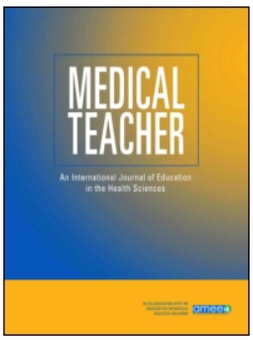

Medical Teacher

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/imte20

Integrating webinars to enhance curriculum implementation: AMEE Guide No. 136

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To cite this article: Michael Cunningham , Rudolf Elmer , Thommy Rüegg , Claudia Kagelmann , Alain Rickli & Paul Binhammer (2020): Integrating webinars to enhance curriculum implementation: AMEE Guide No. 136, Medical Teacher, DOI: 10.1080/0142159X.2020.1838462

To link to this article: https://doi.org/10.1080/0142159X.2020.1838462

MEDICAL TEACHER
https://doi.org/10.1080/0142159X.2020.1838462

MEDICAL TEACHER
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AMEE GUIDE

Integrating webinars to enhance curriculum implementation: AMEE Guide No. 136

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ABSTRACT

Webinars have been used in medical education since 2006 and are now part of the educational offerings of many organizations, including universities, societies, and industry for healthcare trainees and professionals. They are frequently used for continuing medical education (CME) and continuing professional development (CPD) for internal medicine physicians, pharmacists, nurses, and surgeons. There is very limited evidence for the positive impact of these educational events on patient care, however, there is literature that suggests they have educational value for various audiences. Based on our own extensive experience, evaluation data, and key findings over the past decade and a review of the literature, this guide proposes best practices for planning, developing, delivering and evaluating webinars as a part of your curriculum. We propose six phases with steps and questions to help achieve the key purposes of each phase.

KEYWORDS

Continuing; international medical education; planning; e-learning/ computers; webinar

A webinar is defined as "a live online educational presentation during which participating viewers can submit questions and comments" (Merriam-Webster Dictionary 2019) and as "an interactive seminar conducted over the internet" (Collins English Dictionary 2019). Its etymology is based on combining the words web and seminar and it was first used in 1998. A webcast is defined as "a transmission of sound and images via the World Wide Web." Many organizations and experts discuss the differences between these two online synchronous types of events.

Before we share our best practices regarding webinars, we must review the current reported uses of webinars for CPD or continuing (medical) education (CME or CE) and the evidence for their effectiveness. In 2012, Buxton et al. reported positive feedback to a year of monthly webinars (a 60-min presentation followed by a 30-min discussion session) to provide timely and practical information for practicing pharmacists on a specific therapeutic area. Evaluation data from 97 responses were positive for the quality, value, and relevance as well as the method of delivery, however, concerns were raised regarding the limited average number of webinars attended by each pharmacist as well as scheduling conflicts and other deterrents to repeat participation (Buxton et al. 2012). Two years later, a comparison of 82 pharmacists' satisfaction with the content and learning environment of a continuing education program series showed synchronous and asynchronous webinar participants responded positively regarding the quality of the programming and the method of delivery, but asynchronous participants rated their experience more positively overall (Buxton 2014).

In a comparison study of an immunization quality improvement program, in-person and webinar delivery modes were both well received, but webinar consultations cost substantially less (Gilkey et al. 2014). Webinars also have potential to improve the expertise of rural physicians in providing treatment to patients with chronic conditions better care without requiring the doctors to travel (Hutten-Czapski 2014). A comparison of three otolaryngology-head and neck surgery live format lectures versus webcast with 148 third year medical students showed equal post-education scores on a written examination and the webcast group outperformed the live lecture group in an Objective Structured Clinical Examination (OSCE) station (Vaccani et al. 2016). Evaluation of HIV-specific medical training with webinars to clinicians supporting HIV care and treatment across 12 Sub-Saharan African countries over a 10-month period showed these were feasible and acceptable but required strengthening of IT capacity and Internet infrastructure to support expanded use (Reid et al. 2012).

