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Social Media in the Emergency Medicine Residency Curriculum: Social Media Responses to the Residents' Perspective Article

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In July to August 2014, *Annals of Emergency Medicine* continued a collaboration with an academic Web site, Academic Life in Emergency Medicine (ALiEM), to host an online discussion session featuring the 2014 *Annals* Residents' Perspective article "Integration of Social Media in Emergency Medicine Residency Curriculum" by Scott et al. The objective was to describe a 14-day worldwide clinician dialogue about evidence, opinions, and early relevant innovations revolving around the featured article and made possible by the immediacy of social media technologies. Six online facilitators hosted the multimodal discussion on the ALiEM Web site, Twitter, and YouTube, which featured 3 preselected questions. Engagement was tracked through various Web analytic tools, and themes were identified by content curation. The dialogue resulted in 1,222 unique page views from 325 cities in 32 countries on the ALiEM Web site, 569,403 Twitter impressions, and 120 views of the video interview with the authors. Five major themes we identified in the discussion included curriculum design, pedagogy, and learning theory; digital curation skills of the 21st-century emergency medicine practitioner; engagement challenges; proposed solutions; and best practice examples. The immediacy of social media technologies provides clinicians the unique opportunity to engage a worldwide audience within a relatively short time frame. [Ann Emerg Med. 2015;■:1-11.]

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INTRODUCTION

In 2013, *Annals of Emergency Medicine* and Academic Life in Emergency Medicine (ALiEM) began a joint social media-based global emergency medicine journal club.¹⁻³ With this series' increasing popularity, as well as the concurrent growing use of online resources and discussion among emergency medicine trainees, the collaboration was extended to the *Annals* Residents' Perspective series.⁴ This article summarizes the social media-based discussion hosted by ALiEM about the 2014 article by Scott et al,⁵ "Integration of Social Media in Emergency Medicine Residency Curriculum."

The Accreditation Council for Graduate Medical Education Residency Review Committee now permits emergency medicine programs to fulfill up to 20% of their weekly didactic conference requirement with an average of 1 hour per week of "individualized interactive instruction," potentially allowing programs to leverage home consumption of online resources into the formal residency curriculum.⁶ In a previous Residents' Perspective, Reiter et al⁷ discussed the implementation of asynchronous resources into the curriculum at Mount Sinai's emergency medicine residency, including the challenges of meeting the Residency Review Committee's broad but vague requirements: an evaluation component, faculty oversight, monitoring for resident participation, and monitoring for effectiveness. The committee is clear that simple consumption of online

educational content does not suffice, and proper faculty and program leadership involvement with 2-way interaction is required.⁶

In addition to the accreditation challenges, program leadership is also faced with a paucity of evidence. A 2013 systematic review of the use of social media in education found only 14 relevant studies, mostly small, focused on reflective writing or using course-specific content.⁸ The focus in many currently published articles on social media in resident education is the risks, particularly with respect to professionalism and privacy, rather than instruction on how to develop a curriculum.⁹ Blog posts and podcasts previously discussing social media in emergency medicine residency educational curricula are presented in Table 1. There were 7 blog posts, 4 podcasts, and 6 news network articles. The featured Residents' Perspective describes many of the available social media modalities that program leadership could incorporate: blogs, podcasts, videos, Twitter, and Google Hangouts. The authors provide examples of specific resources to use and descriptions of how their emergency medicine residency at the University of Pennsylvania uses each modality. They also describe their use of an innovative, debate-based, flipped classroom model. Finally, the authors address their approaches in dealing with common drawbacks in social media use for resident education, including the potential for "information overload," which was a topic covered by Thoma et al in an accompanying Residents' Perspective.¹⁰

Table 1. Online blog posts, podcasts, and news network articles discussing social media in emergency medicine residency educational curricula.

