INNOVATIONS

Hosting an eConference: Interactive Video Conference Grand Rounds Between Two Institutions

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Submitted: August 15, 2017; Accepted: September 25, 2017; Electronically Published: January 15, 2018; https://doi.org/10.21980/J88P80

ABSTRACT:

Audience: The eConference is an interactive video conference grand rounds innovation to augment the didactic curriculum provided for medical students, interns, residents, fellows, and attending physicians.

Introduction: Formal education during emergency medicine (EM) training has historically emphasized aspects of humanism and constructivism; the former through self-directed reading in books and journals, the latter through the content and discussion during resident didactics.[1] However, some studies suggest that the current generation of EM learners are increasingly using digital and internet technologies to connect with online peer networks, a phenomenon known as connectivism.[2] As such, contemporary EM learners are increasingly utilizing social media and Free Open Access Medical Education (FOAM) to supplement traditional learning resources. The eConference was developed to be an interactive, virtual grand rounds that marries the merits of constructivism with connectivism; a new format of EM didactics that goes beyond the "typical lecture" model to incorporate the changing landscape in technology and medical education by combining classroom teaching at multiple institutions alongside digital learning tools. This manuscript outlines how to plan and execute a joint video conference with another institution.

Objectives: Our objectives were to create and implement a novel virtual conference format through the integration of social media tools which allows for interdisciplinary and multi-site participation to enhance EM resident education. We wish to outline the steps required to reproduce this innovative session and share lessons learned.

Methods: We designed and executed a multi-centered, novel form of virtual conference into the EM residency curriculum at two participating institutions. The virtual conference took place during a routine conference day for both programs, an hour in duration. The format utilized a hybrid of live and virtual lectures based upon a clinical case presentation that was broadcast to and from both institutions, utilizing Google

Hangouts™ and Twitter™. Senior house staff, EM faculty and subspecialty content experts combined to present the case and guide the cross-institutional discussion.

Topics: Video conference, multi-centered, social media, free open access medical education, neurology, stroke, resident education.

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List of Resources:

Learner Audience:
Medical students, interns, junior residents, senior residents, fellows, attending physicians

Time Required for Implementation:
Executing this innovation requires significant coordination across participating institutions in advance of the teaching session. Test trials of the audio and visual connections are essential. The preparation for this session will require approximately 5-10 hours of pre-planning time. Learners use the innovation for 1 hour during dedicated conference time, but this timeline can be adapted based on the planned content. This conference time must be coordinated at each institution to occur at the same time.

Recommended Number of Learners per Instructor:
Our learner to instructor ratio was approximately 15:1. This ratio may vary depending on the number of speakers and conference participants. Large residency programs, for example, may opt to have a single podium speaker at each site giving grand rounds presentations. The learner to instructor ratio can be easily adapted to fit the conference content.

Topics:
Video conference, multi-centered, social media, free open access medical education, neurology, stroke, resident education.

Objectives:
By the end of the session, the learner should be able to communicate using social media resources and interact with another institution via video conference. Precise learning objectives will adjust depending on the planned didactic content. In our implementation, the learning objectives during our session addressed the diagnostic and therapeutic considerations in patients presenting with vertigo attributable to intracerebral vascular insufficiency, highlighting the risks and benefits of admitting such patients to an observation unit.

Linked objectives and methods:
The objective of this innovation is to provide a virtual conference tool with interdisciplinary, multi-site involvement that allows interaction via social media and to improve EM resident education with a new learning format. Multiple studies have demonstrated EM residents frequently utilize web-based teaching resources and prefer active, "flipped classroom" educational modalities. The use of social media and FOAM as an adjunct in medical education is becoming more popular among EM physicians in training.[3] In addition, interactive lessons have been shown to increase both short- and long-term knowledge retention.[4] Another study demonstrated a threefold increase in attendance after the introduction of a more interactive educational format.[5] The common model for didactic lectures mandate educator and learners gather simultaneously for a set period of time in a shared physical space. These qualities inherently limit the reproducibility and number of learners that can be reached, effectively diminishing the educational impact. Yet, the current model for weekly EM curriculum at a single institution is limited due to the finite pool of educational sources. The purpose of the eConference is to create a broader community of practice and to inspire learners to expand their knowledge acquisition beyond that possible in the "typical lecture" model currently in place at any single EM residency program.

To develop this innovation, a core group of EM faculty and senior residents from both institutions met with interdisciplinary specialists to create educational objectives for the case presentation of a patient with a complex neurologic disorder, addressing the clinical course from the emergency department to an observation unit. Presenters included EM faculty, residents, and specialty consultants.