More recently, Kimura et al. conducted a focus group with 6 participants of twice-weekly webinars for primary

Practice points

Webinars can be a valuable addition to CPD in your organization if:

- Planning is included in your overall curriculum delivery.
- A process for identifying content and presenters is established to ensure relevance to audience.
- The offerings are clearly communicated to the target audience.
- The live event is delivered through a high-quality user experience.

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care physicians in Japan and showed webinars were perceived to provide a comfortable learning climate, enabling physicians to teach one another and share their experiences in an unbiased way and that the chat system stimulated real-time interaction. The expansion of the webinars raised two concerns: the possibility of speakers becoming nervous (no longer being able to see the faces of all participants was considered a disadvantage) and the increased burden on the organizers (additional funding might ease the burden on organizers and moderators) (Kimura et al. 2018).

Recognizing that technology provides an opportunity to engage with a variety of audiences to provide cancer education, information, and support, Cancer Council Victoria (CCV) designed and evaluated a suite of webinars for people affected by cancer and for health professionals (Chiswell et al. 2018). Four hundred thirty-eight people participated in the webinars (41.5% of 1056 registrations), and 207 post-event surveys were completed by participants (47.3%). Overall, 90.1% indicated that the webinar content was relevant to their interests and needs. Self-ratings of knowledge, awareness of resources and confidence to discuss webinar topics increased after the webinar.

Lewis et al. compared the functionality of a list of commonly used web-conference software and constructed a set of troubleshooting tips for the most commonly encountered problems (Lewis et al. 2020). They also highlight that the host and participants must be aware of best practices, especially the host "requires considerable preplanning, technology familiarity, and practice." They recommend sharing information with learners after the event and gathering their feedback in a short survey. They also advise that highly interactive conferences, experiential learning, hands-on techniques, and highly sensitive-topic conferences are generally best given and received in person rather than virtually. A meta-analysis of 15 studies showed that webinars were descriptively more effective in promoting student knowledge than asynchronous online and face-to-face instruction. Satisfaction was negligibly higher for webinars compared to asynchronous online instruction but lower than for face-to-face instruction (Ebner and Gegenfurtner 2019).

In the field of surgery education, recent evaluation of a series of 12 webinars for continuing education from the Austrian Society for Oral and Maxillofacial Surgery (ÖGMKG) showed the content was well accepted by 51 responders (allowed for an adequate transfer of knowledge), with females giving better ratings than males (Wagner et al. 2019). This group also evaluated learners' acceptance of a live, interactive webinar on orthognathic surgery by the International Association of Oral and Maxillofacial Surgeons (IAOMS) using a standardized, validated questionnaire (Student Evaluation of Educational Quality, SEEQ). Participants who attended the webinar from five continents reported a high level of acceptance for almost all subscales (independent of sex, specialty, and work experience) (Knipfer et al. 2019). A multi-pronged knowledge-translation intervention that included a 90-min live and archived webinar was shown to improve the attitudes, knowledge, and fertility preservation practice of a cohort of breast surgeons (Warner et al. 2020).

In summary, there is limited evidence to show positive impact from educational webinars for continuing education in medicine or surgery. Most research has been limited to satisfaction surveys and feedback methods and these data suggest webinars are valuable to learners and organizations for various reasons. This guide describes our proposed best practices for planning, developing, delivering, and evaluating webinars for learning.

In the AO Education Institute, we use both webinars and webcasts as formats to offer participants the opportunity to learn from renowned experts and discuss current clinical topics from anywhere in the world. These live events allow participants to ask questions and receive answers in real-time. Our webinars are interactive live broadcasts of a lecture or presentation on a defined topic (https://www.aofoundation.org/what-we-do/education/topic-areas/ao-video). Our (surgical) webcasts are interactive broadcasts of clinical procedures delivered live from the operating room. We promote and incorporate interactivity in both webinars and webcasts between the presenter and audience by making use of a live chat option in which a moderator brings forward the relevant questions for discussion.

