars M. Building the capacity to build capacity in e-health in sub-Saharan Africa: The KwaZulu-Natal experience. Telemed J E Health 2012;18:32-7.
17. Ibrahim A. Sub-specialization in plastic surgery in sub-Saharan Africa: Capacities, gaps and opportunities. Pan Afr Med J 2014;19:13.
18. Boulous MN, Maramba I, Wheeler S. Wikis, blogs and podcasts: A new generation of Web-based tools for virtual collaborative clinical practice and education. BMC Med Educ 2006;6:41.
19. Sethi SK. Blog/web log – A new easy and interactive website building tool for a non-net savvy radiologist. J Thorac Imaging 2007;22:115-9.
20. Barbosa Pereira JL, Kuppen PL, de Albuquerque LA, Batalini F, de Carvalho GT, de Sousa AA. E-learning forneurosurgeons: Getting the most from the new web tools. Asian J Neurosurg 2015;10:48.
21. Kuppen PL. What every neurosurgeon should know about the Web 2.0. Surg Neurol Int 2010;1:21.
22. Humphries LS, Curl B, Song DH. SocialMedia for the Academic Plastic Surgeon-Elevating the Brand. Plast Reconstr Surg Glob Open 2016;4:e599.
23. Miller R. Commentary on: Social networks uncovered – 10 tips every plastic surgeon should know. Aesthet Surg J 2012;32:1016-7.
24. Bosley JC, Zhao NW, Hill S, Shofer FS, Asch DA, Becker LB, et al.
Decoding twitter: Surveillance and trends for cardiac arrest and resuscitation communication. Resuscitation 2013;84:206-12.
25. Roberts MJ, Perera M, Lawrentschuk N, Romanic D, Papa N, Bolton D. Globalization of continuing professional development by journal clubs via microblogging: A systematic review. J Med Internet Res 2015;17:e103.
26. Chung A, Woo H. Twitter in urology and other surgical specialties at global conferences. ANZ J Surg 2016;86:224-7.
27. Wilkinson SE, Basto MY, Perovic G, Lawrentschuk N, Murphy DG. The social media revolution is changing the conference experience: Analytics and trends from eight international meetings. BJU Int 2015;115:839-46.
28. Martin-Smith JD, McArdle A, Carroll SM, Kelly EJ. Webinar: A useful tool in plastic surgery specialty trainee education. J Plast Reconstr Aesthet Surg 2015;68:1323-4.
29. Kalet AL, Coady SH, Hopkins MA, Hochberg MS, Riles TS. Preliminary evaluation of the Web Initiative for Surgical Education (WISE-MD). Am J Surg 2007;194:89-93.
30. Jham BC, Duraes GV, Strassler HE, Sensi LG. Joining the podcast revolution. J Dent Educ 2008;72:278-81.
31. Alikhan A, Kaur RR, Feldman SR. Podcasting in dermatology education. J Dermatolog Treat 2010;21:73-9.
32. Rohrich RJ. Podcasts on the Plastic and Reconstructive Surgery Web Site: The journal goes portable and audio. Plast Reconstr Surg 2006;118:1071-2.
33. Whitehead DE, Bray D, Harries M. Erratum: Not just music but medicine. Podcasting surgical procedures in otolaryngology. Clin Otolaryngol 2007;2:161.
34. Jham BC, Duraes GV, Strassler HE, Sensi LG. Joining the podcast revolution. J Dent Educ 2008;72:278-81.
35. Kalludi SN, Punja D, Pai KM, Dhar M. Efficacy and perceived utility of podcasts as a supplementary teaching aid among first-year dental students. Australas Med J 2013;6:450-7.
36. Lakshmanan A, Leeman KT, Brodsky D, Parad R. Evaluation of a web-based portal to improve resident education by neonatology fellows. Med Educ Online 2014;19:24403.
37. Cook DA. Web-based learning: Pros, cons and controversies. Clin Med (Lond) 2007;7:37-42.
38. Cook DA. Where are we with Web-based learning in medical education? Med Teach 2006;28:594-8.
39. Evgeniou E, Loizou P. The theoretical base of e-learning and its role in surgical education. J Surg Educ 2012;69:665-9.
40. Power M, St-Jacques A. The graduate virtual classroom webinar: A collaborative and constructivist online teaching strategy. Merlot J Online Learn Teach 2014;4:681-96.
41. Yost J, Mackintosh J, Read K, Dobbins M. Promoting Awareness of Key Resources for Evidence-Informed Decision-making in Public Health: An Evaluation of a Webinar Series about Knowledge Translation Methods and Tools. Front Public Health 2016;4:72.