Social Media in Nurse Anesthesia: A Model of a Reproducible Educational Podcast

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Social media and specifically podcasting are available to the field of nurse anesthesia as potential educational tools. This article outlines key concepts in social media, including free open access medical education and literature supporting the use of podcasting in higher, medical, and nursing education. The authors provide an educational model useful for developing social media tools and a logic model for producing an educational podcast. These tools were used in the production of the authors’ educational anesthesia podcast, and key steps are outlined. The goal of this article is to provide an overview of social media and relevant resources so that other educational podcasts may be developed for the nurse anesthesia community.

Keywords: Free open access medical information, Keller ARCS model, nurse anesthesia education, podcast, social media.

Social media and specifically podcasts are available as educational tools for Certified Registered Nurse Anesthetists (CRNAs), student registered nurse anesthetists (SRNAs), and nurse anesthesia educators. This article provides an overview of social media, free open access “meducation” (FOAM), and literature supporting the use of social media in medical, nursing, and higher education. Furthermore, the authors provide an outline of an educational model and a reproducible logic model for developing educational podcasts. Recognizing the potential of social media as a positive and influential educational tool for CRNAs and SRNAs is an important step for educators and clinicians in harnessing this technology for the advancement of the nurse anesthesia field.

Literature Review
• Defining Social Media Concepts. Social media is defined by Merriam-Webster Dictionary as “forms of electronic communication (as websites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content (as videos).”¹ This definition encompasses a virtual plethora of websites, businesses, blogs, podcasts, and other avenues for communication. A visual model titled the Conversation Prism categorizes 200 of the most popular social media platforms into 26 categories with the following headings: social networks, blog/microblogs, crowd wisdom, questions and answers, comments, social commerce, social marketplace, social streams, location, nicheworking, enterprise, wiki, discussion and forums, business, service networking, reviews and ratings, social curation, video, content/documents, events, music, live casting, pictures, social bookmarks, influence, and quantified self.²

The wide variety of social media platforms available create spaces for people to interact and share information on a range of topics and for diverse purposes such as education, entertainment, commerce, fitness programs, opinion-sharing, and networking. Leaders in the field of medical and nursing education are using social media to change the way information is shared. The concept of free open access education harnesses the power of social media to enable healthcare clinicians, researchers, and educators to easily share information with others. The abbreviation FOAM means free open access “meducation,” which describes a movement in the medical community to provide free access to medical education via social media platforms.³ A definition of FOAM is provided on the medical blog Life in the Fast Lane: FOAM is the movement that has spontaneously emerged from the exploding collection of constantly evolving, collaborative and interactive open access medical education resources being distributed on the web with one objective—to make the world a better place. FOAM is independent of platform or media—it includes blogs, podcasts, tweets, Google hangouts, online videos, text documents, photographs, Facebook groups, and a whole lot more. FOAM should not be seen as a teaching philosophy or strategy, but rather as a globally accessible crowd-sourced educational adjunct providing inline (contextual) and offline (asynchronous) content to augment traditional educational principles.³

Life in the Fast Lane is one of many medical social media outlets that provide regularly updated and evolv-
The concept of FOAM arose from the fields of critical care and emergency medicine, but its scope is not limited to these disciplines. Practitioners from these fields as well as the realms of internal medicine, prehospital medicine, toxicology, anesthesia, nursing, respiratory care, tactical medicine, and others both contribute and subscribe to the content found on these sites. The FOAM movement has garnered enough attention in the international medical community that an annual, multiday conference evolved that embraces many of the concepts of FOAM. The Social Media and Critical Care conference is a nonprofit conference in which critical care practitioners contribute their time and content for free. Attendees of this conference use social media tools, such as live Twitter feeds during talks and electronic poster displays. All conference presentations are recorded as podcasts and are published on free, open access websites.

FOAM is a free and open access method of providing social media content and context within the medical community. Use of FOAM is anticipated to continue as more practitioners, educators, researchers, and students recognize the power of free and open access medical information. In fact, calls have been made for traditional academic medical journals to cease print publication and fully embrace the interactive, online tools available through social media as a means to maintain and even increase relevance with their audience, many of whom already use social media technology in their personal and professional lives. The rationale for having full and only online content is the speed with which new publications can be disseminated, consumed, and adopted and/or challenged by medical communities.

Providing medical information in free and open access outlets and abandoning print versions of journals are 2 novel ideas that have emerged only recently as the use of social media by medical communities has grown.