In 2012, our colleagues demonstrated that surgeons want to engage in education when they have a practice gap (de Boer and Fox 2013). When practicing physicians are unable to attend traditional face-to-face education due to costs, time away from practice or other reasons, their ability to perform may be reduced and their care of patients may be compromised. Therefore, organizations must explore all delivery options in their curriculum implementation. Our needs assessment conducted with 3790 orthopedic and trauma surgeons worldwide showed an interest in receiving education through both webinars and webcasts (Buckley et al. 2017). Both formats are now used frequently for delivering appropriate content for our curricula for continuing professional development (CPD) for surgeons dealing with disorders of the musculoskeletal system (Figures 1 and 2). We started to use webinars in 2009 and since then have delivered more than 300 international events from Switzerland covering orthopedic trauma, spine, craniomaxillofacial, arthroplasty, and veterinary orthopedics, as well as many more from our regional offices in Asia Pacific, Latin America, and North America to thousands of participants from all regions and countries of the world.

We present this guide in six phases (Table 1) based on 10 years of finetuning our processes and reviewing evaluation data. We support our ideas (and challenge some) with evidence from the most recent publications and from almost two decades of experience from many organizations and researchers.

Phase 1: Planning

A structured planning process is required to decide what to cover in your webinars, what specific objectives should be addressed, and who will deliver them. Every organization must decide the content that is most needed and relevant to their target audiences.

Our approach is to identify the formal groups of faculty experts who are involved in education related to the topic and to invite these groups to propose specific topics

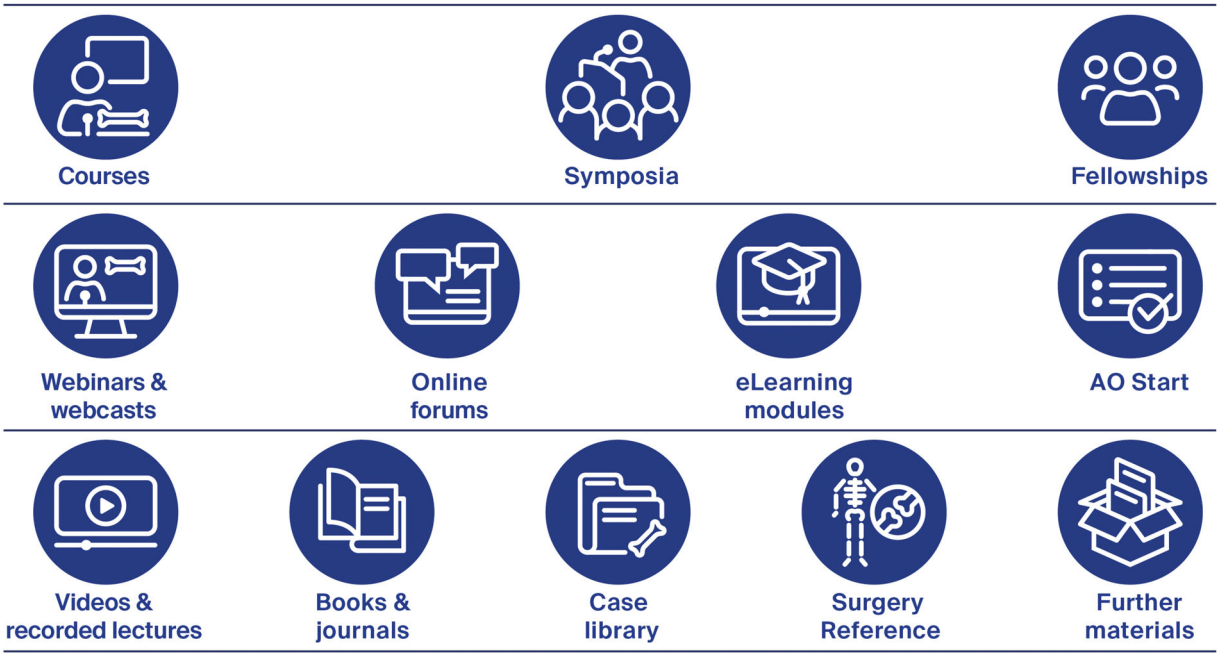

Figure 1. Curriculum view, showing the delivery options we use in our curricula for CPD.

