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ABSTRACT

Background: The rise of free open-access medical education (FOAM) has led to a wide range of online resources in emergency medicine. Canadian physicians have been active contributors to FOAM.

Objectives: We aimed to create a virtual community of practice that would serve as a national platform for collaboration, learning, and knowledge dissemination.

Methods: CanadiEM was formed in 2016 from the merger of two Canadian websites and a podcast. Using a community-of-practice model, we introduced two training programs to support junior community members in becoming core editorial team members and employed asynchronous Web technologies to facilitate collaboration. We also introduced a coached peer review process and formed strategic alliances that aim to ensure a high quality of publication.

Results: CanadiEM has become a portal for readers to access a broad range of FOAM content. The website has published 782 articles. Of these, 71 have undergone a coached peer review process. The website has received over 2.5 million page views from 217 countries, and the associated CRACKCast podcast has been downloaded over 750,000 times.

Conclusions: CanadiEM has succeeded in building a national multi-interface dissemination network that fosters collaboration and knowledge sharing in emergency medicine while fostering junior digital scholars. The construction of a community of practice has been facilitated by quality assurance, training programs, and the use of asynchronous Web technologies. Ongoing challenges in sustainability include a volunteer workforce with high turnover.

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NEED FOR INNOVATION

Free open-access medical education (FOAM)¹ has fostered the development of virtual communities of practice around the use of social media and online educational resources.² Facilitated by critical clinicians, translational teachers, and interactive investigators,³ these communities disseminate educational and knowledge translation resources among geographically disparate health care practitioners.^{2,4,5} FOAM is particularly adept at raising awareness and contextualizing knowledge—key steps in the knowledge translation process^{6–8}—through the dissemination of accessible resources.

However, a digital divide exists between trainees and teachers in terms of preference for the resources created by the FOAM movement (e.g., podcasts, blog posts).⁹ Moreover, the ubiquity of these resources¹⁰ has raised suspicion about their quality, especially when they are produced by trainees. In response, early adopters have sought ways to assure quality, but often lack senior mentors with experience in this area. This innovation explores the development of a virtual community of practice to support the education and growth of the next generation of digital scholars through the coproduction of a FOAM website.^{11,12}

BACKGROUND

Groups from around the world including Australia (Life in the Fast Lane), the United States (Academic Life in Emergency Medicine), and the United Kingdom (St. Emlyn's) have established national FOAM platforms which have gained international recognition and galvanized communities of practice within these countries.¹³ As of 2015, the Canadian FOAM community comprised approximately 10 unique websites with no comprehensive national platform or consistent engagement with geographically disparate collaborators. These websites were challenged by reliance on a small, junior volunteer workforce¹⁴ and found it difficult to quickly produce quality content.^{15,16}

To address these concerns, we developed a national website to foster a virtual community of practice that facilitates sustainability, collaboration, and education scholarship while developing junior digital scholars. We have been successful in disseminating high-quality

content widely using strategies that could be adopted to other contexts and specialties.

DEVELOPMENT PROCESS

Conceptual Framework

Our organizational chart is based on Lave and Wenger's Community of Practice (Figure 1).¹⁷ A community of practice establishes a social context based on shared interest that allows participants to learn together and from each other, resulting in versatile and dynamic knowledge exchange.^{18,19} Within the community, progression of roles and responsibilities is based on member engagement. CanadiEM was founded by several nationally acclaimed medical educators who functioned as senior editors for the website. The rest of the initial editorial board consisted of their digital mentees. These members formed the nexus around which a community of practice arose.

Our community of practice is based primarily in online communication technologies, and our online audience comprises our peripheral membership.² CanadiEM accepts article submissions openly through a publicly available e-mail address, allowing peripheral members to contribute and further the goals of the community, a process termed legitimate peripheral participation.¹⁷

Those interested in becoming core members have two opportunities for apprenticeship: first, the CanadiEM Junior Editor program trains junior learners in operational and leadership roles. Responsibilities include uploading and copyediting posts, liaising between authors and expert reviewers, graphic creation, promoting posts through social media, and optimizing content for search engines. These tasks transition junior editors from consumers of online educational resources to distributors and creators. They are supervised by faculty members, ensuring that high-quality content is developed and delivered.