Web Site	Author	Title	Type	Country	Date
American Academy of Emergency Medicine Resident and Student Association (AAEM/RSA)	Meaghan Mercer	FOAM—This Is Not the Future of Medicine, It Is Medical Education NOW!	Blog	United States	July 23, 2013
ALiEM	Andrew Grock	New AIR Series: ALiEM AIR	Blog	United States	July 16, 2014
ALiEM	Nikita Joshi	Lost in Translation: What Counts as Asynchronous Learning?	Blog	United States	January 18, 2013
ACEP Now	Jeremy Faust	Tweets From Emergency Medicine-Related Conferences Relay Latest Research About Social Media and Critical Care, Resuscitation Procedures, Ultrasounds, and Toxicology	News network	United States	May 7, 2014
ACEP Now	Jeremy Faust	FOAMed Appeal Is Simple: Get More, Pay Nothing	News network	United States	February 1, 2013
Emergency Medicine Cases	Anton Helman	Social Media & Emergency Medicine Learning	Podcast	Canada	June 24, 2014
Emergency Medicine Cases	Anton Helman	Best Case Ever 25 Rob Rogers on Social Media in EM Education	Podcast	Canada	June 18, 2014
Emergency Medicine News	Paul Bufano	News: How Twitter Can Save a Life	News network	United States	April 12, 2013
Emergency Medicine News	Gina Shaw	Breaking News: Don't Call It Social Media: FOAM and the Future of Medical Education	News network	United States	February 1, 2013
Emergency Physicians Monthly	Nicholas Genes	PRO/CON: Why #FOAMed Is NOT Essential to EM Education	News network	United States	April 7, 2014
Emergency Physicians Monthly	Joe Lex	PRO/CON: Why #FOAMed Is Essential to EM Education	News network	United States	April 7, 2014
iTeachEM	Robert Cooney	How We Are Flipping EM Education	Blog	United States	January 15, 2014
Takeokun	Jason Nomura	Resident Education in Ultrasound Using Simulation and Social Media AIUM14	Blog	United States	April 2, 2014
The Poison Review	Leon Gussow	Must-Read: Getting Started in Online Emergency Medicine Education and FOAMed	Blog	United States	June 28, 2014
The Rolobot Rambles	Damian Roland	#FOAMed and #SMACC: Revealing the Camouflaged Curriculum	Blog	United Kingdom	July 1, 2014
The Skeptics Guide to Emergency Medicine	Ken Milne	Tiny Bubbles (#FOAMed and #MedEd)	Podcast	Canada	April 25, 2014
Ultrasound Podcast	Matt Dawson	Social Media and Medical Education. #FOAMED Talk From #ACEP13	Podcast	United States	May 14, 2014

AIR, Approved Instructional Resources.

ALiEM explored these challenges and opportunities in integrating social media into a residency curriculum, using social media platforms, including a Twitter conversation, Web site discussion, and live video interview with the authors and key subject-matter experts. This article aims to curate (ie, collect, organize, and summarize) the online discussions from the global community of practice and highlight potential challenges and strategies. We also report objective Web analytics for the various online platforms used.

MATERIALS AND METHODS

The *Annals* editors selected the Residents' Perspectives article, and 6 facilitators were chosen by ALiEM for their expertise in medical education and active presence on social media. Two are experienced bloggers on ALiEM (B.D.H., M.L.), and all have active Twitter accounts that had

follower numbers greater than 100 (@SKobner), 190 (@MikeGisoni), 580 (@Stella_Yiu), 5,160 (@MDaware), 5,170 (@PharmERToxGuy), and 7,640 (@M_Lin) at the discussion. The discussion was hosted by ALiEM (<http://www.aliem.com>), which is a public, WordPress-based, educational blog Web site created in 2009, with currently greater than 1 million page views annually, greater than 19,000 Facebook fans, greater than 500 Google+ followers, and greater than 500 e-mail subscribers.

Promotion of the Event

Promotion for the discussion included notices on the ALiEM Web site, ALiEM Facebook page, ALiEM Google+ page, and the *Annals'* and facilitators' individual Twitter accounts, using the #ALIEMRP hashtag. It began in the days leading up to the dialogue, which started July

1. **Educators:** What are the biggest barriers for educators and how to overcome them?
2. **Learners:** How do we engage learners once the tech-innovation is employed? If you build it, they won't necessarily come.
3. **Programs:** What are other examples of actual or potential innovations in graduate medical education that wasn't described in the paper?

Figure 1. Featured ALiEM blog questions.

28, 2014, and then continued several times a day during the first 5 days of the discussion period. Tweets were directed toward individuals who also follow established hashtags, such as #FOAMed (“free open access medical education,” or FOAM), as well as the followers of the facilitators.

Social Media Discussion Period

The facilitators' goal during the discussion, which began July 28, 2014, was to encourage sharing and reflection on 3 preselected discussion questions (Figure 1) about social

media in the emergency medicine residency curriculum from the perspective of learners, educators, and programs. On July 31, 2014 (day 4), a live panel discussion was hosted on Google Hangout on Air, featuring 2 of the authors of the highlighted article, Kevin Scott, MD, and Mira Mamtani, MD (University of Pennsylvania); 2 established educators, Stella Yiu, MD (University of Ottawa), and Michael Gisondi, MD (Northwestern University); and the *Annals'* assistant social media editor, Seth Trueger, MD, MPH (University of Chicago). Michelle Lin, MD (University of California, San Francisco), and Scott Kobner (New York University) participated off camera by live-tweeting the event. Bryan D. Hayes, PharmD (University of Maryland), moderated the discussion. The video interview was automatically recorded and archived into ALiEM's YouTube account (ALiEM Interactive Videos). The discussion was hosted on the ALiEM Web site, with comments moderated on the blog Web site and Twitter.