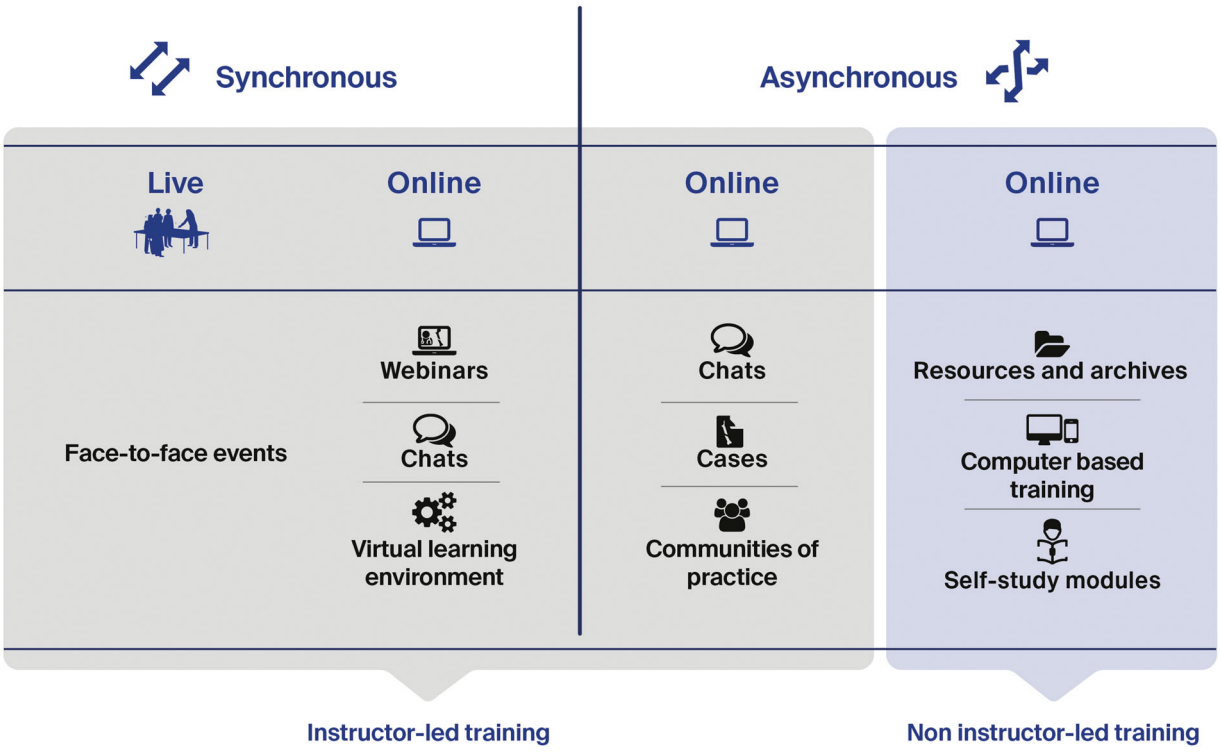

Figure 2. Delivery modalities and methods in AO Foundation and AO Education Institute.

(webinar titles, target audience, learning objectives) and to identify their expert presenters (aiming to include faculty with various backgrounds to address the diversity of the target audiences). In our context of preparing a set of international webinars for global implementation, we gather input by:

- Asking curriculum taskforces for topics to enhance their offerings (e.g. to reinforce key or new information, to reach broader audiences)
- Asking our expert groups who are involved in developing new techniques
- Asking our regional committees to identify topics they will address locally and what topics they might have interest in having as an international event
- Asking our research groups who are involved in developing new recommendations, guidelines, etc.
- Reviewing the evaluation data from previous webinars
- Reviewing our needs assessment data (sometimes conducting new assessments)
- Reviewing our curriculum evaluation data (to identify gaps or recurring challenges)

Table 1. Phases in webinar implementation and the key purposes of each one.