The eConference content was devised to include speakers from both institutions, each speaker delivering different sections. Each speaker had focused teaching points, content that was reinforced with the concomitant visible Twitter feed. Twitter-polling questions during the session expedited even more learner participation. An interactive multi-site and multi-disciplinary lecture was broadcast using Google Hangouts™ in conjunction with a live Twitter™ feed with questions, resources, and learning pearls coinciding with presented material. Active participation during the conference could also take place via online questioning or gaming programs such Poll Everwhere™ or Kahoot!™

The eConference used a flipped classroom approach, calling upon learners to prepare in advance of the session to augment learning during the virtual conference.[5] Learners should be expected to read a relevant piece of primary literature before the eConference. For our session (a case of vertigo due to bilateral pontine infarcts), the selected paper discussed the evidence behind a Head Impulse, Nystagmus and Test of Skew (HINTS) exam to aid in the diagnosis of acute vestibular syndrome.[6] Additionally, learners were primed prior to the

conference with information about how to sign up for and use the Twitter platform.

During the virtual conference with Google Hangouts™, case-specific learning objectives are achieved through each speaker. The live twitter feed allows for participants to engage in the social media conversation during the conference time as well. Following the conclusion of the session, learners can go back through Twitter to answer poll questions, to read insights provided by colleagues, and to reference learning materials distributed during the session. Learners completed a post-assessment survey of the virtual conference to determine the perceived value and attitudes. Survey assessment was obtained using a three-point scale (yes, no, other) and results were reported as mean values.

Recommended pre-reading for instructor:

- Instructors for the virtual conference session should be prepared with the teaching points outlined for their segment of the discussion. This content will be specific to the case decided on for presentation.

Learner responsible content (LRC):

- Learners for the virtual conference session should read the assigned primary literature prior to the eConference. In addition, conference attendees must have basic familiarity with the use of Twitter™ for accessing resources, answering polls, and engaging with other learners during the conference.

Implementation Methods:

The educational session should start with an introduction from the participating institutions over the video conference software (our session used Google Hangouts™). During the introduction, the learners should be told which unique Twitter hashtag to use and how to engage in discussion through social media tools. The scheduled speakers at each participating site will rotate through their slides and teaching points, as would occur at a single site lecture. The bilateral audio and visual connection permits ample audience interaction and discussion. A live twitter feed using the unique hashtag will simultaneously broadcast questions, resources, and discussion as the case scenario unfolds. Any complex patient scenario with structured learning objectives can be utilized as the core content for this session. We recommend at least a one-hour block of conference time to facilitate the case resolution and questioning.

List of items required to replicate this innovation:

The innovation leans heavily on contemporary technology and hardware, but most are technological resources that are either free or readily available at most residency program institutions. The basic setup at each site involves two computers connected to projectors. One projector at each site displays the Twitter feed and video conference, while the other projector displays the combined lecture slides. The video conference software used was GoogleHangouts™, a free application with a Google account. Proprietary options such as GoToMeeting™, BlueJeans™, or ezTalks Cloud Meeting™ could be utilized for this purpose as well, but with extra cost attached. Other suggestions to augment the audio-visual experience include purchasing USB microphones and HD webcams at each program site.

Basic Requirements

1. Two computers at each program site
2. Two projectors at each program site
3. Conference room speakers at each site
4. Appropriate adaptors to connect computers, projectors, and speakers
5. Install free GoogleHangouts™ software

Recommended Purchases

Item	Cost
Two USB Microphones – (authors used Blue Rhino)	$127 each from Amazon.com
Two HD webcams for podium speakers – (authors used Logitech HD Webcam)	$76 each from Amazon.com
Consider virtual meeting software (eg, GoToMeeting™, BlueJeans™, or ezTalks Cloud Meeting™)	$10-20/month

Approximate cost of items to create this innovation:

The cost of the eConference may vary depending on resources already available at the participating institutions. Audiovisual equipment such as microphones, high definition (HD) webcams, and audio speakers may be purchased for optimal sound and video quality if not readily available. Alternatively, most personalized laptop computers have this equipment already installed, but it may be of lower quality and not project as well in a large conference room.

Detailed methods to construct this innovation:

A step-by-step approach to successfully carrying out this virtual conference involves a planning phase and an implementation phase.

Step-by-Step: Planning Phase

1. Find Quality Collaborators

Planning a virtual conference takes time and dedication at both institutions involved in the process. The easiest collaborations will arise when medical educators at each participating site

have a professional connection independent of the virtual conference. It will expedite scheduling if resident conference at all participating sites is already on the same day of the week. Similar time zones can be helpful, but not necessary.