- **Overview of Research on the Use of Social Media.**

  The use of social media in higher education is a relatively new area for research given that social media outlets have largely developed in the last decade. The word explosion has been used to describe the amount of research on and publication of various social media platforms related to medical and nursing education. Several articles have in-depth explanations of the various types of social media platforms and their usefulness in medical, nursing, and higher education, emphasizing that more research is needed on how to train professors as well as students in the use of social media in education.

  Schmidt and colleagues provide a particularly in-depth overview of various social media resources and the benefits and challenges associated with integrating social media into nursing education. Doyle and Chu et al published overviews of technology, including social media, specific to anesthesia education for residents and their physician educators. Although there have been numerous editorials and research articles published concerning the social media in medical, nursing, and even physician anesthesiology education, there is a relative void of research addressing social media in nurse anesthesia education. In a search of databases for this article, no research was found addressing the use of social media in nurse anesthesia education.

  Although to date there is no published research on social media in nurse anesthesia education, it is clear that the nurse anesthesia community uses social media tools. For example, Nurse-anesthesia.org and the Facebook group “CRNAs and SRNAs” have memberships of more than 26,000 and 19,000, respectively. Membership in these sites is restricted to individuals directly involved in nurse anesthesia, including registered nurses who have been accepted to a nurse anesthesia program, SRNAs, and CRNAs. The use of social media tools by the nurse anesthesia community may serve as a subject of future research.

- **Research Related to Use of Podcasts in Nursing Education.**

  Many publications describe the positive impact of podcasts in higher, medical, and nursing education. Stoten, in an editorial published in the Journal of Continuing Education in Nursing, noted the benefits of podcasting to include “unlimited access to the material, the ability to show and narrate demonstrations of skills or the use of equipment, assurance that all nurses receive consistent information, cost-effectiveness and improved learning.”

  Long and Edwards provided an overview of podcasting in the context of nursing education and staff development, covering relevant research, equipment, production and format guidelines, and pros and cons of podcasting. Benefits of podcasting were numerous and included accessibility, ease of use, portability, and the ability of podcasts to be reviewed multiple times. Cons included that creating podcasts “can be costly and time-consuming,” podcasts involve 1-way communication, and many faculty and students may be unfamiliar with the technology.

  Burke and Cody conducted a study of undergraduate nursing students in which preintervention and postintervention surveys were conducted related to podcasts that were created to review lecture material over the course of a semester. Completion of the surveys was voluntary. The postintervention survey found overwhelmingly positive opinions toward the podcasts, with 86% of students reporting enriched learning and 95% commenting that the podcasts were valuable tools. The authors challenged nurse educators to use creativity when developing podcasts: “An experienced podcaster has the ability to engage the learner by infusing personality into the creation of podcast materials [by including] video clips, audio clips, illustrations, and sound effects.”

  Marrocco et al tested the use of podcasts in graduate nurse practitioner education and found “faculty enthusias-
tically embraced podcasting’s potential” despite the learning curve inherent in developing new ways of teaching. Podcasts were developed by faculty for a number of purposes, including case study reviews, physical examination outlines, and interviews with a diverse array of clinicians regarding clinical insights.23 Student feedback was mixed. Some students believed that assignments associated with podcasts required extra work (eg, needing to write down information from a case study podcast in order to answer questions about the case study), while others appreciated the format and ability to review information covered in classes during commutes.23 The authors found podcasts provided “asynchronous education that spanned learning and geographic barriers” and encouraged graduate nurse educators to incorporate podcasts as a means of enhancing transformational learning.21

Schlairet24 conducted a study of undergraduate, second-degree, and graduate nursing students in which podcasts of classroom lectures were recorded for voluntary student use. Forty-seven percent of students reported accessing the podcasts, with most of those students (62.5%) finding the podcasts helpful.24 Second-degree and graduate nursing students used the podcasts more than undergraduate students did and found the podcasts more helpful than the undergraduate students did.24 The author encouraged nurse educators to “leverage student’s positive attitudes [toward podcasting] and technological skills” to create “high-quality podcasts that align with students’ unique learning environments and goals.”24

Kardong-Edgren and Emerson25 studied students’ use and perceptions of podcasts in undergraduate nursing courses. Fifty-eight percent of students enrolled in 3 nursing courses, which already used podcasts of lecture material, responded to a survey.25 Eighty-eight percent of students believed the podcasts helped them better understand the course material, and 85% of students took notes on the podcasts while listening.25 One student reported, “[T]he podcasts are the best asset to my learning in your class.”25 Another student wrote, “I love podcasts! I have attention deficit disorder and historically I have tried to record lectures on my own, but podcast is so much better…. Listening to the lectures afterwards really helps me…. It made the class so much more enjoyable.”25 Students in the study did not report the podcasts influencing class attendance, but “faculty reported increased absenteism over the semester as students discovered course podcasts.”25 Faculty responded to this trend with various strategies to facilitate more classroom interaction, including quizzes and more discussions.25 Students believed that having access to podcasts that covered lecture material was beneficial in helping them catch up if they happened to miss a class.25 Despite challenges regarding class attendance, the authors recommended that nursing faculty embrace podcasts as a way to integrate evolving technology to benefit student learning.25