Curation of Multimodal Discussion

Transcripts from Twitter, the blog Web site, and the video interview discussions were analyzed for broad

Table 2. Aggregate analytic data from various social media-based discussions for the first 14 days of the event.

Social Media Analytic Aggregator	Metric	Metric Definition	Count
Google Analytics: a free online service to track page views and other blog metrics	Page views	Number of times the Web page containing the post was viewed	1,222
	Users	Number of times individuals from different IP addresses viewed the site (previously termed “unique visitors” by Google)	1,033
	Number of cities	Number of unique jurisdictions by city as registered by Google Analytics	325
	Number of countries	Number of unique jurisdictions by country as registered by Google Analytics	32
ALiEM social media post widget: a Web-based tool embedded into each blog post, which tracks engagement metrics for multiple social media platforms	Average time on page	Average amount of time spent by a viewer on the page	4:11 minutes
	Number of tweets from page	Number of unique 140-character notifications sent directly from the blog post by Twitter to raise awareness of the post	160
	Number of Facebook likes	Number of times viewers “liked” the post through Facebook	32
	Number of Google+ shares	Number of times viewers shared the post through Google+	6
ALiEM comments section	Number of site comments	Comments made directly on the Web site in the blog comments section	36
	Average word count per blog comment (excluding citations)		311
Symplur Analytics: a free online service to track metrics for Twitter engagement of health-related hashtags; used to track Twitter hashtag #ALiEMRP ¹¹	Number of tweets	Number of tweets containing the hashtag #ALiEMRP	285
	Number of Twitter participants	Number of unique Twitter participants using the hashtag #ALiEMRP	87
	Twitter impressions	How many impressions or potential views of #ALiEMRP tweets appear in users' Twitter streams, as calculated by number of tweets per participant and multiplying it by the number of followers that participant has	569,403
YouTube Analytics: a free online service to track YouTube video viewing statistics	Length of videocast	Total duration of recorded Google Hangout videoconference session	25 min 54 s
	Number of views	Number of times the YouTube video was viewed	120
	Average duration of viewing	Average length of time the YouTube video was played in a single viewing	5 min 13 s