	Phase	Main purposes
1	Planning	• Decide the content that is most needed and relevant to your target audience • Define the learning objectives to be achieved • Provide the resources for implementation • Create a communication plan to inform your target audience about your webinars
2	System selection and preparation	• Select, install, and test the necessary software and hardware • Create an optimal space with good connections, etc. • Develop or bring in technical expertise for support
3	Content preparation	• Create content that addresses the learning objectives • Build in interactivity, opportunities for feedback, and assessment • Ensure quality standards are applied to all slides, graphics, patient images, etc. • Review with peers and editorial team
4	Faculty preparation	• Select content experts (presenter and moderator) • Apply clear guidelines for structure and all steps in the process • Provide training (to teach online and on the specific webinar system), support, and practice time
5	Live delivery	• Conduct rehearsals so that faculty, content, and system are all performing optimally • Apply all recommendations provided for delivery: technical, interpersonal, etc. • Monitor all technical aspects and the online experience and be ready to address problems • Record the event for archiving and asynchronous delivery at a later date
6	Evaluation	• Provide information on the impact of each webinar • Gather feedback from the participants • Provide feedback to the faculty • Help the planning committee make decisions for future events

- To complement our online resources (all webinars are recorded and archived for re-viewing, e.g. overviews of surgical approaches)
- Monitoring the latest research and new topics of interest to the healthcare systems, patient populations, etc. (e.g. antibiotic-resistant bacteria, infection prevention)

All proposed webinars must be considered by a reviewing panel of education experts and a selection made based on available resources. The selection process should be based on the merits of the proposal, the prioritization suggestion of each group, and the suitability of the content and objectives. The presenters of the selected webinars must be informed and the proposers of the webinars that were not selected should be informed about the decision and thanked for their contribution.

Like all educational events, a team of experts is required to run webinars. As well as providing budget and support for the presenting faculty, editing and technical support is required, as well as communications and event management systems and an evaluation process. A clear plan can only be developed and delivered if the necessary resources are allocated and the tasks are scheduled with the team members.

Clear communication regarding the steps in the process and the timelines involved is essential for planning. The overall plans need to be shared with the managers and each phase can then be extracted for the various audiences who need to be informed (Table 2).

Create a communication plan to inform your target audience about your webinars and a monthly or yearly calendar to clearly show:

- Webinar title
- Faculty
- Date and time (international times)
- Description and target audience
- Image
- Learning objectives
- Link to registration (with scheduling confirmation and a reminder system)
- Faculty disclosures

Over 10 years, we consistently see around one third of all registered participants for our free of charge webinars (delivered at 13:00 or 14:00 Central European time) attend live online on the day of the webinar (although this proportion increased in April 2020). Many participants register but daily practice, other commitments, etc., cause them to miss the live event, therefore, it is best practice to provide access to a recorded version and share a link with these registrants.

Phase 2: Systems selection and preparation

As Fadlelmola stressed, the choice of platform for hosting a webinar is crucial and the various features provided by numerous free and paid-for platforms must be weighed up considering the resources and budgets available. The system must ensure high speed, reliable delivery, easy to use interfaces for the presenters and technical teams, adequate access for many participants, and strong support for the integration of text, images, sound, and interaction (chat functions, polling questions, etc.). Recent articles list and compare many features of the following products to consider based on available budget and the required numbers of participants, etc.: Adobe Connect, Cisco Webex, ClickMeeting, Google Hangouts, GoToMeeting, JoinMe, Mconf, Myownconference, Skype, Uber Conference, Zoom (Carvalho-Silva et al. 2018; Fadlelmola et al. 2019; Lewis 2020). They propose minimum requirements and extended features and each organization has to make their selection based on all the technical factors and their overall intended volume and frequency of use.