Research on Social Media in Anesthesia Education. Matava et al26 conducted the only study of anesthesia learners’ use of podcasts that our literature search revealed. The authors surveyed Canadian anesthesia residents’ use of podcasts and preferences for content. Sixty percent of residents who responded to the survey reported using medical podcasts, with almost half of those respondents stating they use podcasts in routine studying.26 Most residents found podcasts to be valuable because they were able to listen to material whenever and wherever they wished.26 Nearly all respondents (98%) who stated they did not use medical podcasts claimed they were unaware of their availability.26 The authors asked which specific topics the residents preferred under various headings:

- Physiology (89%) and pharmacology (88%) were the most requested basic science topics by all respondents.… The most requested clinical topics included intensive care (80%) and thoracic anesthesia (74%).… Under the procedural topic category, respondents requested podcasts on regional anesthesia (84%) and advanced airway skills (80%) … while crisis resource management (86%), and morbidity/mortality (67%) were most requested for the professional category.… Research methods/statistics (37%) and dental anesthesia (24%) were the least popular topics for podcasts.26

Anesthesia residents also had distinct preferences regarding podcast format. The most popular length of podcasts were shows lasting 5 to 15 minutes on topics such as case studies, procedural skills, and journal article reviews.26 Residents reported that podcasts covering didactic lectures ranging from 15 to 30 minutes were reasonable but were less likely to view shows on any topic lasting longer than 45 minutes.26 In particular, “practice oral exam questions were very popular among residents with 25% responding that they would be ‘likely’ and 67% ‘very likely’ to watch these podcasts.”26 The survey found that 37% of residents preferred podcasts with audio and still images or digital slides, whereas 34% preferred audio podcasts and 28% preferred video podcasts.26 The authors concluded that residents appear to have distinct preferences in terms of podcast content and format and that anesthesia educators should use this information to tailor the creation of podcasts to the actual preferences of anesthesia learners.26

Current published literature and research abound with content describing the process of creating podcasts and other social media tools for educational purposes.5,7,10-12,15-17 The research clearly outlines students’ positive feelings toward podcasts as being a valuable tool in their overall education.6,9,13,14,11,22-26 At least one study outlines the preferences of anesthesia residents in terms of content and format for medical podcasts.26 Original research is needed to better understand the preferences of SRNAs and CRNAs for podcast content and format. Understanding the current literature regarding podcasting will help the reader appropriately evaluate the...
potential benefits and limitations of using podcasts in educational formats.

The authors pulled from the literature valuable insights concerning the creation and development of their own website and podcast titled From the Head of the Bed … A Podcast for the Anesthesia Community. The remainder of this article will outline an educational model for developing podcast content and a reproducible logic model for creating an educational podcast. These tools were used in the creation of the authors’ website and podcast.

**Educational Model**
The Keller ARCS Model of Instructional Design is an educational tool for “improving the motivational appeal of instructional materials.” The model provides an outline for developing high-quality educational content. The ARCS model is composed of 4 major conditions—attention, relevance, confidence, and satisfaction—that need to be met for the learners to become motivated and for the learners to actually be engaged and stay motivated to learn. Use of this model can help nurse anesthesia educators create high-quality educational podcasts.

**Attention** is the first condition, which entails the educator capturing and sustaining the learners’ attention throughout the educational period. Keller describes using strategies such as introducing conflict, using concreteness, introducing variability, using humor, and allowing for inquiry and participation of the learner to sustain attention. These strategies can easily be incorporated into creating an educational podcast by covering a wide range of topics in various presentation styles such as one-on-one interviews, group discussions, and case reviews. Visual content may be provided in the form of show notes on a podcast webpage, which might include accompanying diagrams, photos, links to references, and so forth. Educational podcasts may be paired with forums or social media outlets such as Facebook groups and Twitter feeds so that users may participate in discussions pertaining to podcast content.