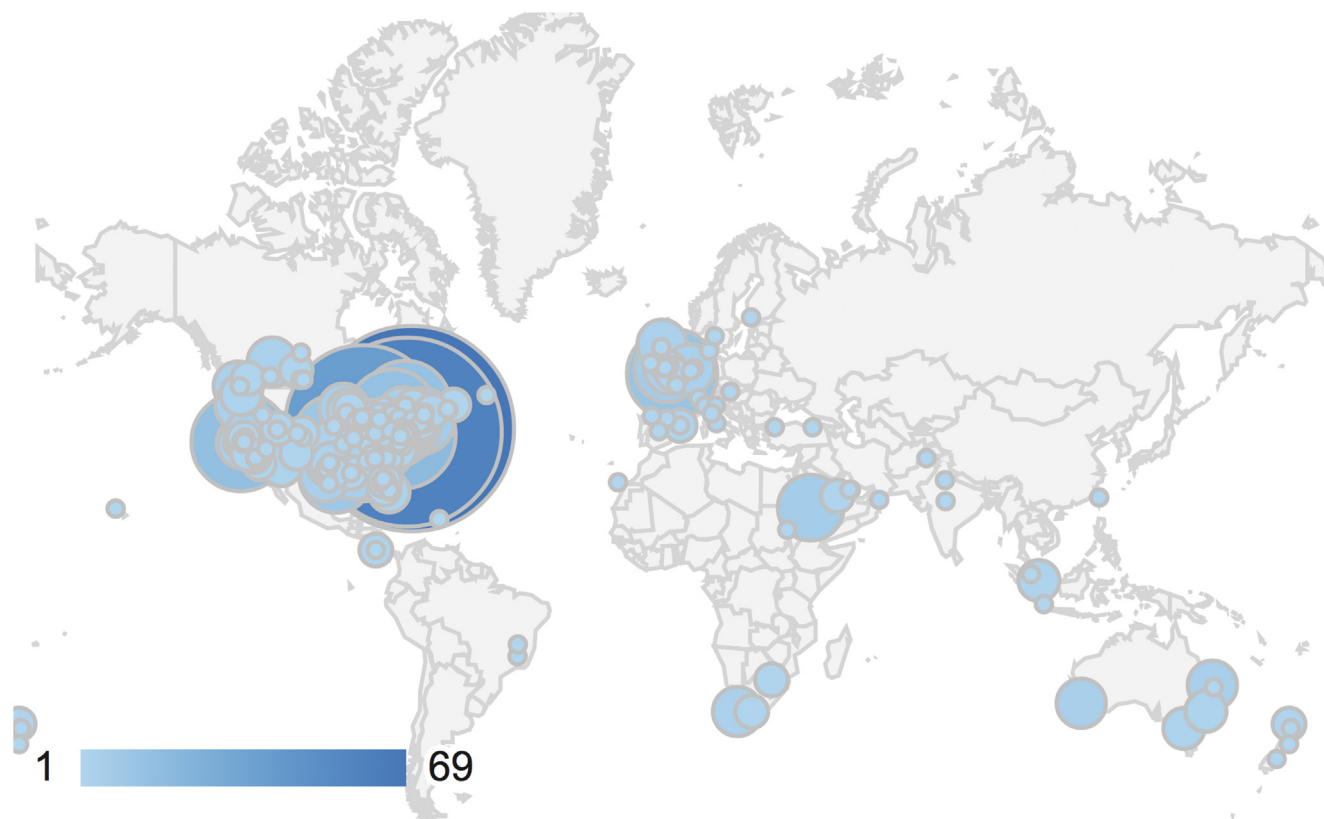


Figure 2. Geographic distribution of readers who viewed the blog post during the first 14 days of discussion.

emerging themes during the 14-day period (July 28 to August 10, 2014) by 3 authors (B.D.H., S.K., M.L.) independently. To ensure logical organization and comprehensiveness, and to settle any disagreements between the primary analysts, the other 2 authors subsequently reviewed these themes. Participants were self-selected, and discussants were excluded from analysis only if their commentary was blatantly inappropriate to the topic of conversation, purposefully inflammatory, or otherwise inconsistent with constructive behavior. A more purposive sampling of participants was not used because the original intent of this multimodal discussion approach was not to achieve saturation in a selected population but rather to provide a novel digital space for a virtual global community of practice to openly engage in academic discourse.

Web analytics were recorded for this 14-day discussion period. Viewership and engagement were measured with such tools as Google Analytics, the ALiEM social media post widget, YouTube Analytics, and Symplur. Table 2 provides descriptions for each of these tools. The number of comments and words per comment in the Web site discussion were also calculated, excluding the initial comments by the facilitators and references.

RESULTS

Web Analytics

The 14-day analytics data for the multiplatform discussion about social media in the emergency medicine residency curriculum from July 28, 2014, to August 10, 2014, are summarized in Table 2. The Google Hangout video interview, posted on July 31, 2014, was viewed 120 times during the 14-day period—rarely in its entirety—with an average viewing time of 5 minutes 13 seconds of the full duration of 25 minutes 54 seconds. Analytics data indicate that 47.62% of page viewers were using a mobile platform (telephone or tablet) to access the video. Figure 2 displays the global geographic distribution of participants who visited the blog. A full transcript of the blog Web site discussion is archived at <http://www.aliem.com/social-media-in-the-em-curriculum-annals-em-resident-perspective-article/>, all tweets with the #ALiEMRP are archived on [Symplur.com](http://www.symplur.com) at aliem.link/1tKVAdD, and the Google Hangout video can be accessed at <https://www.youtube.com/watch?v=kyeTj7SXzCI>.¹¹

Summary of the Online Discussion

Five major domains were identified, which included curriculum design, pedagogy, and learning theory; digital

curation skills of the 21st-century emergency medicine practitioner; engagement challenges; proposed solutions; and best practice examples.

Curriculum Design, Pedagogy, and Learning Theory

Even before considering the role of social media and technology in the emergency medicine residency curriculum, several blog comments and tweets supported a broader and more scholarly thought process in addressing social media integration issues into the curriculum. Many supported the notion that pedagogy, the science and theory of teaching, should drive medical education and the role of technology.

Furthermore, Javier Benítez, MD, (no affiliation) advocated that “learning theories give us a framework with which to describe how learning might happen under certain circumstances. I think the use of Social Media to engage learners in the acquisition, participation, and creation of knowledge should be explored on the basis of different learning theories. Learning theories are frameworks which help to describe how learning might occur under certain circumstances.... The use of technology should be to support effective pedagogic practices which include self-regulated learning, critical thinking, information management, and more.”