Within our organization, we have established a dedicated webinar delivery room, with threecomputer systems arranged beside each other in one location, that has good lighting, fast connections, and no interruptions. When a dedicated room is not available, remote connections by the presenter and moderator can be considered if the connection is fully tested for access and speed and each location meets quality standards for sound and visuals (good quality speaker headsets, no background noise or distracting images).

Table 2. Webinar project tasks and timeline.

Step	Tasks	When
Planning	Agree the topic and presenter/moderator	9 months before
Design and content preparation	Define the learning objectives and start to gather cases and assemble the content	6 months before
Kick-off meeting	The presenter and team plan and agree the entire process	2 or 3 months before webinar
Finalize the communication for the webinar	Project manager helps the presenter to finalize information to advertise the event	2 months before webinar
Creation of content	The presenter prepares the content and asks moderator to review. Editors and illustrators enhance content.	6 weeks before webinar
Online test	Online test run to introduction the presenter to the software	1 month before webinar
Final training and test run with content	Ensure that the presenter and moderator are able to use the system and that the content is working	1 day before webinar
Live rehearsal	Final run through the content and timing, including interaction with the chat moderator	2 hours before webinar
Live delivery	Deliver the education, evaluate it, and make the recording available afterwards	Event date and after

A technical expert supports all preparation and training and ensures the highest quality is achieved in all steps. The decisions on software and facility selection should be based on optimizing the educational experience for the available budgets and resources. One of the most common reported reasons for participant dissatisfaction is poor connection for audio or images, therefore, it is imperative that the delivery computers do not contribute to any potential access barriers.

Phase 3. Content preparation

One of the most important tasks for the presenter (faculty) is to define the learning objectives to be achieved (knowledge and attitudes mostly) and the take-homes messages. In our competency-based curricula, webinars are a form of educational event that are offered to address gaps related to our defined competencies. Clear learning objectives that are related to the competencies should be defined for each webinar (usually 3–5 for a 1-h event), with the following focus recommended:

- Knowledge (declarative and procedural): gaps can be addressed in a webinar
  - participants can be assessed through onscreen questions during the event or by pre and post event questions online
- Skills: limited to the knows how level in a webinar (video clips may enhance and a webcast with live broadcast cameras can be considered)
  - participants are usually not assessed during the event
- Attitudes (behaviors): webinars can create awareness and key points can be made in response to online questions from participants
  - participants could be assessed by comparison to peers on polling questions

The presenter prepares the content in an official template with the following general structure:

- Introduction of the faculty
- Description of the topic
- Conflict of interest declaration
- Learning objectives
- Main presentation with optional polling question slides (can be either content related questions to evaluate knowledge of the participants or to gather opinions)
- Question and answer session
- Take-home messages
- Optional links to online references regarding the topic

The main presentation should take around 30 min and should not have too many slides. All material must have copyright permission and patient consent and all clinical images must be anonymized. Simple animations and videos can be integrated. An editor and illustrator will review the content and enhance the quality.

To advertise the webinar, the presenter also provides a text description about the content (2 or 3 sentences) and an X-ray or picture of the pathology or treatment. The event should be advertised in as many ways as possible to any potential learners who use online education (through newsletters, website, email blasts, social media, faculty networks, etc.).

Phase 4. Faculty preparation

The two faculty roles for webinars are:

The Presenter (faculty member) is a recognized expert on the defined topic. The Presenter prepares and presents the lecture. The presenter also supports the Project Manager in the preparation of the announcement and registration process for the webinar by providing information (text and images) and learning objectives.

The Chat Moderator is an expert on the defined topic and moderates the interactive discussion. The Presenter and Chat Moderator agree before the webinar on the timing for asking questions (during the presentation, after the presentation, or a mixture of both).

Preparation and planning follow a set of tasks according to a timeline for preparation, communication, and delivery (Table 2). Webinar presentations require some specific adaptations to the content and a change in the skills and mindset of the presenter. The following 10 tips have been developed to help presenters make the most of the event (Table 3).