Keller believed that **relevance** comes not only from the actual educational material but also the way that something is taught. Podcasts, as outlined in the literature review, provide a valuable tool for nurse anesthesia educators to meet program requirements while using relevant and accessible delivery techniques for SRNAs. Producers of educational podcasts should create material specific to listeners’ interests and learning styles to be relevant. Covering case studies, academic lectures on a range of topics, equipment use guides, and board review and certification are only a few ways nurse educators can use podcasts to meet educational goals. Matava and colleagues article on the podcast preferences of Canadian anesthesia residents may provide insight to producers of educational anesthesia podcasts when developing content and the length of podcasts. Another relevance strategy is meeting the listeners’ needs for affiliation and establishing trust by providing opportunities for no-risk interaction. One way to do this is to provide a moderated comments section on a podcast website with published guidelines for participation, including language requiring polite and professional communication.

**Confidence** is the third condition in the Keller ARCS Model. Keller argues that confidence “can influence a student’s persistence and accomplishment.” Podcasts may afford listeners the opportunity to foster confidence by being able to learn about new skills in a low-risk environment of their choosing. Show notes accompanying each podcast can expound on content and provide references for topics discussed in the show. The peer-reviewed process for social media content is an important and complicated topic that is beyond the scope of this article to address at adequate depth. Show notes provide a way for podcast producers to provide evidence-based context and references to their discussions. The validity of social media content is critical to fostering confidence in consumers of medical information and is something that is and will continue to be discussed.

**Satisfaction** is the last condition of the Keller ARCS Model, which incorporates the use of natural consequences to achieve satisfaction after learning new material. Podcasts are largely 1-way communication formats, with the producers publishing the content and the listeners consuming the content on their own. This presents challenges for producers to provide positive reinforcement of learning outcomes for listeners. One of the chief forms of satisfaction derived from listening to a medical podcast is enhanced personal understanding of concepts. Another form of positive reinforcement might come from the recognition by a colleague (or a preceptor for anesthesia learners) for enhanced clinical knowledge. Producers of podcasts can, however, provide direct positive reinforcement to those listeners who post in the comments section of a website. This kind of positive feedback and interaction is often a hallmark of popular social media outlets by helping to create a sense of community on a blog, podcast, or website.

The Keller ARCS Model of Instructional Design provides a framework for creating content that captures the learners’ attention, establishes relevance of content, and promotes confidence and satisfaction in the learning process. Producers of educational podcasts have the opportunity to incorporate the 4 conditions of the ARCS model into the development of their podcasts, thereby basing their podcasts on a published educational model that seeks to “enhance the motivational appeal” of content. Use of this or a similar educational model will likely help producers of educational podcasts create content that is inspiring and educationally sound.
Methods

**Reproducible Model.** As podcasting has become more prevalent in the education of our nation’s healthcare providers it is of increased importance that the methods behind creating a podcast be shared.\(^{20,24}\) Podcasting, in its simplest form, can be broken down into a few relatively simple steps: first, one must be able to create or capture the content; second, the content should be edited for accuracy; and last, the content should be published on the Internet, where it can be accessed by others. The relative complexity of these steps, as well as the required resources to accomplish them, will be determined by the level of quality desired in the finished product and the intended purpose for use of the podcast.

The use of a logic model may help producers of educational podcasts both define the specific goals of creating the podcast and outline how to accomplish those goals. Logic models have been used in program development for decades and are an essential method of logically linking specific resources, actions, and outputs to the program’s desired outcomes.\(^{28}\) Furthermore, logic models allow programs to undergo critical evaluation of whether the program has succeeded in accomplishing its own goals.\(^{28}\) The specific logic model used by the authors for the creation of their educational podcast is shown in the Figure. By publishing this logic model outline and describing the process in this article, the authors provide a reproducible model of creating and developing educational podcasts and websites.

To best determine how to plan for and begin the recording process, the authors contracted the services of a professional radio production consultant. The consultant provided basic instruction regarding interview skills as well as hands-on personal instruction regarding recording equipment setup and audio editing software use. Although such personal instruction can be extremely helpful to a new podcast producer, numerous resources on the production of audio recordings and podcasts are available on the Internet. Sound recording and processing equipment and software are critical aspects of producing podcasts with high-quality sound.\(^{31}\) The authors used high-quality microphones (Røde, Røde Microphones, and Blue Yeti, Blue Microphones), a 12-channel audio mixer (Mackie, LOUD Technologies Inc), a digital re-
cordem (Sony PCM-D50, Sony Corp of America), and personal computers to run the editing software (Adobe Audition, Adobe Systems Inc).

The equipment setup for each interview consisted of a microphone for each participant in the interview so as to have distinct sound files available for editing purposes. These microphones were connected to the mixer, which in turn was connected to the interviewee’s personal laptop running the recording software (Adobe Audition, Adobe Systems Inc). Additionally, the digital recorder served as a backup recording device by capturing the output from the mixer. Finally, the setup included a pair of high-quality headphones, which were used so producers could hear how the recording was sounding in real-time. This allowed the interviewer to make audio adjustments during the interview instead of trying to compensate for them in postproduction editing.