As an example, Jeffrey Hill, MD, (University of Cincinnati) suggested using the community of inquiry framework, which is an instructional design model based on social constructivist education theory. This might help guide the incorporation of social media into residency education. The community of inquiry framework defines a “good” learning environment as having a cognitive, teaching, and social presence. Lin, editor-in-chief of the ALiEM blog, agreed that “you need to get buy-in from the learners about the intrinsic value of the content, a strong facilitator presence, and a ‘safe’ community to grow and learn.”

Teresa Chan, BEd, MD, (McMaster University) provided a slightly different perspective, advocating that “theory and technology have to evolve side by side.” As an example, she referenced the Lave and Wenger¹² theory of situated learning, which posits that learning should not be the mere transmission of noncontextualized knowledge to individuals but rather a socially driven process in which contextualized, coconstructed knowledge occurs. This may explain how clinicians in communities of practices “go from peripheral participants to experts within a community. This theory likely explains much of the FOAM community, and yet it never truly anticipated the role that online, asynchronous virtual spaces might play on developing online communities. Adaptations of these



Christopher Doty
@PoppasPearls



@jvrbntz Absolutely!!! Most medical educators don't use adult learning theory. Trapped in pedagogy. Use #andragogy to teach adults #ALiEMRP

Figure 3. Tweet by Christopher Doty, MD.

theories, but also being open to altering them in light of new phenomenon [sic] brought forth by the technology may be a new and intriguing merger of both curricular design and implementation.”

In addition to pedagogic frameworks, Christopher Doty, MD, (University of Kentucky) also advocated faculty development on andragogy, which is the art and practice of teaching adult learners (Figure 3).

Digital Curation Skills of the 21st-Century Emergency Medicine Practitioner

A separate discussion examined the pervasive use of educational social media among residents but soon evolved into a dialogue about the importance of critical appraisal of information. Anand Swaminathan, MD, MPH, (New York University/Bellevue) observed that “residents have already embraced much of this [social media]. Each of them has their preferred blogs and podcasts. The information has been integrated into their general learning, and I hear things on shift that I know echo things they learned from FOAM.” Although other commentators were concerned with the possibility of information overload for residents, Benítez suggested that this use of social media represents a unique opportunity to teach a valuable skill. He argued that “medical education has always been burdened with information overload as reported by Anderson, et al. in 1980. One way to alleviate information overload and decisionmaking is by training physicians on information management with the aid of technology.” Lauren Westafer, DO, (Baystate Medical Center) resonated (Figure 4).



Lauren Westafer
@LWestafer



Crucial new skill for docs-have to be able to ascertain validity of #FOAMed we come across -@MikeGisondi
shortcoatsinem.blogspot.com/2014/05/i-hear... #ALiEMRP

Figure 4. Tweet by Lauren Westafer, DO.



Figure 5. Tweet by Jeff Riddell, MD.

In developing residents' critical appraisal and information management skills, Robert Cooney, MD, MMed, (Conemaugh Memorial Medical Center) also suggested that faculty advance their own ability to curate information alongside learners in this digital age. Discussants agreed that this would provide a more robust relationship between faculty and learners, encouraging the development of the curation skills of both.

Teaching critical appraisal of online resources is a new challenge for educators who may not have robust curation skills themselves. This challenge was the impetus for the creation of the ALiEM Approved Instructional Resources series, which attempts to address observations that "residencies struggle in evaluating which blog posts and podcasts are appropriate and high quality for resident education".¹³ Swaminathan contended that "programs like the ALiEM Approved Instructional Resources will make some of this easier," in reference to lists of expert-reviewed and vetted social media content published for programs to easily integrate into their curricula.

Engagement Challenges

Several respondents identified engagement as the central challenge to using social media in education. Learner engagement depends on both learners and educators. From the learner perspective, the consensus seemed to be that learners are naturally gravitating toward reading and listening to online content to supplement their clinical education.¹⁴ One key obstacle identified by George Miller, MD, (Louisiana State University Health Sciences Center), however, was the issue of distraction. Because social media technologies draw in both professional and personal content to central platforms, learners may become distracted during educational sessions.

Engagement with social media platforms in residency education was identified more as a problematic issue for educators and other stakeholders, such as those in key residency leadership positions. Anecdotally, skeptical faculty members have highlighted the lack of formal peer review and quality control in contrast to more established educational modalities such as textbooks and journal publications.