Second, the CanadiEM Digital Scholars program provides Canadian junior faculty members and senior emergency medicine residents subspecialty expertise in digital medical education scholarship.²⁰ Its competency-based curriculum consists of five modules (podcasting, blogging, digital identity, patient communication, translational teaching) is customized for each scholar and focuses on applying core medical education theory to online educational resources. Supervisors facilitate access to international leaders in medical education.

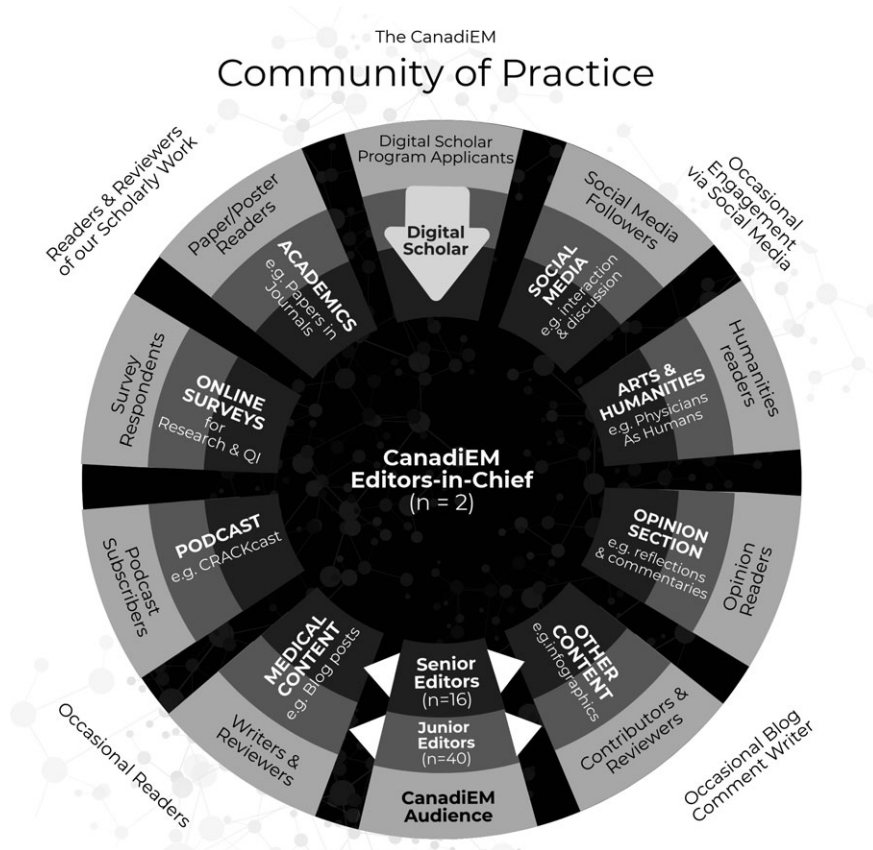


Figure 1. The virtual community of practice at CanadiEM.

IMPLEMENTATION PHASE

In 2016, CanadiEM was formed through the merger of the BoringEM and FrontDoor2Healthcare websites, two independent Canadian FOAM platforms. The CRACKCast podcast joined shortly thereafter. It is unlikely that analogous online entities will come together in the future, but pressures like those that drove these groups together are commonplace in the FOAM community. Once amalgamated, CanadiEM's five primary content sections were divided into interdependent teams (medical concepts, podcasts, academics, opinion & arts) and subsections (Data Supplement S1, Appendix A, available as supporting information in the online version of this paper, which is available at <http://onlinelibrary.wiley.com/doi/10.1002/aet2.10199/full>) and aimed to transition from disruptive to sustaining innovation.²¹

The CanadiEM Editorial Board consists of two editors-in-chief (both experienced, graduate-trained clinician educators), who oversee 16 senior editors and 40 junior editors. To ensure robust communication among nationally distributed contributors, we use online technologies to empower asynchronous

collaboration and mutual engagement among members (Data Supplement S1, Appendix B). As quality assurance was still a concern,^{15,16} content experts were sought to legitimize the community as a place for sharing and creating knowledge¹⁹ through two programs:

First, CanadiEM introduced a *coached peer review* process.²² This modified peer review process connects trainee authors with nonblinded content experts via e-mail. Content experts work with authors to improve article quality through multiple revisions in MS Word documents with tracked changes and correspond among themselves and the editor managing the piece. A core principle is that any submitted article has enough inherent value to become publishable. The timeline for the coaching process can range from 1 to 2 days to multiple months. Coached peer review is designed to be a positive collaborative experience for authors and experts, with the goal of encouraging future involvement in FOAM and other academic publications. Content experts also provide brief commentary that is published with the article. A complete description of this innovation has been published.²²

Second, we created strategic alliances with nationally recognized organizations, including the *Canadian Journal of Emergency Medicine* (CJEM), the Canadian Association of Emergency Physicians (CAEP), and Translating Emergency Knowledge for Kids (TREKK). These organizations provide educational resources for dissemination via our online platform. The alliances take the form of a unique memorandum of understanding between each group and our website that is customized to the needs of each partner. Broadly speaking, the organizations provide content that we customize for our blog's style and disseminate via our social media platforms.

OUTCOMES

Website Content and Audience

To date, we have published 782 articles on the CanadiEM platform, including 288 imported from *BoringEM* and *Frontdoor2Healthcare*. Seventy-one articles have been vetted through coached peer review while strategic alliances have yielded 71 articles (TREKK $n = 6$, CAEP $n = 48$, and CJEM $n = 17$). In total, 141 contributors have written a median of one article (interquartile range = 1–2) and represent nine of the 10 Canadian provinces (Data Supplement S1, Appendix C). Excluding editors, the maximum number of submissions from an author is eight.

From the website launch (January 1, 2016) through September 23, 2018, CanadiEM received > 2.5 million page views (now averaging > 120,000 page views/month) while CRACKCast podcasts were downloaded > 750,000 times (>35,000 downloads/month). Website viewers hailed from 217 countries, with approximately 35% from Canada, 30% from the United States, and 35% from the rest of the world. CanadiEM currently ranks ninth out of 148 in the June 2018 Social Media Index, which measures the impact²³ and quality²⁴ of emergency medicine and critical care websites.

Education Scholarship

At CanadiEM, the facilitated interactions between team members in our community of practice have developed an identity that values national collaboration on high-quality scholarship. Our community has produced more than a half-dozen nationally presented posters and presentations and four traditional academic publications.^{22,25–27} As CanadiEM has become an established leader in FOAM, we have begun to

spearhead the online recruitment efforts of study participants⁴ and to support research on FOAM projects.²⁶

REFLECTIVE DISCUSSION

Despite the many benefits of the CanadiEM model, we acknowledge a major limitation related to human resources. Training of new members has required a mix of informal training and on-the-job learning, which has occasionally led to delays and technical glitches. CanadiEM continues to rely on volunteer medical students, residents, and staff physicians, who are subject to work and life stressors that affect their commitment to CanadiEM.

We have mitigated the effects of the above limitations by building a close-knit culture with constant online communication. In 2016, editors began holding annual meetings at the Canadian Association of Emergency Physicians Annual Conference and coordinating group events. We have rewarded our volunteer learners with networking benefits from being part of a community of practice; for example, digital mentorship, academic coaching, and letters of reference. All members benefit from skill development in leadership, teamwork, writing, and editing.

CanadiEM remains in the early stages of development. Future directions include curricular mapping of content, as some topic areas may be overemphasized.²⁸ We continue to pursue strategies to reward participation within our community of practice, especially for our core editorial team. Some institutions have started to credit online educational resources toward academic promotion,²⁹ which may reduce the opportunity cost of pursuing these projects. This strategy could also be adopted by residency training programs.³⁰ A variety of funding models could improve sustainability and further exploration will be necessary to determine whether these models cost publication autonomy and independence.

CanadiEM has succeeded in building a national platform for collaboration and knowledge dissemination in emergency medicine while supporting the development of junior digital scholars. The construction of a community of practice has been facilitated by quality assurance, training programs, and the use of asynchronous Web technologies. Ongoing challenges in sustainability include costs and a volunteer workforce with high turnover.

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Supporting Information

The following supporting information is available in the online version of this paper available at <http://onlinelibrary.wiley.com/doi/10.1002/aet2.10199/full>

Data Supplement S1. Supplemental material.