Phase 5. Live delivery

The presenter sits at the main screen with a web camera and the main presentation (slides, etc.). The moderator sits at a monitoring station where they can type responses and

Table 3. Ten tips for webinar presenters.

1. Prepare your material early Use the guidance, templates, and support teams to optimize your content and to prepare all the material to meet all timelines	6. Involve the audience Include 3–5 polling questions in your presentation to ensure interactivity. And remember to comment on the results
2. Ensure your slides are easy to read Many webinar viewers use small devices or have poor internet connection. Divide text over multiple slides and use large fonts	7. Rehearse your presentation Rehearse your presentation and timing including introducing yourself and the moderator and the schedule and objectives
3. Use multimedia content A good video or animation is worth a thousand words. If you have multimedia content that fits your presentation, is not too long, and of good quality, it can be highly valuable to emphasize the learning objectives	8. Speak slowly and clearly It is important to speak slowly and clearly. Participants from all around the world will join your webinar, including non-native English speakers as well as viewers with bad internet connection or noisy surroundings
4. Include only horizontal videos Many presenters want to include videos they made themselves with their mobile device. Note that horizontally recorded video usually fits better in slide presentations	9. Adapt your mindset A webinar is not a lecture. You have no audience present, therefore, cannot judge how well your webinar is going
5. Enrich your webinar with cases Add cases to help transform the theory into practice and make the content more tangible for the viewers. Include a case to introduce the topic and add questions to encourage participants to interact	10. Form a team with your moderator Make use of the knowledge of the chat moderator to enrich the event and provide an exciting and instructive discussion. Involve them in the preparation of the presentation

can also have their web camera switched on. The technical support member of the team sits between the presenter and moderator and supports the overall event and the two faculties. Remote access by the presenter and moderator is possible if the computer connection speeds and the delivery environment have been tested in advance and deemed adequate regarding quality of connection, and audio and visual transmission.

One day before the webinar, the presentation is set up and main presenter is trained to use the software. A first rehearsal is held to check the functionality of the presentation slides, the length and timing of the presentation, and to identify any potential missing details or problems in handling the software.

On the morning of the live event, a second rehearsal is held with the main presenter and the chat moderator to finally test all adapted system configurations and changes to the presentation. Our live webinars are typically broadcast at 13:00 or 14:00 Central European Time to enable participants to attend from most time zones worldwide.

Each webinar is 1 h in duration and the agenda usually has a half hour for presentations and cases and the other half hour for interaction through questions, discussion, etc. The moderator monitors and manages the submitted questions on a computer in the broadcast room. Based on his/her experience and knowledge of the topic, the moderator picks the most relevant questions, and introduces the questions to the presenter, or additional experts participating in the webinar. The questions may be answered during the presentation or during a "questions and answers" session at the end. Time should be allocated for the wrap up and final messages and thanks. Our faculty usually offer to stay for 15 or 30 min after each webinar to ensure all questions from participants are answered.

If delivery becomes slow or interrupted during a live broadcast, switching off the video camera may help, along with preventing additional participants from joining. Lower resolution delivery without video can be planned if the connection speed of the participants is known to be slow. If the Internet service or other factors cause a persistent problem during a live broadcast, rescheduling the event is worth considering.

Phase 6. Evaluation

Each organization must decide what information to gather and for what purpose. Generally, you should gather data that can help:

- identify ways to improve future webinars
- provide feedback to the faculty
- compare webinars to other events used to deliver the curriculum
- guide the planning committee regarding topics for the future
- monitor the audiences being reached.

It is important to develop standard questions (before the webinar to help refine the content or after the webinar for evaluation purposes) and a system and timeline to administer these in a systematic and efficient way. Resources must be provided to ensure the data are collected (this task should be included in the webinar timeline and one person should be responsible for gathering, compiling, and reporting). The faculty and committee should review and act on the findings and all data should be pooled centrally in the organization to summarize recurring suggestions and share between groups.