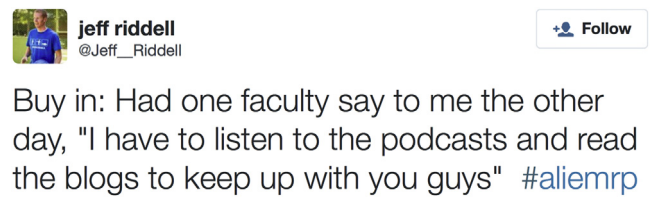


Figure 6. Tweet by Jeff Riddell, MD.

Others have questioned the need for new educational tools and the potential of this new and as yet unproven educational approach. Furthermore, several noted that the lack of published outcomes data using social media in medical education contributes to the skepticism about incorporating social media into the curricula (Figure 5).

The central argument illustrating a need for a culture change with more faculty buy-in was best summarized by Shannon McNamara, MD, (St. Luke's–Roosevelt), who stated that "As educators, we need to meet our learners where they're at." Jeff Riddell, MD, (UCSF-Fresno) echoed this in his tweet (Figure 6).

Proponents advocated that educators embrace the digital modalities that residents are already learning from to help them navigate knowledge gaps and provide individualized feedback. Online educational content should be accepted and valued by all stakeholders (learners, educators, and administration) as a complementary resource to traditional resources, rather than as nonessential, "extra, noncore material."

In addition to a more engaged educator presence, others recommended the concept of learner agency, which is giving the learners the autonomy or power to control their own education. Educators should learn to encourage learners to initiate and invest in their own educational experience in a virtual community of practice. Multiple respondents asserted that they hope this will shift education away from the current teacher-centered, passive model to one in which learners are intrinsically motivated, are centrally involved, and develop lifelong learning skills in the process. In a more learner-centered model, educators thus may need to change their approach to teaching. Lin commented, "It is incredibly hard for educators (myself included) to shift away from giving the stock lecture that I've given every year. There's a growing trend toward less 'talking at' (lectures) and more 'talking with' (facilitating) learners." Furthermore, Hill stressed that the issue of engagement can be more difficult with online teaching compared with traditional teaching, such as classroom-based lectures. "In live teaching you can adjust your teaching style on the fly if it seems you are losing them versus when you are responding to discussion board posts



Christopher Doty
@PoppasPearls

+ Follow

Learner-centered models are key to engagement. Build design around what they need & they will engage. SoMe is just a delivery tool #aliemrp

Figure 7. Tweet by Christopher Doty, MD.

or on a comment thread.” The modern educator will need to evolve to incorporate these new skills in teaching, facilitation, and engagement in online environments.

Ultimately, the overarching principles remain the same as when designing nondigital educational curricula. Several individuals agreed with Hill that creation of social media-based products should still keep in mind that “the ultimate goal of any initiative should be to create a robust venue for interaction between learner and instructor” for meaningful learning experiences. Doty said that learner-centered curricula will help ensure learner engagement, as long as it is remembered that social media technologies are merely operational tools (Figure 7).

Proposed Solutions

Multiple suggestions were put forth to address the barriers and challenges in social media adoption for emergency medicine residency education. First, Swaminathan proposed that each residency program have faculty champions, who are active in social media and medical education, in their local departments to start the culture change from within (Figure 8).

Second, multiple commentators agreed there should be more widespread faculty development efforts on learning theories, especially as they relate to digital scholarship and technologies.

Third, readers said that there must be recognition that general differences exist in how technologies have played a role in our lives. Different expectations and uses cascade into generational differences with respect to educational preferences. Program leadership may even consider incorporating reverse mentoring of educators by learners on educational technologies.

Fourth, there was a call for developing academic incentives to help support the efforts of digital educators. Currently, online educational efforts do not receive as much academic credibility as traditional educational endeavors in terms of academic value for promotion and tenure advancement. This may contribute to problems in recruiting and engaging faculty to join this digital educational movement. Chan challenged the academic

I think the key is that there must be a faculty FOAM champion (or two).

- Anand Swaminathan



Figure 8. Blog comment by Anand Swaminathan, MD, MPH.

norm by stating, “Just as some medical schools are giving credit for editing Wikipedia perhaps there can be some sort of ‘credit’ given to those who are engaging in KT [knowledge translation] and/or review-based scholarship in the FOAM world¹⁵? I think it is imperative that our community not only train clinicians who can be informed consumers of FOAM, but also those who can be active contributors back to the community.” Real-time Web analytic data demonstrating objective measures of viewership and engagement with social media may help educators quantify and legitimize their efforts.