2. Select a Topic and Speakers

Consider this lecture a grand rounds style presentation, and choose the topic accordingly. As with conventional single-site lectures, the best topics are engaging for the learners. The best sessions focus on providing a new piece of information to help in clinical practice. Our case was an atypical presentation of a posterior circulation stroke that had features of neuromuscular junction disease, and reminded learners to consider the HINTS exam in diagnosis, and to discuss risks and benefits of admitting these patients to an observation unit. Similarly, the speakers should be engaging and/or have expertise in the topic area. We invited a stroke neurologist to highlight key portions of our case, along with education faculty and chief residents from both institutions.

3. Share Cloud-Based Resources

To facilitate collaboration across institutions, cloud-based services such as Google Drive™ can help coordinate an overall plan. We used Google Drive™ to organize the conference objectives, speaking points, a sequence of events, and to-do-list prior to the virtual conference day (Image 1). The Google Drive™ cloud solution allowed us to streamline the information for eConference planners, and cut down the email burden amongst participants. Other popular cloud-based services for sharing files in a group include Dropbox, Amazon Drive, iCloud, and Box.com.

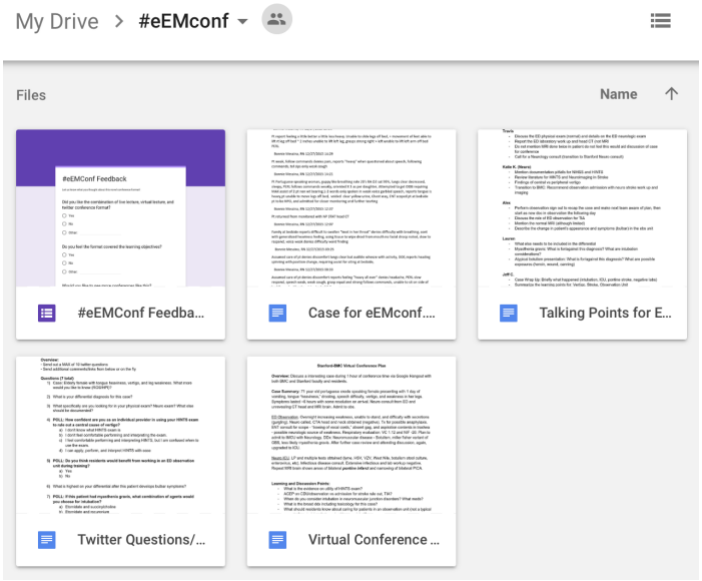

Image 1: Google Drive™ organizing conference related documents (screenshot from personal computer)

4. Develop a Combined Presentation

After the case, objectives, and learning goals are established, a single presentation to be used during the virtual conference needs to be created. This must be the same presentation in the same order of slides to be used at all institutions. This will help simplify the setup and displays on the conference day, and ensure all sites are following the same itinerary. An alternative setup could utilize the slide sharing functionality of GoogleHangouts™ or other video conferencing software at each site, but the content should be organized in a cohesive presentation.

5. Prepare for Twitter

The live Twitter™ feed portion of the virtual conference day requires pre-planning as well. To efficiently send out resources related to the lecture topic and ask meaningful audience poll questions, create a document with the content you intend to tweet during the presentation (Image 2). Consider registering a hashtag specific to your conference. We registered #eEMconf with Symplur Hashtags, which is a free platform to help connect other healthcare twitter followers to your conversation. It is wise to engage eConference attendees to familiarize themselves with Twitter™ in advance of the session to maximize participation and impact. We also designated a Twitter moderator to send out polls, literature resources, and questions during the conference, along with a brief summary of the online commentary at the conclusion of the session.

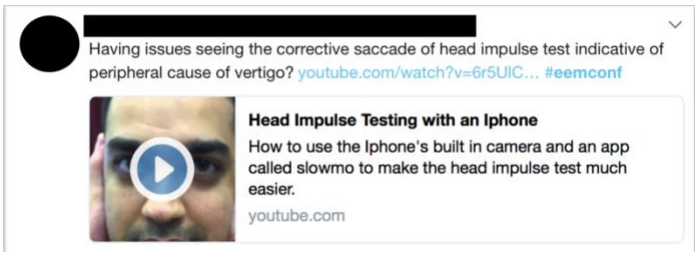

Image 2: Example of a YouTube video link that was selected as a resource prior to the virtual conference (screenshot from personal computer)

6. Practice Run

A 'dress rehearsal' or practice run is perhaps the most imperative part of the preparation for this session to be sure that the technology functions as intended at both sites, to be certain that the lecture flows smoothly. The practice run should be scheduled at least 1 week in advance, and incorporate all necessary parties including the conference organizers, presenters, and technology experts at both institutions. The laptops, projectors, microphones, cameras, and audio speakers should be set up exactly as they will be configured on the day of the conference (Image 3). The presenters stand adjacent to the projector screens in front of the audience at each site, with computers, HD cameras, and microphones directly facing them.