With each interview, there were considerations and conditions maintained to maximize the sound quality in recordings. This included careful site selection where external sounds would not interfere with interviews as well as the physical composition of the interview location to avoid echoes or electrical interference with recording equipment. On certain occasions, suboptimal locations were unavoidable, and aberrancies in sound quality were accounted for and minimized during the postproduction editing process. These editing techniques are often specific to the editing software used and are described in software user manuals as well as publications on sound editing.

Although previous research on topics of interest related to anesthesia providers is quite limited, Matava et al.26 described the interests of anesthesia learners in topics such as basic sciences, clinical topics, procedures, and professional development. The authors used this research to help guide the selection process for interviewees and topics. Anesthesia providers who had expertise in selected areas who were willing to share their knowledge were identified as interviewees. Interviews were either conducted face to face or remotely via software (Skype, Skype Communications, Microsoft Corp), which specializes in providing video chat and voice calls via the Internet. In each session, written consent from participants was obtained enabling interviews to be released and shared in public domains.

A website domain name and content hosting services were required to serve as an Internet destination for the podcasts. Bluehost.com (Bluehost Inc) was chosen to provide both domain name and website hosting services. The website was built using WordPress (Automattic Inc), an open source website creation tool. Finally, media hosting was needed to manage the large data files of multiple podcast recordings. Blubrry podcast hosting (Blubrry Podcasting Community) was selected to fill this need because it is optimized specifically for podcast media and works seamlessly with WordPress. The authors’ website, hosted by Bluehost.com, links to the podcast files, which are hosted on Blubrry. In addition to providing access to podcasts directly on the authors’ website, a really simple syndication (RSS) stream was created so listeners could subscribe to the podcast and receive updates automatically on a device of their choosing, such as a mobile phone, portable music player, or computer. The authors also published their podcast on iTunes (Apple Inc) because this is one of the most popular podcast content management sites in the world.

Branding and marketing was integral in ensuring that the authors’ podcast was disseminated to as many listeners as possible. A custom domain name and the creation of a corresponding logo were integral in forming an identity and brand for the authors’ podcast. The authors marketed their podcast on Facebook and Twitter, statistically 2 of the most popular social media platforms based on number of users.29 Marketing measures were also focused on online forums targeting nurse anesthetists. Two such websites were Allnurses.com and Nurseanesthesia.org, which act as forums to discuss and share ideas and research related to the practice of anesthesia. Finally, business cards were produced and distributed at both state and national nurse anesthesia association meetings.

- Projected Outcomes. The projected outcomes of the authors’ podcast were multifaceted both in scope and timeframe. The direct, short-term outcomes included providing CRNAs and SRNAs content specific to the practice of anesthesia. The authors had a goal of producing several podcasts on a range of topics before launching the website so that subscribers had options of what to listen to. Another specific outcome was developing content tailored to SRNAs. The authors drew on their own personal experience as SRNAs to develop several shows addressing topics relevant to SRNAs, such as communicating with preceptors, preparing for nurse anesthesia school, and success strategies for nurse anesthesia programs. Topics for future shows were generated from both the personal interests of the authors, as well as referencing the research of Matava et al.26 These lists continue to guide the production of the podcast.

A long-term outcome goal is the development and production of a podcast specifically addressing nurse anesthesia issues so that further research can be conducted regarding its impact. Although the use of podcasts as an educational tool has been studied in nursing education, there is no published research concerning benefits of podcasting for the nurse anesthesia community.9,15,20,22-25 A rationale why such research has not been conducted may be the fact that podcasts created by nurse anesthetists have not been extensively developed. The creation of such podcasts would enable future research to be conducted and, in turn, potentially change the way educators choose to deliver education to anesthesia providers.
Conclusion
Social media is a broad concept incorporating the realm of free open access 'meducation' (FOAM) and podcasting, specifically.1,2 A general overview of social media, FOAM, and literature supporting the use of social media in higher, medical, and nursing education has been provided. A void in the literature exists concerning the research of social media use and efficacy in nurse anesthesia education. This topic is open for new research to be conducted in the future. Currently, nurse anesthesia educators have the powerful tools of social media and podcasting available to them to create content and delivery mechanisms that are relevant, effective, and congruent with program requirements and goals. The use of the Keller ARCS model and the logic model outlined in this article provide a guide for nurse anesthesia educators who wish to develop effective educational podcasts for the field of nurse anesthesia.

REFERENCES

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