The following is a sample of feedback in response to "Do you have any suggestions for improvement regarding content and faculty?" from participants after a recent webinar:

- Recommend having some study material before and after to complete elective learning
- Thank you, better if there is a certificate of attendance
- There could be more cases integrated
- The lecture should be longer
- Have webinars more regularly on different topics (e.g. trauma, oncology, deformity)
- Presentation should be slower so that audience can understand all content and that will allow us to have a good discussion

These responses represent some themes that often appear in our evaluations and a formal coding of open text

responses should be conducted by each group annually. It is also critical to ask the presenters and moderators for feedback regarding the webinar experience. These comments should be shared with future faculty and with the organizing committee.

It is also worthwhile to publish a list of the highest rated webinars every year, both to show the value of the events and to acknowledge the faculty. It is also recommended to include a process to inform the faculty of webinars that are rated lower than others and to help them identify aspects to do differently next time.

During the past decade, we have presented processes and positive findings at congresses from our webinars for surgeons managing orthopedic trauma in older adults and pediatric populations, spine surgery education, and magnetic resonance imaging (Blauth et al. 2013; de Boer et al. 2013; Kraus et al. 2014; Slongo et al. 2014). AOTrauma education offered four webinars on specific topics in orthogeriatrics between 2011 and 2013 and these were attended by 550 clinicians worldwide. Following the two webinars in 2013, 80 participants completed a 10-question online evaluation. 62% of respondents rated the webinar content 4 or 5 on a 1 to 5-point scale of being "useful and relevant to daily practice," 55% reported they learned something new and planned to use it in their practice, and 76% reported being "likely" or "very likely" to make a change in their clinical practice as a result of the webinar (Blauth et al. 2013). Evaluation data from 222 of the 689 participants from 68 countries who attended 1 or more of 3 webinars on pediatrics topics showed that 63% learned something new and planned to use it in their practice (Slongo et al. 2014). A review of 745 surgeons who participated live in 11 webinars on spine surgery topics over 3 years showed 96% of responders rated the content "relevant to their current practice" and the majority reported an intention to make a change in clinical practice. We have also explored webinars for interdisciplinary education and found positive feedback to an event to help communication between surgeons and radiologists in evaluating spinal trauma with MRI (Kraus et al. 2014).

Discussion and conclusions

Our experiences over 10 years have been very positive, and we believe this is due to our expert faculty delivering relevant content supported by a team and process. We share our 10 tips for effective webinars, a document that is used in our preparation and faculty training. Some of the published findings in the articles we reviewed in the introduction are reinforced by our evaluation data and our committees frequently review progress. Research projects to identify the exact components or aspects of webinars that make them have a high impact for participants would be valuable for the future.

Recent publications reflect many of the same discussion and decisions our organization encountered over the last decade. Based on 5 years of delivering webinars, Carvalho-Silva et al. propose "Ten simple rules for delivering live distance training in bioinformatics across the globe using webinars" (Carvalho-Silva et al. 2018). Their guidance is based on a set of questions for several topics: select your webinar software, pilot the delivery, get a "host," find your audience, prepare your content, live delivery, be engaging, record the event, get feedback (and act on it), and plan future events. A recently published set of "ten simple rules for organizing a webinar series" provides similar and complementary guidance on many of the same issues (Fadlelmola et al. 2019). A recent review of 12 randomized controlled trials suggests webinars are effective for professional training as well as for higher education (Gegenfurtner and Ebner 2019).

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

Notes on contributors

Michael Cunningham (PhD), Rudolf Elmer, Thommy Rüegg, Claudia Kagelmann, and Alain Rickli are a team of curriculum development and technology-enhanced learning professionals at the AO Foundation – AO Education Institute in Switzerland, where they support surgeon taskforces and faculty in the planning, design, delivery, and evaluation of an annual calendar of webinars and webcasts.

Paul Binhammer, MSc, MD, FRCSC, is an Assistant Professor in the Division of Plastic and Reconstructive Surgery at the University of Toronto and a hand surgeon at the Sunnybrook Health Sciences Centre. He was an international faculty member and program editor on the AO Trauma Upper Extremity Education Taskforce.

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