Fifth, Riddell also championed legitimizing social media technologies from the perspective of learners, stating, “How do we engage learners? One way is to make sure we get credit for our time.... Many in our program are regular consumers of podcasts, videocasts, and blogs and we get little to no official ‘credit’ for our hours of learning.... The easier it is for us to get ‘conference credit’ for our time, the more engaged people will be.”

Best Practice Examples

Throughout the course of discussion, many respondents highlighted their experience with social media in emergency medicine education. Assembled in Table 3 is a summary of their innovative examples across a diversity of settings and social media platforms.

LIMITATIONS

As with the previous ALiEM-Annals Residents’ Perspective discussion on multiple mini-interviews, our results may be susceptible to selection bias because voluntary participants in social media discussions may represent a distinct subset with views different from those of the broader population.⁴ Furthermore, the views of vocal participants may be disproportionately represented over those of stakeholders who did not participate in the public discussion. Additionally, individuals in geographic regions in which access to the social media modalities used in this study is censored could not be included in this study. Socioeconomic or technologic barriers to entry in this discussion may have also introduced sampling

Table 3. Summary of best social media integration practices into education mentioned by contributors to the blog discussion.

Contributor	Residency Program	Social Media Incorporation
Brian Adkins, MD	University of Kentucky	For medical students, uses Twitter for a quiz contest that translates toward examination bonus points and a comedic prize
Robert Cooney, MD, MMed	Conemaugh Memorial Medical Center	Implements wikis to redesign curriculum in real time
Sean Fox, MD	Carolinas Medical Center	Incorporates social media content as supplement to primary literature for flipped classroom
Andrew Grock, MD	SUNY Downstate	Summarizes residency conference teaching points on http://www.cmcedmasters.com/core-concepts to create a bedside resource for residents
Jeffrey Hill, MD	University of Cincinnati	Cocreated ALiEM AIR series to identify expert-identified blog and podcast content for residency programs
David Marcus, MD	Long Island Jewish Medical Center	Published an online orientation curriculum for flight physician course
Shannon McNamara, MD	Temple University	Hosts Google+ literature discussion forum for educator-learner discussion
Tamara Moores, MD	University of Utah	Cocreated popular #EMConf hashtag on Twitter, which allows emergency medicine residency programs to share conference pearls worldwide through tweets
Jeff Riddell, MD	UCSF-Fresno	Incorporates podcasts and blogs into the emergency medicine curriculum to increase learner engagement
Stephen Smith, MD	University of Minnesota	Described her residency program practices: Provides iPads to all interns, which includes downloaded textbooks, RSS setup, Twitter, and medical apps Provides automatically synchronized summaries from conference through a shared residency Evernote folder Encourages asynchronous learning using social media/multimedia resources (eg, podcast) and integration into residency conference discussion
		Incorporates social media discussion about timely scientific developments (eg, PEITHO and MOPETT trials), such as Twitter and blogs to trigger conversation in morning report
		Incorporates his blog's content (Smith's ECG blog) into a 32-hour ECG course

bias. In addition to potentially having selection bias, our study was not designed to reach saturation, and thus some relevant themes may not have emerged.

Objective Web analytics have many limitations. For instance, Twitter and Symplur data capture only Tweets that include the #ALiEMRP hashtag and may understate the number of participants and the full extent of discussion. On the other hand, the “impressions” statistic represents an upper bound of potential reach. We were able to measure 285 tweets by 87 individuals, for a total of 569,403 impressions.

Furthermore, the nature of this online journal club lends itself to a potentially recursive conflict of interest because the study authors, blog editors, and journal all stand to benefit from mutual collaboration. Such inherent conflicts may be initially unavoidable in this evolving new endeavor to expand a journal article's reach and engagement through social media technologies with trainees and practicing clinicians.

DISCUSSION

This article presents the results of the second ALiEM-Annals collaboration using a variety of social media approaches to explore the topic of social media integration into emergency medicine residency curricula. In analyzing the themes that emerged from the audience, some echoed the existing literature and featured article and others generated novel hypotheses for further study.