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An additional computer and camera at each site can face toward the audience. The dry run-through should utilize the video conferencing software. Allow an extra thirty minutes to troubleshoot technology issues during this rehearsal. Make sure that unused microphones are appropriately muted to prevent excess audio feedback.

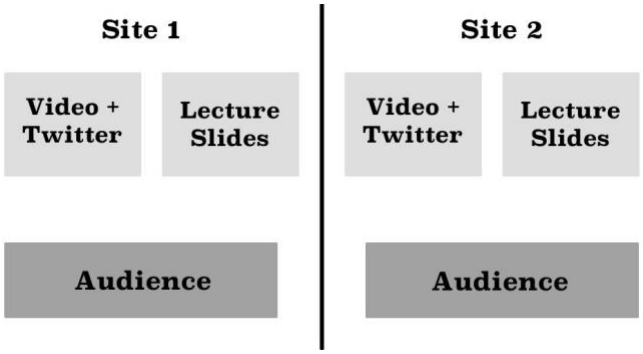

Image 3: Basic schematic of the conference room setup at each location (author designed)

Step-by-Step: Implementation Phase

1. Arrive Early for Setup

New technology innovations are notoriously difficult with initial implementation. Early technological challenges can be addressed if conference planners start at least 30 minutes prior to the start of the eConference; setting up equipment, connecting both computers at each site to the appropriate projectors, logging in to Google Hangouts™ and creating the connection with the other institution. After both sites have joined the "Hangout," ensure the audio and video work appropriately in each conference room. When the audience arrives, the presentation can then start seamlessly.

2. Backup Plan

As always in emergency medicine, consider the worst-case scenario and have a backup solution. If the video conference audio is malfunctioning, make sure cell phones are available for backup communication. If the wireless internet in the building is unpredictable, ensure that a landline (LAN) internet connection is accessible.

3. Organization and Flow

Plan to have an organizer at each site serve as a timekeeper. One person should be in control of the conference twitter account, to send out the polls and share online resources in sync with the didactic content.

Results and tips for successful implementation:

We believe this innovation is a powerful way to connect residency programs in joined virtual dialogue about EM conference material. The implementation is best done during scheduled residency conference time, at a date and time agreed upon by both sites. Using the guide created for this innovation, along with a checklist, may help in replicating this virtual conference at additional sites (Table 1).

Guide to Creating an eConference	
Pre-conference Planning	**Conference Day Checklist**
1. Find Quality Collaborators	o Arrive early for Setup
2. Select a Topic and Presenters	o Test audio/video connections again
3. Share Cloud-Based Resources	o Cell phones for backup communication
4. Develop a Combined Presentation	o Landline (LAN) internet for backup
5. Prepare for Twitter	o 1-2 working video feeds at each site
6. Practice Run	o One person at each site keeping time and one person in charge of Twitter

Table 1: Guide to Creating an eConference

Our novel conference format was successfully carried out on December 14th, 2016. The evaluations completed by residents were overall favorable; 76.2% (16 of 21 survey participants) reported that they would like to see more conferences similar in format, and 85.6% (18 of 21 survey participants) liked the combination of live lecture, Twitter™ feed, and virtual lecture. Fewer individuals, 57.1% (12 of 21 survey participants) felt they benefited from the Twitter™ feed component of the lecture. Despite the survey results, the discussion on Twitter was robust including 14 individual participants, 42 individual tweets, 48 retweets, and 97 likes. Attendance at each site included approximately 40-50 people for the 1-hour session.

We learned a great deal from this virtual conference. Countless iterations could be developed based on our innovative eConference format. For example, some educators may perceive that the simultaneous lecture and Twitter™ feed can be sensory overload for learners. In that case, our protocol can easily be implemented with an eConference during routine conference hours, with a separate Twitter™ feed to occur *later* in the day. Programs could also phase in video conferencing with a single lecture at each institution, and add the online discussion component after feeling more comfortable with the technology and setup. With current video conferencing software, more institutions could be invited to join. Ultimately, mastering the technology is a major key to success, and having

a group of social media and technology savvy individuals on the team is essential.

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