Emergent themes included using learning theories to develop learner-centered curricula.¹⁶ Respondents stressed that curation skills are vital for both learners and educators while remembering that social media should not be used as a sole appraisal method for primary literature.^{5,17} A key overarching theme throughout the discussion involved the issue of learner and educator engagement. All of the themes aligned with the current literature on the challenges and best practice strategies about collaboration, cooperative learning, engagement, and learning in a social context.¹⁸ Ultimately, a major culture shift is necessary among all stakeholders, including learners, educators, the residency leadership, and academic institutions, to accept and adopt these social media-based resources as legitimate forms of education and scholarship because learners are already independently incorporating them into their medical education.¹⁹

In the incorporation of these new technological approaches into formal curricula, it is essential to focus faculty development on teaching today's clinician-educators about pedagogy, specifically, curriculum design and learning theories. Major educational efforts, regardless of the role of technology, can usually benefit from established instructional and curricular design approaches, such as Kern's 6-step model for curriculum design, which includes problem identification and general needs assessment, needs assessment for targeted learners, goals and objectives, educational strategies, implementation, and evaluation and feedback.¹⁶

Social Media: A New Frontier in Scholarly Discussions

As described previously, our methods for scholarly discussion represent a departure from traditional approaches to critical appraisal of literature by providing a free, public, global, asynchronous forum for conversations among authors, learners, experts, clinicians, and educators.⁴ By continuing to explore new media for academic discourse, such as Twitter, blogs, podcasts, and YouTube, we have demonstrated the continued feasibility and potential of social media as means of meaningful discussion and engagement with primary literature. Throughout our 14-day, multiplatform discussion of the *Annals*' article, we were able to reach a larger audience than in our previously reported discussions.⁴

As shown in Table 2, although the views and reaches on the Web site alone were consistent with the engagement observed in our previous discussion, we observed a doubling of Twitter "impressions," which is defined as the number of potential views of all tweets by unique Twitter users. We also observed an increase in Twitter participants who used the #ALiEMRP hashtag in the discussion. This could be partially confounded by a growing Twitter user base compared with that of the previous discussion, with more followers per user, thus creating more impressions. Twitter involvement grew disproportionately to engagement with the Web site, possibly because iterative social media discussions are recruiting greater numbers of viewers from the sidelines and encouraging them to actively participate in the discussion. Alternatively, the increase in active participation may be the direct result of the subject matter. Further investigation into the engagement habits of viewers of online scholarly discussions and influx of emergency physician Twitter users should be conducted to explore these possibilities.

Again, the YouTube analytics for the Google Hangout video broadcast continued to demonstrate notably less success than the blog and Twitter discussions. Similar to that of the previous installment in the series, the average viewing time was 7 minutes 8 seconds out of 22 minutes 36 seconds.⁴ Although the online video format is both accessible and familiar, many factors could contribute to these relatively meager statistics. For instance, mobile platforms enable viewers to engage in brief discussions in various environments (such as during commutes). These environments may be more prone to interruption and less suitable for longer-form videos. Furthermore, watching a filmed discussion is a more passive learning experience than engagement through blog comments or Twitter; therefore, participants might be less responsive to this medium of discussion. Digital scholarly discourse may be more suited to the relatively shorter time frame often associated with

blogging and microblogging media. Whether this is due to preference of medium versus the content itself is a question for future study.

Even with these incomplete viewings, we believe that the video interview with the authors and experts has unique value by connecting learners with experts more than was previously possible. In addition to the blog and Twitter discussion, the video likely reached learners who otherwise would not have become familiar with the *Annals* article. Some critics may be concerned that learners will increasingly depend on secondary sources instead of critically reading the primary literature. Though some viewers of our discussion might return to the original *Annals* article, others who might not seek out primary literature were still exposed to the discussion and critical appraisal process. We hold that this form of digital scholarship we present here exceeds traditional expectations of secondary sources by teaching learners how to critically analyze and discuss primary literature. Though this approach may not be ideal, it at least promotes scholarly inquiry among learners who might not have engaged otherwise, increasing, not substituting, engagement.

As the landscape of digital scholarship evolves, our broad analytic approach to study multiple social media platforms establishes the importance of our digital, asynchronous form of academic discourse in medicine. The ability to communicate with thousands of learners, educators, and clinicians—across time, geographic barriers, and resource availability—represents a powerful opportunity that goes far beyond anything possible in traditional academic settings.

CONCLUSION

From an educational innovation perspective, this multimodal approach provided a novel venue for asynchronous, scholarly discussions about a controversial topic published in the journal literature. It was able to attract 1,222 unique readers from 32 countries, using social media modalities that included a medical education blog, Twitter, and live video interview. Our social media-based approach showed the power of online engagement with multiple experts and a diverse audience to detect new and emerging themes as framed by existing literature. This method may allow more rapid hypothesis generation for future research and enable more accelerated knowledge translation. However, the online community demonstrated here is only a small subset of hundreds of thousands of emergency medicine practitioners worldwide, many of whom do not engage in digital scholarly practices. As the methods presented here continue to be refined, it is hoped

that a larger proportion of emergency medicine educators and learners will become engaged in this approach to knowledge translation.

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